Medico-Legal Update

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Comparative Analysis of Emergency Provisions During A Pandemic

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Abstract

The novel Corona virus is a pandemic that has affected every human being on this planet, either directly by the virus itself, or by the social and economic consequences of the same. Needless to say, this pandemic has also had an effect on the administrations of most, if not all, the nations. This research paper seeks to draw a comparative analysis between the powers of the Executive in India and the United States of America during this pandemic. As we know, India follows a Parliamentary form of governance where the Prime Minister is the Head of the Government and a system of collective leadership is followed, whereas the USA follows a Presidential form of governance where the President is the Head of the State and the principle of individual leadership is followed. A comparative analysis of the two States’ powers of the Executive will enable an enhanced comprehension by highlighting important details about pandemic related legislations like the Pandemic and All-Hazards Preparedness Act, 2006 (USA) and the Epidemic Act of India, 1897; and help making abstract ideas more concrete. In this research paper, using the doctrinal method of research, we will analyse the background of the pandemic via medical papers and WHO mandates, and further delve into the executive powers of both, India and the USA during a pandemic by analysing constitutional provisions like that of the 10th Amendment of the Constitution of the USA and the Emergency Provisions under Articles 352 to 360 of the Indian Constitution and different legislations. In conclusion, we shall see that in India, including pandemics as a valid ground to give power to the President to impose a nationwide lockdown, under the National Emergency clause in Article 352 of the Indian Constitution, shall prove to be beneficial.

Keywords: Pandemic, parliamentary governance, emergency, constitutional provisions.

Introduction

The World Health Organization defines a pandemic as “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people”. Owing to variables such as increasing economic integration, urbanisation, improvements in land utilization, and enhanced degradation of the natural world, it is proposed that the likelihood of disease outbreaks has accelerated over the previous generation. These variables are expected to further escalate and exacerbate. Identification and limiting of emerging outbreaks that might lead to pandemics need significant attention along with the expansion and sustenance of investment to build preparedness and health capacity. Pandemics have many significant impacts, including significant morbidity and mortality rises and relatively greater mortality effects on low- and middle-income countries (LMICs); economic harm incurred by short-term fiscal shocks and long-term disruptive economic growth shocks; human psychological effects, such as fear-induced job resistance and other public meetings.

Predefined contagion mitigation techniques, if not seriously influenced by the disease outbreak, can also cause huge economic and social disruption. Nations with weakened structures and trends of political uncertainty may, during infectious diseases, face heightened diplomatic tension and anxiety. Pandemic response initiatives have caused incidents of aggression and conflict between regimes and their residents in some circumstances. December 2019 marked the beginning of a novel virus called SARS-CoV-2 or the Corona...
Virus. Phylogenetic research shows that SARS-CoV-2 originated in mammals, presumably bats, and was transferred to other species at a wet market in Wuhan City before crossing into humans. There is some suggestion that pangolin, a form of nocturnal anteater smuggled illegally for its meat, may have been the intermediate vector. This species bears a Corona virus strain that is somewhat similar to SARS-CoV-2, but varies in a key area that specifies the extent of viral infectivity and host. Therefore, it is likely that the virus progressed into humans and then mutated to develop the features that helped it spread so rapidly, via evolution when it affected more people. It resulted in the outbreak of a respiratory illness called COVID-19. Especially worried by the disturbing degree and magnitude of the occurrence and the disturbing degree of neglect, the World Health Organisation proclaimed COVID-19 a disease outbreak on 11 March 2020.2

In order to stop the further spread of COVID-19, locating and testing all suspected cases is required in order to confirm cases in an effective manner to further isolate and it is also important to ensure adequate treatment and to quickly classify the latest or similar connections of all such reported cases so which they could be sequestered and recorded by healthcare experts for the 14-day implantation duration of the infection. Among various methods to contain pandemics, quarantine remains the most common one. Quarantine can be understood as a state or a place of isolation for a being that may have come in contact with a contagious disease(s). This entails travel limitation and, finally, isolation from the majority of the community. The constitutional power for the imposition of lockdown in several nations is in the hands of the governmental machinery.

In the case of the novel Corona virus, it was determined that if enough people participate in quarantine and social distancing, the number of COVID-19 cases would probably remain at a manageable level for the health services. Medical professionals termed this as “flattening the curve,” because it would maintain the number of COVID-19 cases below the maximum capacity of medical providers throughout the duration of the outbreak. For this very reason of “flattening the curve”, quarantine is a necessary measure during a pandemic like the aforementioned COVID-19.3

Findings

Emergency powers during a pandemic in the USA.

There are several provisions enshrined in the American Constitution and many other acts that help in the smooth execution and governance in the country during a pandemic. This chapter seeks to study the role and power of the President and Executive during such a non-military emergency in the USA. The total number of National Emergencies in effect by President Donald J. Trump is eight.4

Section 201 (a) of the National Emergency Act of 1976, lays down powers and authorizes the President to declare such emergencies at the time of an extraordinary emergency. The act lays down imposition on the procedural powers of the President during emergency. The powers of the executive remain till the pandemic persists after it is proclaimed and issued. The Legislature can even annul a proclamation by passing a resolution by a simple voting majority of both the houses.5

Various other acts like the Pandemic and All-Hazards Preparedness Act, 2006 (PAHPA), after being amended from Public Health Service, (PHS) exist to facilitate such health emergencies. It has diversified the ambit of the act from before. The PHS had laid down the foundation for Health and Human Services (HHS) to legally declare an emergency if, there exists knowledge about a hazardous infectious disease which risks the health of the entire public by the virtue of section 319 of PHS. PAHPA, on the other hand emphasizes on improving the public health by increasing various funding programs and reauthorizing them to make the nation ready for any biological attack or a pandemic. The purpose of the Pandemic and All-Hazards Preparedness Act is “to improve the Nation’s public health and medical preparedness and response capabilities for emergencies, whether deliberate, accidental, or natural.”6

Major Program Areas of the Pandemic and All-Hazards Preparedness Act, 2006, include:

- Medicinal Expert Jurisdiction for research &
development activities (BARDA) and Surgical detection systems;

- Emergency Service Feature (ESF) # 8: Local programmes: health research and emergency management;
- Emergency assistance Feature (ESF) # 8: Emergency Responses and Public Health: Global systems;
  - Subsidies;
  - People at risk;
  - Nationwide plan for health protection (NHSS);
  - Spacial awareness: monitoring, telehealth and accreditation; and
  - Instruction and schooling

They are subject to broad state legislation in the USA, as they often consider a distinct residual force in the states, referred to as “crime force.” Particularly industrial activity should be governed for the purposes of health, education, and morality. Alongside the clear economic authority of Congress, this power exists and generally yields not to the statutory grant itself, but only to the legitimate, contradictory exercise of the federal power.8

Emergency orders at the federal level, such as the HHS public health emergency declaration under Section 319 of the Public Health Service Act, will encourage and foster medical and public health responses by approving appropriate emergency measures, providing funds to assist intervention or recovery operations, or even waiving fines for failure to comply with appropriate federal laws and regulations during a disaster. Essential federal assets such as the National Disaster Medical System (NDMS) and federal medical stations could also be provided by the federal government to facilitate CSC (Critical standards of Care) responses at the state, provincial, and local levels. States play a vital role in accepting requests from within the community for federal resources; analysing their demands, demanding, obtaining, and allocating these federal resources; and deciding the need for and demanding federal announcements and exceptions. Such practises may also take place in compliance with specific lines of control, in compliance with such state emergency orders, often under the leadership of the Governor or state health department; pre-established federal guidelines and standards may also apply.7

**Emergency powers during a pandemic in India**

One of the main Central laws in India, to prevent diseases like that of Covid-19, includes the Epidemic Diseases Act, 1897. The aim of this Act is to ensure effective protection of the transmission of hazardous contagious disorders. The purpose of this Act is to guarantee that the spread of dangerous communicable disorders is avoided effectively. This Act allows state and local governments and the state authority to take appropriate or needed measures in order to prevent the continued dissemination of such disorders.9

If any of the state governments is satisfied that any part of its territory is threatened with an outbreak of a dangerous illness, it may adopt all appropriate measures, including quarantine, to prevent the outbreak of the said disease. Similarly, if the central government is satisfied that an outbreak of an contagious disease is imminent and that the current provisions of the legislation are insufficient at that time to avert such an outbreak, it must take action and approve regulations authorising the inspection of any ship or vessel leaving or arriving at any port and the detention of any person arriving at any port. Under section 188 of the Indian Penal Code, 1860, any person found to disobey the regulation issued under the Epidemic Diseases Act, 1897 may be charged with the crime. The defendant is liable, on conviction, to a term of simple imprisonment for one month, a fine, or both, in breach of the clause of the 1897 Act. Notwithstanding everything found in the CrPC, such an offence can be summarily punished at the discretion of the trial magistrate.10

Further, for the people that would enter India from foreign land, a health officer is appointed and posted at the port of entry, by the Central government. Only after there is full satisfaction that a ship or aircraft is in full compliance with the health regulations, does the health officer grant pratique, or ‘permission to ships to
have dealings with a particular port, given either after quarantine or on the showing of a clean sheet of health to the vessel or aircraft for landing’. The designated health inspector, which request the airplane, travel medical record consisting of all of the other communities affected by the airplane to be viewed. He should also examine the plane, its occupants, and its personnel, upon his order, and have them undergo physical examinations following delivery. With respect to exchangeable viruses involving a time of containment, such as the Corona Virus, the department shall follow strict measures. In the event that any individual on an airplane is needed to be departed and hospitalised for a duration of time under certain regulations, the officer can transfer him to a facility or go to another unknown place and retain him in confinement. It may restrict the embarkation of any aeroplane of any individual showing illnesses of any quarantined disease when brought to the notice of the health officer. In addition, laws mandate airline workers to record all reported cases that might exhibit severity of the disease requiring isolation, from data gathered.11

The Epidemic Diseases Act, 1897, grants the states wide-ranging authority when it comes to state legislation to allow the effective handling of a health problem after the outbreak of an illness. If a state government is concerned that it is or any part of it is endangered by the outbreak of a serious disease and that the ordinary provisions of the law in place at the time are inadequate to resolve the outbreak, it may allow any person to take certain measures and recommend temporary regulations to be followed by the resident; the State Government can also take steps and recommend regulations for the surveillance, vaccination and inoculation of persons travelling by road or train, including their isolation in a hospital, given that such persons are suspected of having been contaminated with some such disease by the inspecting health officer, or that any of these powers have been assigned to the Deputy Commissioner in their respective separate competences.12

A state government can also authorise its Deputy Commissioner, by notification in the gazette, to practice all the authority provided in his division under Section 2 of the 1897 Act, which are subject to review by the individual states in their states. Several of these rights are set down in Municipal Corporation Acts that regulate “major urban regions,” or Public Health Acts that often offer lockdown or other rights to local commissions or collectors.

**Discussion**

**Comparative analysis of the emergency powers during a pandemic in the USA and India:**

We saw that both the countries are equipped with several Constitutional provisions, legislations and powers to declare an Emergency during a pandemic. Though, the impact of the ongoing Covid-19 pandemic has not been the same on the aforementioned countries. The USA was among the initial few nations to report a case of the COVID-19 virus, since the Wuhan Corona virus outbreak in China in December of 2019 and a public medical crisis was declared on the 21st of January 2020. In India, the first instance of the virus was reported on the 30th of January 2020 in Kerala, of an individual who had travel history from the most affected region in China, Wuhan. This was followed by the Indian Prime Minister, Narendra Modi ordering a nationwide lockdown for 21 days on 24 March 2020, starting from 25 March 2020. Currently there are 6.54M cases of the virus in the USA and 4.85M cases of the virus in India.13

**A) Difference in powers**

The United States of America: Article 2 of the American Constitution essentially lays down that the President of the USA can judge extraordinary occasions and ask both the Houses or either one of them to convene for further discussions and shall recommend his considerations. Further, The National Emergency Act of 1976 lays down imposition on the procedural powers of the President during an emergency. Section 201 (a) of the act authorizes the President to declare such emergencies at the time of an extraordinary emergency. There is a pre-assumption that the President’s ‘power to regulate’ includes whatever power is needed to manage emergencies. There is also a legislation in place to deal with health pandemics like the one we currently face, called the Pandemic and All-Hazards Preparedness Act (PAHPA), Public Law No. 109-417.14
India: Unlike the USA, the Indian Constitution does not enable the President to declare a National emergency solely on the basis of “whatever is needed to deal with emergencies” and instead, Article 352 of the Indian Constitution specifies that for the proclamation of a National Emergency, the President must be satisfied that a grave emergency exists where the security of India threatened by the following:

- War
- External aggression
- Armed rebellion

Here, we see that an epidemic or medical emergency is not listed as a criterion for the proclamation of a National Emergency and as the legal maxim, ‘expressio unius est exclusio alterius’ (the explicit mention of one thing is the exclusion of another) lays down, the exclusion of an epidemic from Art. 352 of the Indian Constitution makes it evident that in the current case of the pandemic of Covid-19, the President does not have the power to declare a National Emergency.15

B) Difference in methods of quarantine

The United States of America: The measures to guarantee quarantine in the USA are extreme because of the dread of increase in the rates of the infection. A few states have adopted a more mild strategy, while a few states have indicated the use of measures that can be called severe. Some of the main estimates declared as a part of the lockdown in the USA incorporate the following:

- Non-essential travelling between the States and Mexico stand curbed;
- Schools will stay shut while childcare centres will keep on functioning;
- Boarding schools are to send their students home and state run libraries and museums are to stay shut;
- Businesses where customers are gathered together will be shut down totally;
- Restaurants can keep on operating if they decide to do so and as per the demand of the customers in that area;
- Federal student credits borrowers can apply for a delay on their instalments for two months with no collected interests;
- Critical clinical supplies will get defence security;
- The deadline for the American residents to file their taxes will be extended from 15th of April to 15th of July;
- All non-essential businesses and services are to remain closed;
- Pharmacies, medical centres and grocery shops will keep on serving the people;
- Airports will continue to work and trash will be picked up;
- Some states have issued ‘stay at home’ orders - the people can visit markets and participate in other essentials undertakings;
- Those who can work from home shall do the same;
- Strict measures have been taken to secure the food banks and proceed with their functioning;
- In a few states the government has permitted bars, cafes and businesses to operate.

India: Here, the quarantine measures differ in several ways from the USA. The Lockdown 1.0, as declared by PM Modi had the following features:

- Privately run public transportation companies will pause their services during the lockdown and state run public transport systems will be restricted to 25 people to take into account needs of people working in essential services;
- Businesses have been told to let their work from home;
- Non essential services have been shut;
- Essential businesses like milk supplies, gas, household goods, vegetables and bakers’ will keep on functioning;
- Educational institutions will stay shut;
- Public has been kept from social occasions that constitute of people that are in numbers more than five;
- In situations where movement is completely vital, those moving out must maintain the rules of social distancing;
- People have been encouraged to remain at their homes and abstain from leaving until absolutely necessary;
- Restaurants can serve take away meals and
shopping centres can work just the sections that sell vegetables, home goods and food supplies;

- The essential services like the postal services, the internet and others will continue to serve the public.

**Conclusion**

Law is not stagnant; instead it is ever-changing because it involves constant attention, reflection, and evolution. This evolution of law has to take place over time in response to its constantly changing environment. Since laws are never perfect, the lawmakers are to always change or modify existing laws for the benefit of the people being governed by these laws.

In the case of the handling of a pandemic like the Corona virus, we see that the United States of America and its Constitution enables its President to declare a National Emergency on the basis of a pre-assumption that the power of the President to regulate encompasses whatever power is needed to deal with emergencies. Also, we can say that the regulations of the quarantine differ from state to state on the basis of their own assessment of the severity of the situation in their respective states. This gives the USA space to administer isolation and quarantine on not just a wider basis, but a more logical and assessment based one. Without the power of the President to declare a National Emergency during such crises, the State would render nearly helpless in overcoming them. The legislations to manage specific emergencies like the Pandemic and All-Hazards Preparedness Act (PAHPA) then act as helping tool to further overcome these disastrous situations.

When it comes to India, we see that the Emergency provisions in Article 352 of the Constitution does not include a pandemic or an epidemic as a ground for the proclamation of a National Emergency, thus, disabling the President to declare a National Emergency in the case of a health crisis. India simply just has a legislation, the Epidemic Diseases Act of 1897, for the management of medical crises like a pandemic. This entire paper makes the need to include a ‘pandemic’ as a valid ground for the proclamation of a National Emergency under Article 352 of the Indian Constitution, extremely evident. Adding to that, looking at the provisions of the USA, we also see the need to let states have some autonomy to vary quarantine orders as per their specific needs. This will act as a blanket provision that will enable the President to be able to declare a National Emergency in situations other than just war, foreign aggression and armed rebellions. Also, letting the states have some degree of autonomy in varying the quarantine regulations within them, in accordance to their own specific situations and needs will provide for a more practical approach to handle such epidemic diseases.

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**Conflict of Interest:** The author declares no conflict of interest, financial or otherwise.

**Ethical Clearance:** None

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Expressed Attitude of Mental Health Professionals Towards Children with Autism Spectrum Disorder

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Abstract

Background: The expressed attitude is a psychological component that represents a mental and emotional entity that inherent or characterizes a person. The positive and negative attitude that we express represents who we are and how we are connected to ourselves and society. An attitude is usually formed based on the individual’s past and present events in life. Also, social environment and lifestyle play a role in attitude formation. Studies indicate that mental health professionals hold mixed attitude such as positive and negative towards mental illness hence this study was carried out to find out the expressed attitude of mental health professionals towards children with autism spectrum disorder.

Method: Attitude Questionnaire by (Sethi et al., 1982) was modified for the study and the responses were collected from 21 mental health professionals (5 psychologists, 5 psychiatric nurses, 4 psychiatrists, 4 psychiatric social workers, 3 special educators). The collected data was computed with descriptive statistics, t-test and ANOVA by using SPSS version 20.

Result: The outcome of the study indicate, the significant difference between the positive and negative attitude of mental health professionals towards children with autism spectrum disorder and also it provides the supporting data on positive emotionality of mental health professionals towards children with an autism spectrum disorder.

Keywords: Attitude, Autism, Emotion, Mental health professionals

Introduction

The concept “attitude” has a range of meaning in psychological and social science research. Attitude has been identified as relatively continuing beliefs, feelings and behavioural tendencies towards socially significant objects, groups, events or symbols. ¹ Studies indicate that an attitude is a form of social behaviour which has been experimentally studied in the laboratory and
also in a social situation. It is believed that attitudes are the precursor to changes in behaviour.\(^2\) It is generally acknowledged that attitude is a hypothetical construct with a verbal and non-verbal form of response.\(^3\) It was studied that when comparing to the general population mental health professionals show a higher positive attitude towards an individual with mental illness especially in the case of Autism Spectrum Disorder (ASD).\(^4\)\(^-\)\(^5\) It is due to the reason that mental health professionals play a major role in identifying the most common presenting problems in children with ASD and reporting them. The therapeutic techniques that are used by the therapists have much valued in the evidence-based practices for children with ASD.\(^6\) Although, the empirical evidence in regards to the emotional expressiveness is limited in the individual with ASD, they exhibit negative and positive emotion intensely.\(^7\) The caregiver’s role is very crucial in the development of children’s social and personal identity. Caregivers can do effective parenting only when their emotional well-being is cared for; similarly mental health professionals exhibit care and affection towards the individual with ASD only when their emotional state is regulated more positively.\(^8\)

Mental health professionals are health care providers who work in the inpatient facilities in general hospitals and psychiatric specialisation and outpatients care in the community set up, schools and private practices. They predominantly provide physical, mental health and social services to improve the individual’s wellbeing. In the clinical and psychological treatment of the individual with ASD professionals like Psychiatrist, Clinical and Rehabilitation Psychologist, Psychologist, Psychiatric Social Worker, Physiotherapist, Occupational Therapist, Speech and Language Pathologist, Special Educator are significantly contributed to the positive therapeutic outcome.

**Objectives**

1. To find the positive and negative attitude of mental health professionals towards children with autism spectrum disorder
2. To find the possible reasons for the expressed attitude of mental health professionals towards children with autism spectrum disorder

**Research Hypothesis:**

1. There will be no significant difference between positive and negative attitude of mental health professionals towards children with autism spectrum disorder
2. There will be no significant difference within the expressed attitude on hostility, dissatisfaction, warmth, emotional overinvolvement among mental health professionals towards children with autism spectrum disorder

**Research Design:** Ex-post facto research design was adopted for this study

**Materials and Methods**

**Samples**

Twenty-one mental health professionals (5 psychologists, 5 psychiatric nurses, 4 psychiatrists, 4 psychiatric social workers, 3 special educators) with a mean age of 24.05 years (SD=6.7) took part in this study. All the selected participants were closely working with the children with autism spectrum disorder.

**Questionnaire**

The participants completed the 30 item Attitude Questionnaire (Sethi et al., 1982)\(^9\), which measures the positive and negative attitude of a family member of schizophrenic patients. For the research purpose, the items in the questionnaire were not changed but the term “patient” was replaced with the term “child” and adapted for this study. The even numbers in the questionnaire were arranged to measure the positive attitude and scored as +2,+1 and 0 and odd numbers in the questionnaire to measure negative attitude, and scored as -2,-1 and 0. Scoring between +11 to +30 indicates highly and moderately positive attitude, -10 to +10 indicates a mildly positive and mildly negative attitude, +11 to +30 indicates highly and moderately negative attitude. The questionnaire also measures the five sub-dimension such as critical comments, hostility, dissatisfaction, warmth, emotional overinvolvement.

**Procedure**

The responses were collected via online form with
the consent form the participants. The purpose of the study was addressed by the researcher and anonymity, confidentiality was assured for their responses.

**Data Analysis:** The collected data was computed by descriptive statistics: Mean (M), Standard Deviation (SD); Inferential statistics: Independent sample t-test and ANOVA by using SPSS version 20.

### Results and Discussion

**Table 1:** Shows the difference between positive and negative attitude of mental health professionals (N =21)

<table>
<thead>
<tr>
<th>Expressed Attitudes</th>
<th>Mean</th>
<th>SD</th>
<th>t-Value</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Attitude</td>
<td>22.09</td>
<td>2.96</td>
<td>4.69*</td>
<td>.000</td>
</tr>
<tr>
<td>Negative Attitude</td>
<td>17.23</td>
<td>3.70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P<0.01 * t value is significant at 0.01 level

From table 1, it can be inferred that the t value 4.69 is significant at 0.01 confidence interval. Hence, hypothesis 1 is rejected and concluded as there is a significant difference between positive and negative attitude among mental health professionals towards children with ASD. People credence and perception towards mental illness such as autism set up the stage for how they interact, provide opportunities and help a person with ASD. Their expressed attitude outline how they experience and express their own emotional issues and psychological stress and whether they unveil these symptoms and look for care. From the experience of working with children having ASD, these mental health professionals broke the stigma and developed compassion over the period of time. Their helping behaviour, treatment and support might have a contribution to the reason for a positive attitude to be higher when comparing to the negative attitude.

**Table 2:** Shows the dimension wise detail of the participant responses

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Comments</td>
<td>21</td>
<td>4.00</td>
<td>9.00</td>
<td>6.62</td>
<td>1.20</td>
</tr>
<tr>
<td>Hostility</td>
<td>21</td>
<td>4.00</td>
<td>9.00</td>
<td>6.52</td>
<td>1.43</td>
</tr>
<tr>
<td>Dissatisfaction</td>
<td>21</td>
<td>3.00</td>
<td>11.00</td>
<td>6.80</td>
<td>2.16</td>
</tr>
<tr>
<td>Warmth</td>
<td>21</td>
<td>5.00</td>
<td>12.00</td>
<td>8.76</td>
<td>1.64</td>
</tr>
<tr>
<td>Emotional overinvolvement</td>
<td>21</td>
<td>6.00</td>
<td>14.00</td>
<td>10.52</td>
<td>1.96</td>
</tr>
</tbody>
</table>
Table 3: Shows the difference between the domains of the expressed attitude of mental health professionals.
(N=21)

**ANOVA**

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hostility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>7.599</td>
<td>5</td>
<td>1.520</td>
<td>.678</td>
<td>.647</td>
</tr>
<tr>
<td>Within Groups</td>
<td>33.639</td>
<td>15</td>
<td>2.243</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41.238</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dissatisfaction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>7.683</td>
<td>5</td>
<td>1.537</td>
<td>.269</td>
<td>.923</td>
</tr>
<tr>
<td>Within Groups</td>
<td>85.556</td>
<td>15</td>
<td>5.704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>93.238</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Warmth</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>12.393</td>
<td>5</td>
<td>2.479</td>
<td>.898</td>
<td>.508</td>
</tr>
<tr>
<td>Within Groups</td>
<td>41.417</td>
<td>15</td>
<td>2.761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>53.810</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Emotional overinvolvement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>24.933</td>
<td>5</td>
<td>4.987</td>
<td>1.430</td>
<td>.270</td>
</tr>
<tr>
<td>Within Groups</td>
<td>52.306</td>
<td>15</td>
<td>3.487</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>77.238</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 * F value is not significant at 0.01 level

Critical comment is a form of making severe judgment which involves analytical evaluations and critics hence that has been consider as a factor in the ANOVA computation. The hostility, dissatisfaction dimensions indicate negative attitude and warmth, emotional overinvolvement represent positive attitude and considered as dependant variables for the ANOVA.

From the table 3, it can be inferred that there is no significant difference with in the expressed attitude on hostility, dissatisfaction, warmth, emotional overinvolvement among mental health professionals towards children with ASD. Hence, hypothesis 2 is accepted. The domains of hostility and dissatisfaction are related to the negative aspect of the expressed attitude, which show lesser mean value when comparing to the positive domains of warmth and emotional overinvolvement. The questions pertaining to emotional overinvolvement in the assessment scale measures the feelings and behaviours of mental health professionals towards the children with ASD, which includes the protectiveness and self-sacrifice. It is evident that mental health professionals contribute more to the emotional development and overall wellbeing of the children with ASD.

**Result**

The expressed attitude on positive and negative
emotion was found to be significantly different among mental health professionals. There is no significant difference was found between the groups of expressed attitude on hostility, dissatisfaction, warmth, emotional overinvolvement.

**Conclusion**

The study outcome emphasizes the fact that a positive attitude is predominant among mental health professionals towards children with ASD. The warmth and emotional overinvolvement that they exhibit towards children with ASD could be the reason for their positive attitude.

**Ethical Clearance**: The study was approved by the Institutional Ethics Committee

**Conflicting of Interest**: None

**Funding**: Source of Financial support: Chettinad Academy of Research and Education, Junior Research Fellowship (CARE – JRF) Fund.

**References**

Analysis of A Conceptual Framework of John Holland’s Theory of Career Satisfaction

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Abstract

This article aims to propose the conceptual framework of John Holland’s Theory of Career Choice for faculties of university. This model achieves the requirements of a college where it covers every one of the critical variables which assist the colleges with expanding the work fulfillment through surveying the character attributes of resources and empower their maintenance after determination for a specific post. The examination is finished by considering different parts of character characteristics like extroversion, principles, receptiveness, neuroticism and a survey of the past writing pertinent to the investigation, especially nearby RIASEC as outlined character attributes to give new bits of knowledge towards incredible occupation fulfillment in resources of college. This paper proposes six measurements in particular practical, analytical, creative, social, and venturesome. It is cheerful that this structure would perceive the best character characteristic towards improving the work fulfillment among resources of colleges.

Key words: Job satisfaction, personality traits, John Holland’s Theory, Conceptual framework, conscientiousness, openness, neuroticism

Introduction

Every nation needs to have sound teachers at each level to strengthen nation’s young population but higher educational teachers are playing vital role in this direction. As per UGC annual report of year 2018-19 in India total of 1416299 university level teachers are working on varying capacity among that 819283 were reported male and rest 597016 are female teachers. In this number the major bulk 862101 are designated as assistant professors which is the entry point in university academic organizational structure. Out of total strength of teachers, in Punjab, total of 51575 university level teachers are working out of which 20871 are male and remaining 30704 are female teachers. Punjab falls at second stage among women percentage of teachers in state after Kerala. These statistics are clearly showing the importance that these university teachers job satisfaction has to take up at priority by keep in mind the future of youth in state and India.1

Personality is the most important trait of a person to define the individual as well as creating individual difference in his behaviour. Personality traits think about fundamental measurements which individuals’ contrast.2 Though there are various instruments which helps to assess the personality traits but a big five inventory is one among all widely accepted to define the individual characteristic. These five qualities are openness, conscientiousness, extroversion, agreeableness and neuroticism.3

Openness qualities known as creative mind and insightful thought, conscientiousness characteristic incorporate elevated levels of mindfulness, great motivation control, and objective coordinated behaviours, agreeableness characters are rich in trust, selflessness, graciousness, fondness, neuroticism is a characteristic portrayed by misery, crankiness, and
passionate shakiness and extraversion is described by volatility, amiability, garrulity, confidence, and high measures of passionate expressiveness.4

Job satisfaction has been characterized as “emotions or full of feeling reactions to features of the (working environment) circumstance”. Job satisfaction is likewise accepted to be dispositional in nature.5 This dispositional perspective expects that estimating individual attributes can help in the expectation of occupation satisfaction. The dispositional wellspring of Job satisfaction has been bolstered by contemplates that show solidness in Job satisfaction, both after some time and over various circumstances.6 Minnesota Satisfaction Questionnaire (MSQ, 1966) 20 items short version is one of widely utilized research tool to evaluate the job satisfaction of professionals at three levels like intrinsic, extrinsic and general category.7

The intrinsic satisfaction counted by the way how people think about the job they do, the extrinsic satisfaction counted by the way how employees feel about the job benefits, pay and other segments of their job whereas the general satisfaction is combination of these two.7

A conceptual framework is an assortment of interrelated ideas, similar to a hypothesis yet not really so very much worked-out. A hypothetical structure guides research, figuring out what things being a specialist we will quantify, and what factual connections we are search for, specifically the present study.8& 9

At the point when analyst structures a system for their investigations then the endeavour will be on distinguishing all the potential ideas and what will be connection among to keep the investigation on track. As such, we can say that hypothetical system will give a skeleton to scientists to the investigation. Job satisfaction and personality traits have been investigated by various researchers on various samples like factory workers, telecom workers, hospital employees with different approach of assessing personality traits and job satisfaction. When we talk about correlation among these two factors then one area of educations seems most appropriate to study and that is teachers.

Researcher attempted here to visualize to identify and settle the concepts of John Holland theory among carrier choice of university/college teachers. As we all realized over the period of time the level of job satisfaction of teachers not only helps to create quality student’s outcome but also enhance the level of creativity among themselves and their students. The present paper kept an objective to analysis of John Holland theory model to understand its implication for carrier satisfaction in relation with teacher’s personality characteristics.

**Material and Methods**

This paper informing an analysis report of John Holland theory model utilization for creating a job satisfaction conceptual skeleton by considering university teachers individual personality characteristics. To create this analysis report, the researcher searched in-depth about John Holland theory model and for this researcher attempted to search printed and electronic data base such as ProQuest, Embase, PsycARTICLES, EBSCO, ResearchGate, EORTC, Scopus, Educational Resources Information Centre (ERIC), and Allied Health Literature (CINHAL). The existing literatures were very systematically opted to recruit into this analysis document.

**Inclusion Criteria**

- The research paper only which directly belongs to John Holland theory model.
- The paper which is easily accessible online and full text available.
- The studies which are completed in English language.
- Articles included from the year 2000 to 2020.

**Exclusion Criteria**

- The study has no keyword as John Holland theory model.
- Poor quality journal publications.
- The research study which is published in without ISSN number journals.
The research studies which are not available on journal database.

- The research studies in which only abstract is available.
- The studies which are published in local language.

**Result and Discussion**

Researcher strongly believes that the existing Holland theory would be very ideal to explain the concept of correlation in between personality traits and job satisfaction, in which researcher explained concepts to express the impact of personality traits on job satisfaction among university teachers.

Professions are controlled by a cooperation between our character and the earth in John Holland’s Theory of Career Choice. This hypothesis fit most in light of the fact that Holland affirms that individuals of a similar personality type cooperating in work make a situation that fits and rewards their sort. Inside this hypothesis, there are six essential kinds of workplace, which connect straightforwardly to the character types. Holland underscores that individuals who decide to work in a domain like their character type are bound to be effective and fulfilled. This thought is significant as it shows Holland’s hypothesis can be adaptable, joining mix types.

Holland’s hypothesis takes a critical thinking and psychological way to deal with profession arranging. His model has been extremely compelling in profession guiding. It has been utilized through well-known evaluation apparatuses. John Holland’s Theory of Career Choice (RIASEC) keeps up that in picking a profession, individuals lean toward occupations where they can associate with other people who resemble them. They look for conditions that will let them utilize their aptitudes and capacities, and express their mentalities and qualities, while taking on charming issues and jobs. Conduct is controlled by a communication among character and condition.

The RIASEC model has been concentrated broadly corresponding to a wide assortment of develops, for example, birth request, relational conduct, capacity to profit by self-improvement medicines for sorrow, and sex-job direction.

Holland’s hypothesis is focused on the idea that the vast majority fit into one of six personality types:

1. Realistic
2. Investigative
3. Artistic
4. Social
5. Enterprising

1. Realistic: This is considered as Doers.
2. Investigative: In theory it represented as thinkers.
3. Artistic: as its word meaning clear that it known as creator.
4. Social: social personality reflects character of helping, so it known as Helper.
5. Enterprising: It is said as persuader. Enterprising occupations much of the time include beginning and completing activities.
6. Conventional: These kind of personality people are considered as organizer.

Analysis of John Holland model to reflect on correlation in between personality traits and job satisfaction:

University teacher carries mixture of different personalities at various levels to bring out expected learning outcome, hence this theory as a whole describing as follows in relation with their job satisfaction. This theoretical framework has been shown in figure-1.
1. Realistic: Higher educational teachers or university teachers are performing their job of imparting learning. Students are observing them at all point of time irrespective of their presence in within class or outside class, at formal or informal place. Teachers are observed outside classes as well. One of important skill of every teacher to create hands on training session or say practical sessions. Teachers regularly manage students learning. This all make them real Doers.

2. Investigative: Teachers is considered as an intellectually brave profession. Facing high number with different intellectual calibre students is a regular job of teacher. University teacher do reflect qualities of their cognitive skills, intelligence and problem-solving behaviour to students. These qualities make them constant thinkers.

3. Artistic: It is expected form each higher education educators to inculcate culture of creativity. Teacher not only practicing but also make their student learn about creativity, innovation and critical skills. When teachers practice such characters then it assumed based on this theory that teachers will get confidence to handle their work with much more quality and also improves their communications skills. This character establishes them as Creator.

4. Social: Teacher is a profession which always practice on the theme of equal opportunity, means teacher never discriminate among anyone. Basically, this quality empowers them to create a helping and cooperative in their all engagements. Second important part that teachers working in university do come across in connection with other stakeholders as well which includes like parents and community leaders, which will also keep them engaging in cooperation and helping. This quality often named them as Helper. This is most important character as per Holland theory which is important for teacher’s profession.

5. Enterprising: Every teacher in higher study institution shows quality to lead. College students are at
the age of 18 plus are considered as early adults and they are supposed to be managed by university teachers, and this practice developed them as a good leader. These teachers developed a habit to lead by their influential teaching and their energetic behavior. By leading the learners in all that way make them persuadable.

6. Conventional: Honest speaking parents and teachers are the only two kinds of people who teach us about ways to develop our managerial skills and organizing capacity. When it came to university level then teacher is the best person to teach the students about meticulous planning and organized activities. This character of teacher made them good administrators along with planned organizer.

There are quite a few quality studies have also reflected on the same issue such as Manikandaprabu et al (2017) distributed their examination paper impact of personality trait on job satisfaction among telecom representatives. Specialists expected to decide the connection between personality traits and job satisfaction among telecom workers. A cross-sectional investigation completed to address the examination objective. The authors have identified the John Holland theory model to express the relationship among personality traits and job satisfaction among telecom workers.10

Kamarul Zaman Bin Ahmad et al (2018) distributed their examination of Hierarchical atmosphere and job satisfaction: do workers’ characters make a difference? Study intended to give a few bits of knowledge on the transaction of hierarchical atmosphere and job satisfaction, accepting character attributes as a mediator. Creators audits the surviving writing from which it builds up a hypothetical model which is then tried exactly in the Malaysian setting, utilizing progressive relapse technique. The outcomes infer that there are directing impacts of character qualities on the connection between specific parts of authoritative atmosphere and occupation fulfillment.11

Mary Agnes et al (2017) led and distributed their exploration work of Pioneer personality traits and representative job satisfaction in the media part, Kenya. Current investigation meant to decide the impact of pioneer personality traits on worker job satisfaction. The examination utilized an illustrative exploration configuration to build up the reason impacts between pioneer character characteristics and worker job satisfaction. Way objective hypothesis and Big Five-factor model of personality traits supported the investigation. Survey was utilized to get information relating to the models develops. The examination demonstrated that pioneer extraversion; receptiveness to new encounters; enthusiastic dependability; reliability and suitability effect sly affect representative job satisfaction. The examination in this way presumed pioneers who depict extraversion; receptiveness to new encounters; passionate solidness; scruples and appropriateness improve worker job satisfaction.12

All in all, the idea of John Holland Theory is about promoting performance of faculties by enhancing their job satisfaction and advocating stakeholders’ participation in selection and retention of the faculties by recognizing the personality traits.

**Conclusion:**

Present paper intended to forecast the critical analysis of John Holland model to understand the university teacher’s career satisfaction in relation with their personality traits. The model much suits to explain this relationship among job satisfaction and their personality traits as concepts of personality traits among university teachers helps them to satisfy with their jobs. As indicated by Holland, employees are not survivors of their surroundings but rather effectively look for possibly perfect workplaces. In the event that a person’s personality and the workplace fit, at that point the individual will appreciate the work and create and develop in the job and sense of job satisfaction will appear.

**Acknowledgement:** Researcher would like to acknowledge untired support and guidance of Desh Bhagat University.

**Ethical Clearance:** Taken from Ethical Committee, Desh Bhagat University, Mandi Govindgarh, Punjab via Ref. No.: DBU/RC/421-A.

**Source of Funding:** Self-funded project
Conflict of Interest: Nil

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8. Kent KN. The relationships between personality traits, vocational interest themes, and college major satisfaction. 2008;1 electronic text (81 p.)
Pattern of Fatal IntraAbdominal Injuries in Autopsy Cases- A 3 Year Retrospective Study

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Abstract

Introduction- Abdominal trauma is an injury to abdomen and is a common presentation in the emergency room if it is caused by blunt force. According to WHO, in few years trauma will become the first or second leading cause of loss of productive years of life for both developed and developing countries. The most common cause of blunt abdominal trauma are road traffic accidents, fall from height, assaults, industrial accidents, etc.

Objective- To study the pattern and prevalence of abdominal injuries in relation to the various epidemiological factors.

Materials and Methods- This retrospective study was conducted over a period of 3 years from January 2016 to December 2018. The total number of cases studied were 120 showing abdominal injuries. This study on medicolegal autopsies was carried out at mortuary of Jawaharlal Nehru Medical College, Belagavi, Karnataka.

Results- A total of 120 cases were included in this study who presented with blunt abdominal trauma. In our study males (83 cases) outnumbered females (37 cases) and majority of the cases were in age group of 21-30 years (38.3%). Most of the cases were from rural background (57.5%). Road traffic accidents (75.8%) were the most common reason behind the abdominal trauma. The most common cause of death was shock and haemorrhage (69.2%). Liver was involved in majority of the victims followed by spleen.

Keywords- Abdominal injuries, Blunt trauma, Road Traffic Accidents

Introduction

Abdominal trauma is an injury to abdomen and is a common presentation in the emergency room if it is caused by blunt force. The incidences of blunt abdominal trauma are increasing day by day due to the modern industrial era alongwith the development of automobiles. The trauma to abdomen usually occurs due to Road Traffic accidents, fall from height, assaults, industrial accidents, etc. Road Traffic Accident (RTA) is one among the top 5 causes of morbidity and mortality in South East Asian countries.1 The fatality rate in road traffic accident in India is one of the highest in the world and reported to be 20 times more than that reported in developed countries.2 The abdominal cavity contains the vital organs like liver, kidneys, spleen, stomach, small intestine, large intestine, etc and trauma to this region challenges the integrity as well as the viability of an individual. These injuries deserve more detailed thought process as many of these lesions are not immediately fatal and present difficult clinical problems for the surgeon to solve. The solid organs such as liver and spleen are more
readily lacerated by blows as compared to hollow organs like stomach, intestine, etc. The most important reason for the increase in mortality and morbidity in such cases is either the delay in early diagnosis or misdiagnosis. The extent of blunt abdominal trauma is increasing at an alarming rate as increasing population is relying more on motor vehicles for the transportation. This study was conducted to study the pattern and frequency of intra abdominal injuries seen in autopsy cases with the blunt abdominal trauma.

**Materials and Methods**

This retrospective study was conducted over a period of 3 years from January 2016 to December 2018. The total number of cases studied were 120 showing abdominal injuries. This study on medicolegal autopsies was carried out at mortuary of Jawaharlal Nehru Medical College, Belagavi, Karnataka. The study included data regarding age, gender, cause of accident, type of victim in road traffic accident, cause of death and incidence of visceral injuries of abdomen. All observations were recorded in specially designed proforma for study. Data was collected and then analyzed to determine the results. Statistical analysis was done by using SPSS software version 25 and the results were calculated in percentages.

**Results**

A total of 120 cases were included in this study who presented with blunt abdominal trauma. Since there is minimal bony protection for underlying organs, the abdomen is more vulnerable to fatal injuries. In our study males (83 cases) outnumbered females (37 cases) and majority of the cases were in age group of 21-30 years (38.3%) followed by 31-40 years (15.8%) as depicted in Table 1.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Males</th>
<th>Females</th>
<th>Total no. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>11-20</td>
<td>7</td>
<td>4</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>21-30</td>
<td>34</td>
<td>12</td>
<td>46</td>
<td>38.3</td>
</tr>
<tr>
<td>31-40</td>
<td>11</td>
<td>8</td>
<td>19</td>
<td>15.8</td>
</tr>
<tr>
<td>41-50</td>
<td>12</td>
<td>6</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>51-60</td>
<td>13</td>
<td>4</td>
<td>17</td>
<td>14.2</td>
</tr>
<tr>
<td>61-70</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>&gt;70</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>37</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>69</td>
<td>57.5</td>
</tr>
<tr>
<td>Urban</td>
<td>51</td>
<td>42.5</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1- Distribution of cases according to age and sex

Table 2- Distribution of cases according to Place of Residence
As depicted by Table 2, the majority of cases were from rural background (69 cases, 57.5%) as compared to urban background (51 cases, 42.5%).

<table>
<thead>
<tr>
<th>Type of Accident</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Traffic Accidents</td>
<td>91</td>
<td>75.8</td>
</tr>
<tr>
<td>Fall from Height</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Direct Impact of Blunt Object</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

According to Table 3, the most common reason behind the abdominal trauma was road traffic accidents (91 cases, 75.8%) followed by fall from height (18 cases, 15%). 6 cases (5%) were due to direct impact of blunt object over the abdomen.

<table>
<thead>
<tr>
<th>Type of Victims in RTA</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike Rider</td>
<td>35</td>
<td>38.5</td>
</tr>
<tr>
<td>Pillion Rider</td>
<td>29</td>
<td>31.8</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>12</td>
<td>13.2</td>
</tr>
<tr>
<td>Four wheeler</td>
<td>11</td>
<td>12.1</td>
</tr>
<tr>
<td>Cyclist</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>100</td>
</tr>
</tbody>
</table>

As depicted in Table 4, the majority of the victims in Road Traffic Accidents were bike riders (35 cases, 38.5%) followed by 29 cases of pillion riders (31.8%) and 12 cases of pedestrian (13.2%). 11 cases (12.1%) were occupant of four wheeler while 4 victims (4.4%) were cyclist.

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Number of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock and Haemorrhage</td>
<td>83</td>
<td>69.2</td>
</tr>
<tr>
<td>Septicaemia</td>
<td>37</td>
<td>30.8</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Shock and haemorrhage was the most common cause of death seen in 83 cases (69.2%) as compared to 37 cases of septicaemia (30.8%) as depicted in Table 5.
Table 6: Distribution of cases according to incidence of visceral injuries of abdomen

<table>
<thead>
<tr>
<th>Visceral Injuries</th>
<th>Number of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liver</td>
<td>21</td>
<td>17.5</td>
</tr>
<tr>
<td>Spleen</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Kidney</td>
<td>15</td>
<td>12.5</td>
</tr>
<tr>
<td>Small Intestine</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td>Stomach</td>
<td>5</td>
<td>4.2</td>
</tr>
<tr>
<td>Liver, Kidney</td>
<td>15</td>
<td>12.5</td>
</tr>
<tr>
<td>Liver, Spleen, Kidney</td>
<td>13</td>
<td>10.8</td>
</tr>
<tr>
<td>Liver, Spleen, Small Intestine</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Spleen, Kidney</td>
<td>11</td>
<td>9.2</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

As depicted in Table 6, Liver was involved in majority of the victims (61 cases) followed by spleen (54 cases). Kidney was involved in 54 cases as compared to 22 cases of small intestine. 5 cases of stomach injury were also reported.

Discussion

In our study, males (69.2%) predominated females (30.8%) which is similar to the studies conducted by Khajuria et al.\textsuperscript{3} This could be due to the risk taking behavior of males and indulging in outdoor activities as they are the earning members of the family. This study has found that majority of the victims were in the age group 21-30 years (38.3%) followed by 31-40 years (15.8%) because of the fact that persons in this age groups have tendency to take unnecessary risk thereby subjecting themselves to danger of accidents and injuries. This observation is consistent with the studies conducted by Suresh et al.\textsuperscript{4}

Most of the cases were from rural background (69 cases, 57.5%) as compared to urban background (51 cases, 42.5%) which is similar to the study conducted by Reddy et al.\textsuperscript{5} This could be due to the reason of ignorance of road safety rules and traffic sense. In this study, the most common cause of abdominal trauma was road traffic accidents (91 cases, 75.8%) followed by fall from height (18 cases, 15%) which is consistent with the studies conducted by Panchal et al.\textsuperscript{6} Among road traffic accidents, bike riders (38.5%) constituted maximum number of cases followed by pillion riders (31.8%). These results are similar to the studies conducted by Gupta et al\textsuperscript{7} and Norton et al.\textsuperscript{8}

The most common cause of death in our study was shock and haemorrhage (69.2%) which is similar to the studies conducted by Ravindra et al.\textsuperscript{9} Liver was involved in majority of the victims (61 cases) followed by spleen (54 cases). Kidney was involved in 54 cases as compared to 22 cases of small intestine. This observation is consistent with the studies conducted by Bakkannavar et al\textsuperscript{10} and Maurice et al.\textsuperscript{11} Among solid organs, liver was most affected as it is more anteriorly placed and hence more susceptible to injury by blunt trauma.

Conclusion

In our study abdominal trauma is a major cause of mortality among young adult males of age group 21-30 years. Most of the cases were from rural background. Road Traffic Accidents were the most common cause of injuries followed by fall from height. Liver was involved in majority of the victims followed by spleen. The main cause of death was haemorrhagic shock due to multiple
injuries. A thorough examination should be done in all road traffic accident cases as many of them show fatal visceral organ damage without external injury. In order to help the authorities to plan better availability of health care on road, the offending agent in Road Traffic Accident should be identified. Awareness of road safety measures, proper attention towards accurate diagnosis and prompt treatment of the accident victim is the need of hour to bring down the mortality as well as the morbidity.

**Ethical Clearance**- Taken from Institutional Ethical Committee

**Conflict of Interest**- None

**Source of Funding**- Self

**References**


Feedback about Foundation Course among Medical Students - A Cross Sectional Study

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Abstract

Background: Medical institutions throughout the world implement foundation course at the initial phase among Phase IMBBS, to overcome the diverse challenges faced by the students and to improve their academics. Indian students preferably get enrolled into the medical profession at the age of 17-19 years with dissimilar psychological characteristics, diverse expectations from family and society.

Aim and Objective: This study was aimed to evaluate the effectiveness and impact of the foundation course among Phase IMBBS.

Materials and Methods: This cross-sectional study was conducted among 150 phase I MBBS students, inclusive of males and females, within the age group of 17-19 year. Their responses were statistically analyzed through Microsoft excel.

Results: 150 students participated in this study and about 82% of Phase I MBBS students showed positive responses regarding the various sessions of foundation course.

Conclusion: Foundation course for Phase I MBBS students is found to be useful for initiation and smooth transition into medical field and justifies the mandatory suggestion done by the Medical Council of India, as it reduces the factors which create stress and improves the academic performance.

Keywords: Medical Council of India, Foundation course, Phase IMBBS, Stress and academics.

Introduction

The newly implemented curriculum by the Medical Council of India (MCI) has a foundation course for a duration of one month for Phase I MBBS students, to overcome the stress and challenges, with a view to prepare them from high school to Medical Institution. Students face diverse forms of stress from family and society to perform well in academics, before they even have an idea about life in a Medical Institution. Alternative factors like language and communication skills, peer and parental pressures, homesickness, and panic about ragging are factors that may psychologically disturb the students.[1] The foundation course has been implemented for helping the students to overcome the aforementioned factors and also to perform effectively in academics and in their career.[2] The Medical Education Unit (MEU) with the help of other disciplines of every Medical Institution conducts a one-month foundation course to orient the Phase I MBBS students, to gain knowledge regarding National health scenarios, medical ethics, attitudes, health economics, communication skills, basic life support, demographics, biohazard safety, sports and extracurricular activites, environmental issues and community orientation. This foundation also provides an overview of the preclinical and clinical subjects. Every Medical Institution must train the phase I MBBS students in diverse aspects

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like professionalism, learning methodology, computer-aided skills before they start their career in the medical profession.\cite{3, 4} The students also need adequate training in interpersonal relationship with peers and faculties, which will help them to maintain a positive team working culture, throughout their student life. The present study aimed to analyze the effectiveness and impact of the foundation course among Phase I MBBS.

**Materials and Methods**

This cross-sectional study was conducted in the Department of Anatomy after obtaining proper Institutional Ethical Clearance (IEC), from the Saveetha Institution of Medical and Technical Sciences. Around 150 phase I MBBS students participated in the study. A self-designed pre-validated questionnaire was prepared in Google form which fulfills the criteria of the study and was shared with the students. The students voluntarily participated in the study and their responses were confidentially maintained.

**Results**

The results presented in Table 1 showed that, the participants were able to gain and update their knowledge in medical course using foundation course. Majority of the participants stated that they gained knowledge in topics covered in most of the sessions which was unexplored by them previously. Similarly the participants were able to change their perception and upgrade themselves in sessions such as stress and time management, communication skills and library usage. Further, participants appreciated the sessions explaining Basic life support, faculty interaction, overview of medical curriculum and skill development. Majority of the participants positively correlated the knowledge gained with various sessions of foundation course. 89% of the participants were satisfactory about the introduction to departments and faculties and 82% of the participants were able to orient better with the help of foundation course.

---

**Figure 1:** Shows the positive responses of various sessions of foundation course

![Feedback about various sessions of foundation course](image_url)
### Table 1: Shows the feedback of assorted sessions of the foundation course

<table>
<thead>
<tr>
<th>Feedback</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness of orientation program</td>
<td>72%</td>
<td>10%</td>
<td>9%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>Effectiveness of skill module</td>
<td>52%</td>
<td>24%</td>
<td>13%</td>
<td>8%</td>
<td>3%</td>
</tr>
<tr>
<td>Effectiveness of community based program</td>
<td>66%</td>
<td>14%</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Effectiveness of introduction classes</td>
<td>66%</td>
<td>11%</td>
<td>11%</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>Overview of the Medical profession</td>
<td>63%</td>
<td>14%</td>
<td>9%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Time management</td>
<td>66%</td>
<td>17%</td>
<td>7%</td>
<td>7%</td>
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### Discussion

Medical institutions across the country implement foundation course as per MCI norms, to acclimatize students to institutional environment, sensitize them with teaching and learning programs, helping them to overcome the academic challenges as they move from high school to medical school.[5] Indian students enter medical institutions based on their performance in the National Eligibility cum Entrance Test (NEET) as per the Indian Medical Council (Amendment) Act, 2016.[6] This results in bringing together students from various states with different lifestyles, into medical institutions to study with lot of passion and dreams. The medical profession is all about improving quality and saving lives of patients, so students need to have a sound knowledge in academics and environmental changes, hence the need for a foundation course is mandatory to handle challenges. To enable our medical students to face the global competition, the Medical Council of India has revised the medical curriculum and introduced a foundation course for Phase I MBBS students and to also hone our students into a multifaceted professional.[7,8]

Through foundation course MCI intends to sensitize the new students, to the medical curriculum, institutional environment and introduce them to some of the essential aspects of medicine, such as, national health scenarios, basic life support, biohazard safety, sports and extracurricular activities, communication skills, ethics and professionalism and leadership and computer skills. In the forthcoming years, MCI can include research also as a part of the foundation course, as research improves critical thinking, analytical process and documentation among students.

According to the feedback received from students, the foundation course is necessary for all the medical undergraduate students, to reduce apprehension and other factors that affect their academic performance. The students have given positive responses regarding the foundation course and its significance. Similarly, this study also correlates with Srimathi et al, (2014) and Mishra et al, (2017). The various sessions such as national health scenarios, basic life support, biohazard safety, communication skills, stress management, time management, ethics and professionalism, leadership and computer skills were attended by the students and their responses are shown in figure 1. These results expressed the benefits of foundation course and they were appropriately correlated with similar studies conducted by Suman S et al, (2007) and Mittal R et al (2013). Based on the feedback received from the students and previous literature, foundation course is mandatory for medical students as per the guidelines of Medical Council of India.[9] Very few studies are available regarding foundation course and its significance, hence this study
was attempted to throw more light on the benefits of foundation course.

**Conclusion**

Majority of the students have rated that foundation course was useful and satisfactory. This new concept declared by the MCI has proven to be useful for the students to a large extent. This course will act as a preparatory period for Phase 1MBBS students, who envisage to acquire a wholesome knowledge in the new competency-based medical education (CBME).

**Funding:** Self-funding

**Conflicts of Interest:** Nil

**References**


High Time to Observe on Physical and Emotional Wellbeing of Elderlies: A Narrative Review

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Abstract

Ageing is a natural process with invitation of multiple challenges and limitations in terms of physical capacity, psychological to social performance of a person. It was estimated that India will be at top of the world in terms of aged population from 2030 to 2050. This review aimed to assess the overall physical and emotional well-being of elderly population. This was a narrative review, here we have gathered information in a very systematic way. The electronic data base such as ProQuest, Embase, PubMed, PsycARTICLES, EBSCO, ResearchGate, EORTC, Scopus, Educational Resources Information Centre (ERIC), and Allied Health Literature (CINHAL) were searched and article published in between from 2010 to 2020 were identified. A total 978 articles were received from these search engines and based on systematic scrutinizing process a total of 13 articles were included in the review. Reviewed studies findings suggested that elderly stayed at old age home or away from home are facing high challenged to maintain physical and emotional well-being. Then the elderly facing any medical history also found such vulnerable then compare with others. The study concluded with that there is huge need to develop some evidence based intervention which will allow the elderly to meet the minimum need to maintain physical and emotional well-being.

Key words: Elderly, physical well-being, emotional well-being, elderly well-being

Introduction

Aging is a natural process of life which always welcomed with compromised health especially physical and emotional domain of health. One of fact which cannot be neglected that aging having risen everywhere throughout the world and major contributing element is all advances in prescriptions and nursing care and this is of worry to each country to have the option to take care of its old populace.(¹)

Despite being delicate and helpless, the old could contribute monstrously to the development of the network given that they are appropriately thought about. It’s a test for each to instruct them for a sound and dynamic maturing.

In India, as indicated by Population Census 2011 there are about 104 million older people (matured 60 years or above) in India; 53 million females and 51 million males. This was mentioned that a total of 8.6% of population shared by elderly in India by year 2016 and estimated to increase in coming years. For an instance, In Punjab it estimated 10.3% of population share belongs to elderly population. In head counts total of 2866 thousands elder populations live in Punjab in which 1422 thousands are male and remaining 1444 are female elderly. Further 1958 thousands of elderly lives in rural Punjab whereas remaining 908 thousand live in urban Punjab location. Among all states and Union Territory of India, Punjab states falls at 4th numbers in terms of highest old age population share in total population after Kerala, Goa and Tamilnadu. One the reason behind this is to having very good life expectancy at birth and at age of 60 years, as per present data Punjab

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stand at third position after Kerala and Tamilnadu for highest life expectancy at birth which is 69.1 for male and 73.1 for females, whereas at the age of 60 years, for males, Punjab has the highest life expectancy is 19.3 years.(2)

In India the aged population is the second largest in the world. The proportion of elderly persons (>60 years) has increased from 4.3% in 1951 to 7.7% in 2001. With current demographic trends it is estimated to reach 21% by the year 2050.(3)

Geriatric care has attracted unprecedented attention and rightly, so as the world is witnessing the phenomenon of global ageing. The most important part of caring for the elderly is to love them and keep them active. There are many different ways to care for the elderly, whether by caring for them in the comfort of their own homes, bringing them to safe environment or moving them to a senior centre. With time and a little hard work, we can properly care for our loved one.

Since the existing literature and statistic about population share of older people among total population of India. One clear indication is drawn out from this literature is that the generation is getting older and number of old people are adding in the list, so it become very important to have enough concentration of wellbeing of this mass population category. As we understand that elderly is always considered under vulnerable population because of many limitations in terms of health. The epidemiological change has brought to the consideration of analysts, experts and strategy creators the significance to advance physical wellbeing and psychosocial prosperity among older residents, whose rate is continuously expanding around the world, even in India at bigger scope. Asset ventures are important to satisfactorily address the requirements of individuals in this life stage, yet additionally to cultivate their strengthening and dynamic commitment in wellbeing advancing practices.(4,5)

This review scheduled to understand the physical and emotional wellbeing of eldersies. In broader way, this review will enable the researcher and audience about what kind of challenges and need are facing by elderly population in view to remain their wellbeing.

Materials and Methods

The literature review was designed as a narrative study, because a broader perception of physical and emotional wellbeing of elderly is different. The articles were included from various countries. A systematic electronic search was used to identify number of studies carried out physical and emotional wellbeing of elderly. The original research papers were only included in study. The following electronic databases are searched: ProQuest, Embase, PubMed, PsycARTICLES, EBSCO, ResearchGate, EORTC, Scopus, Educational Resources Information Centre (ERIC), and Allied Health Literature (CINHAL). The existing literatures were very systematically opted to recruit into this narrative review.

Inclusion Criteria

1. The research paper only which directly belongs to physical and emotional wellbeing of elderly.
2. The paper which is easily accessible online and full text available.
3. The studies which are completed in English language.
4. Articles included from the year 2010 to 2020.

Exclusion Criteria

1. The study concern to with any chronic disease specific.
2. Poor quality journal publications.
3. The research study which is published in without ISSN number journals.
4. The research studies which are not available on journal database.
5. The research studies in which only abstract is available.
6. The studies which is published in local language.

Search Strategy

MeSH terminology used for PubMed and ERIC(“Physical and emotional wellbeing” {MeSH Terms} OR (“physical wellbeing” {All Fields} AND
Results and Discussion

A total of 978 articles were received from search engines from which 675 articles were excluded based on exclusion criteria. So total retrieved articles were 303 among all 74 duplicate articles, 68 No full text available, 58 not relevant and 51 abstracts were excluded. Final retrieved articles were 52; among them 39 full articles were excluded based on inclusion criteria. Finally, 13 articles were included in the review.

There were many researches organized in view to elderly wellbeing, where they included many dimensions of health. Based on this narrative review, the researcher opted best suited article.

Andrzej Knapik et al has published their work in line with relationship between physical fitness and health self-assessment in elderly. This was an observational study, in which physical fitness was evaluated using the senior fitness test (SFT). Self-esteem of health was assessed by the SF-36 questionnaire. A total of 123 elderlies were recruited whose age falls in between 60 to 86 years. The study findings were suggested that physical fitness and health self-assessment among elderly may be strongly determined by cultural conditions, for example, habits, lifestyle in various regions. (6)

Jharna Bag et al stated in their investigation of Assessment of subjective well-being status of elderly people in old age homes in Kolkata in relation to their perceived physical health and cognitive functioning. This was a descriptive survey in which 50 elderly aged more than 65 years were recruited. Elderly was selected by total enumeration sampling from two different old age Home in Kolkata. They were assessed using subjective well-being inventory and a self-developed checklist for perceived physical health Problems. Cognitive function was assessed by using mini mental state examination. Study result expressed that more than half (52%) of the elderly people have reported high subjective well-being status. Regression analysis showed that perceived physical health problem \( p < 0.001 \) and having Children \( p = 0.010 \) were statistically significant predictors of subjective well-being. In order to improve the quality of life of elderly people health workers should give more emphasis on psychosocial aspects of this population. Improved psychosocial aspects can increase perceived physical health hence subjective well-being. (7)

Abdonas Tamosiunas et al have shared their work of research in document as psychological well-being and mortality: longitudinal findings from Lithuanian middle-aged and older adults’ study. The study organized in between 2006-2008. Here 7115 individuals aged 45–72 years were surveyed by questionnaire. Psychological well-being was evaluated by a casp-12 questionnaire. Socio-demographic, Lifestyle, biologic factors and depressive symptoms were evaluated. Study findings stated that Psychological well-being is an important predictor of longevity, controlling well-recognized risk factors such as age, education, cardiovascular diseases, social status, marital status, lifestyle and biological factors and depressive symptoms. Positive psychological well-being should be taken into account when screening older people to prevent negative health Outcomes. (8)

Anjali Rathaur, and Sunita Mishra shared their work in line with Psychological and emotional well-being in non-institutionalized population. This study was used random sampling technique to recruit the study participants. These were 120 elderly (age group 60-85 years) in which 60 institutionalized and 60 non-institutionalized. The independent variables were gender, working status and marital status, while the dependent variables were psychological well-being emotional well-being. The research instruments were used as the scale RYFF’s (1995) scales of psychological well-being (SPWB) and use the scale Dr. Shruti Narain (1971) emotional Intelligence scale. (EIS). ANOVA test and Karl-person ‘r’ method used to check correlation. The findings revealed that is consistent Relationship between psychological and emotional well-being and health in old age. On applying person’s coefficient Correlation significant positive relationship was found between psychological and emotional in elderly people. (9)

Yuzana et al. stated in their researched work of reviewing the subjective wellbeing of elderly. This was a cross-sectional study organized at nurul saadah
institution in Terengganu, Malaysia. Questionnaires were obtained from 73 elderly aged 50 – 89 years. The questionnaire was having 28 questions. In the questionnaire, the Likert scale is a five-point scale that is used to allow the participants to express how much they; strongly agree, agree, neither agree nor disagree (or neutral), disagree, or strongly disagree with a particular statement. It communicated based on findings that a majority of the participants reported feeling isolated at their homes rather than in the institution. Emotional and social supports are of minimal significance, while spiritual support is of maximum significance to the elderly population’s wellbeing. Furthermore, elderly who maintain frequent contact with their relatives or friends are more optimistic than those who do not maintain such contact. Social networks are significantly correlated with the elderly’s wellbeing.\(^{(10)}\)

Jamila bookwala published her document on Confidant availability (in)stability and emotional well-being in older men and women. Participants in two waves of the Wisconsin longitudinal study were assessed on depressive symptoms and the availability of a family member and friend as confidant. There were 4,631 elderly were recruited in the study. Using mixed linear effects models, four groups were compared over time and across gender on depressive symptoms: those with and without a family/ friend confidant at both waves and those who lost and gained a family/friend confidant. The study revealed that those with stable availability of a family or friend confidant consistently scored the lowest on depressive symptoms; the gain of a family or friend confidant corresponded with a decrease in depressive symptoms, with a larger effect seen for the gain of a family confidant; the loss of a family confidant was associated with an increase in depressive symptoms over time; and stable availability of a family or friend confidant was more strongly linked to lower levels of depressive symptoms among women, whereas stable unavailability of a family confidant was linked to higher levels of depressive symptoms.\(^{(11)}\)

Priyanka thakur et al. stated in their investigated work on quality of life and psychological well-being among elderly living in old age homes and living with their families in selected areas of Uttarakhand. A quantitative research approach with descriptiveComparative design was used to assess the quality of life and psychological well-being among elderly living in old age homes and living with their families. There were total 164 elderly were recruited. The population consisted of old people residing in selected Old age homes and community area. The study was conducted at selected old age homes and community area of Uttarakhand. Purposive sampling technique was used to recruit the 164 subjects from the population i.e., 82 subjects from respective old age homes and 82 subjects from selected community area. Socio-demographic proforma, who QOL-BREF scale and self-developed psychological well-being scale was used to assess the QOL and psychological well-being among elderly with the help of structured interview method. The result of the study shows that overall mean score of QOL for elderly living in old age homes and those living with their families was 68.47 and 97.43 respectively. Similarly, overall mean score for psychological well-being among elderly living in old age homes and those living with their families was 45.31 and 66.86 respectively which showed that QOL and psychological well-being was good among those elderly who were living with their families as compare to old age homes inmates. On comparison of overall mean of QOL it was found that mean score for QOL with SD for elderly living in old age homes and living with families was 68.47±10.752 and 97.4±8.564 similarly on comparison of overall mean score of psychological well-being it was found that score was 45.32±6.385 and 66.87±5.86 which was found to be statistically significant at \(p<0.05\). Hence the overall findings suggest that quality of life and psychological well-being was good among elderly who were living with their families as compare to those who were living in old age homes.\(^{(12)}\)

Jinmyoung cho et al has communicated their researched work in line with the relationship between physical health and psychological well-being among oldest-old adults. There were 306 older people were identified as study participants. Structural equation modelling was performed to examine health influences on psychological well-being. Latent variables were created to reflect subjective health, as measured by self-ratings of health and objective health, as measured by physical health impairment (i.e., health problems, past And
present diseases, hospitalization) and biomarkers (i.e., haemoglobin and albumin). Psychological well-being was measured by positive and negative affect. The analysis of study expressed that there were significant direct effects of subjective health on affect and significant indirect effects of objective health through subjective health on positive affect and negative affect. Subjective health took the role of a mediator between objective health and psychological well-being. These results highlight the status and perceptions of health as a critical Indicator for well-being in extreme old age.\(^{(13)}\)

N.N. Ariati et al has communicated their work on the ergonomic elderly gym improving physical fitness and increasing the bone mass of the elderly. There were 20 elderly selected as study participants in the study. The data collections were physical fitness and bone mass. The difference in treatment effects was analysed using a paired sample t-test with \(\alpha = 0.05\) for data with normal distribution and Wilcoxon test, \(\alpha = 0.05\) for data with the abnormal distribution. Result has showed that there were differences in physical fitness improvement in period i and period ii after 8 weeks of gymnastics at 43.43\% with very bad categories being bad, the difference in the increase in whole-body bone mass was 16.76\% and leg bone mass 68.67\%. Analysis of paired sample-t-test physical fitness data and Wilcoxon test for bone mass data in period i and period ii after gymnastics for 8 weeks, found that there was a significant difference (\(p < 0.05\)). It can be concluded that ergonomic elderly gym can significantly improve physical fitness and increase the bone mass of the elderly. It is recommended that the elderly continue to exercise with a duration of 30 – 45 minutes, the frequency of three times a week to maintain the elderly’s physical fitness.\(^{(14)}\)

Pipit Festi Wiliyantarti et al shared their researched work on developing holistic care model: the physical wellbeing of elderly based on social support and characteristic. The sample’s age was more than sixty years old, living with their family and under Medokan Ayu public health centre supervision. Total 110 samples were selected to perform the study. Multi stage random sampling was performed. The research instrument was physical wellbeing including elderly autonomy, cognitive, complaining about physical and disease as well. Structural equation modelling with partial least square was used to analyse the data. The research results showed that majority of emotional support in social support variable was good (98\%). The majority of instrumental support was good (88.18\%). Social wellbeing has significant relationship with the elderly physical wellbeing (\(p = 0.312, t\)-statistic: 4.420, t-table: 1.65), elderly characteristic of holistic care (0.178, t-statistics 2.422, t-table: 1.65), and elderly characteristic of physical health (0.140. T-statistic 1.790, t table: 1.65). Finally, it concluded that social support influences the physical wellbeing of elderly.\(^{(15)}\)

Yi-Ju Lee & Wei-Li hung have communicated their research work on the relationship between exercise participation and well-being of the retired elderly. Here total of 352 retired older were recruited. Face-to-face questionnaire survey was adopted, and quota sampling was chosen to select the respondents. A total of 352 valid questionnaires were collected in selected parks in Taipei. The results showed that exercise frequency and well-being were positively correlated, but a negative correlation was found between exercise intensity and well-being. The survey found that the intensity of exercise was self-evaluated by as being low to moderate, but most of the activities were in the categories of moderate or vigorous intensity according to the metabolic equivalents suggested by American college of sports medicine. The study suggest that the elderly felt more comfortable and gained more pleasure psychologically while participating in exercises less intensive. As a result, the retired elderly are recommended to take exercise as frequently as possible. As to exercise intensity, self-evaluated low-to-moderate intensity exercise might be better for the psychological well-being of the elderly.\(^{(16)}\)

Zoran Milanović et al has published their work with age-related decrease in physical activity and functional fitness among elderly men and women. In study 1288 elderly were participated. Participants’ level of physical activity was evaluated using the International physical activity questionnaire: 594 were male and 694 females. Functional fitness was also estimated using the senior fitness test: back scratch, chair sit and reach, 8-foot up and go, chair stand up for 30 seconds, arm curl, and 2-minute step test. This study found that the reduction in physical
activity level and functional fitness was equal for both men and women and was due to the aging process. These differences between Young and old elderly people were due to the reduction of muscle strength in both upper and lower limbs and changes in body-fat percentage, flexibility, agility, and endurance.\(^{17}\)

Abdel-Hady el-Gilany and Raefa Refaat Alam shred their investigated work as effects of nursing program as a life review on life satisfaction and happiness among elderly people. It was a quasi-experimental study having study settings as two elderly clubs namely; Elsaada and el-amal in Mansoura, Egypt. Data collected from 74 older people, and it was with socio-demographics, subjective happiness, and satisfaction with life scales. Nursing program as (a life review) was implemented and the two scales were re-measured immediately and two months after intervention. Findings evidenced that there is an improvement of the overall median life satisfaction score in the immediate post-intervention and two months after intervention. These improvements are statistically significant with \(p=0.001\). Also, the overall median happiness score improved from 14 up to 19.5 and 20 in the immediate and two-months post-intervention; respectively. These improvements are statistically significant with \(p=0.001\). This pattern of improvement persists after stratification of all the socio-demographic variables studied and with the presence or absence of chronic diseases. Finally, it concluded that implementation of a life review intervention improved the life satisfaction and sense of happiness among elderly immediately and post 8 weeks of intervention.\(^{18}\)

**Conclusion**

Researcher made all attempts to gather all relevant information in view to assess the present condition of physical and emotional well-being of the elderly. Throughout the review process, researcher came in impression that majority of elderly lives in old age home or such similar institutions are facing multiple health issues from physical illness to psychological distress and social stigma. But it also noticed at elderly either remain in institution or non-institution area but they are facing physical and emotional distress, which is again irrespective of country, as this review covers reviews from not only India but from developed to undeveloped countries. This review made a way for researcher to take up conclusion from this review to develop some intervention which can be helpful to elderly to improve their physical and emotional well-being.

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**Ethical Clearance:** Taken from Institutional Ethical Committee, National Institute of Medical Science and Research, NIMS University, Jaipur, Rajasthan via Ref. No.: NIMSUNI/IEC/2018/PHD/116.

**Source of Funding:** Self-funded project

**Conflict of Interest:** Nil

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Ear Lobe Crease: A Marker of Coronary Heart Disease

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Abstract

Aim and Objective- The clinical study was undertaken to evaluate the diagonal ear lobe crease (Frank sign) as an indicator of Chronic heart disease (CHD). However, there are certain studies have not found any correlation between Frank sign and CHD.

Material and Method - Total of 10 patients aged >40years were enrolled in this study with prior medical history of heart disease. Patient with anatomical obliteration of ear excluded from the study. All the selected patient was initially screened and findings were recorded in patient Performa. Date were recorded, tabulated and analysed by using descriptive analysis for responses to each question.

Result- DELC is observed in 80% of subjects with heart disease. The most frequently bilateral DELC is observe in 70% of subjects and without DELC in 20% of subjects. The mean age is within the range of 30-70 years. Unilateral and bilateral DELC was more among subject less than 50 years.

Conclusion- DELC is uncommon and has a prevalence of correlation with CHD as indicated in the present study. It is suggested that DELC examination be recommended for detecting underlying heart disease.

Keywords: Coronary heart disease, Diagonal ear lobe crease, artherosclerosis.

Introduction

Chronic heart disease causes 30% death occurred worldwide. According to WHO in India prevalence of chronic heart disease is between 7% -13% in urban areas and 27% in rural areas.1,2 Case control studies reported that risk factors of chronic heart disease in India include smoking, diabetes, hypertension, obesity, stress and physical inactivity.3 In this modern era clinical evaluation and examination is most reliable tool to diagnose sub clinical stage and for further investigation play an important role to diagnose the underlying disease.

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Dr. Sanders T. Frank in 1973 proposes a term “Frank Sign”. It is a wrinkle or furrow in the skin which is extending from the tragus to rear edge of the ear lobe at 45degree in varying depth, also known as diagonal earlobe crease.4 Several studies concluded that earlobe creases are silent indicators of CHD. Dermatological signs considered as definitive functioning system that communicates with the internal environment. In many cases dentist may be the first health care provider to diagnose the underlying disease in early stages through dermatological or oral signs.

There is limited information about pathophysiology explaining link between frank sign and CHD, some authors concluded that diseases of microvascular arteries result in loss of elastin and elastic fibers which cause diagonal ear lobe crease.5 In an autopsy-based report, it was suggested that progression of atherosclerosis is related with collagen metabolism which occurs in the skin.6,9 The presence of earlobe crease can be easily
conducted and patient can undergo early diagnostic procedures to detect the risk of CHD and preventive therapies can be detected early. These findings have opened new venues for dentist to identify individual with high risk of developing CHD. Due to unclear etiology, and several studies concluded that earlobe crease may be associated with the weakening of elastic fibers with age.

So, this study is planned to assess the link between chronic heart disease and diagonal ear lobe crease as it provides diagnostic information which is important in clinical management of various dental treatment procedures.

**Materials and Methods**

A cross-sectional study conducted in oral medicine and radiology department. This study comprises of 10 patients who came in outpatient department for various dental treatment above the age of 40 years with proven heart disease. Informed consent was taken and study protocol was approved by the ethical committee of the Teerthankar Mahaveer Dental College and Research Centre. Complete history was taken and photograph was taken from every participant. Patient with distorted anatomy of ear, ear piercing and incomplete ear lobe crease were excluded from the study. Clinical examination was carried out and history of each subject were taken thoroughly. A deep diagonal crease extending obliquely from the tragus of the ear to the outer border of the earlobe was recorded as DELC. Unilateral and bilateral crease both considered as DELC positive. Data was recorded, tabulated and analysed.

**Statistic Alanalysis**

Statistical analyses were done by using SPSS (statistical package for social sciences) version 25.0 and MedCalc software. Descriptive statistics was performed by calculating mean and standard deviation for the continuous variables. Categorical variables are presented as absolute numbers and percentage.

**Result**

In the assessment of subject included in this study with heart disease age of the participants ranged from 32 to 70 years mean age of the study population was 53.80 years with standard deviation ±11.39 years. Mean age of patients with bilateral DELC was more than 50 years in 33% and unilateral DELC was common in less than 50 years of subjects 25% and Bilateral DELC was observed in 70% of subjects and subjects with unilateral 10%. There were CHD patients (20%) without earlobe crease. There was no significant difference in the distribution of the diagonal ear lobe crease between less than 50 and more than 50 years age groups. Unilateral and bilateral ear lobe crease was more among subjects lesser than 50 years of age with heart disease.

| Table 1- Distribution of diagonal ear lobe crease |
|------------------|------------------|
| **Bilateral Diagonal Ear Lobe Crease** | 7 | 70.00% |
| **Unilateral Diagonal Ear Lobe Crease** | 1 | 10.00% |
| **Without Diagonal Ear Lobe Crease** | 2 | 20.00% |

| Table 2- Age-wise distribution of DELC |
Table 3- Association of DELC with age

<table>
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<tr>
<td></td>
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<tr>
<td>Lobe Crease</td>
<td>75.00%</td>
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p-value = 0.20

Discussion

DELC is an anatomical landmark to detect the underlying heart disease. The presence of unilateral or bilateral DELC is important in diagnosis to avoid the adverse consequences in various dental procedures. Advantage of knowing DELC in patients include (1) it can help to predict the risk of coronary artery disease. (2) It can help in evaluating the treatment during/after treatment. DELC provide a valuable contribution to the dentist to assess the patients with risk of any heart disease in dental office.

Friedlander AH et al concluded in their study that whether it is not confirm its association and more research is required in this area, they advise to dentist to that DELC used as a clinical marker for risk assessment and medical evaluation. They observe relation between DELC and CAD. DELC may be said to be the external presentation of atherosclerosis.5

Kadam YR et al also reported prevalence of Bilateral DELC was 2.7% and its positive association with Cardiovascular disease, diabetes mellitus and hypertension.10 The registrar General of India reported 17% of total death occurs yearly due to CHD. Hence proper preventive strategies and early diagnosis help to eradicate this epidemic.11-12 In our study we observe DELC is associated with coronary artery disease. The statistical analyses show higher incidence of Coronary Artery Disease in patients with bilateral DELC.11 There was significant relation with the advancement of age with DELC. This study comprises of a smaller number of subjects within the limitation this study the findings may not be generalizable. Therefore, further investigations are needed. In order to make a diagnosis of CHD it is essential to know the physical sign (DELC) for that particular population so further studies with larger sample size are necessary to affirm the results.

Conclusion

This study has shown that DELC has high prevalence in patients with heart disease. Result of this study also suggest that bilateral DELC might be common in with patients with Coronary heart disease. The incidence of DELC were significantly higher in individuals above the age 50years it may be due atherosclerosis. Atherosclerosis
could be due to hypertension, hyperlipidaemia, diabetes or obesity.

**Conflict of Interest:** -Nill

**Funding:** Self Funding

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**References**


The Effect of Socialization Group Activity Therapy on the Communication Ability of Patients Withdrawing at the Psychiatric Hospitals of West Nusa Tenggara Province

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Abstract

Schizophrenic mental disorders often occur with social withdrawal disorders, followed by symptoms of disturbed sleep patterns, anger, ineffective coping, changes in thought processes. Socialization Group Activity Therapy is a therapeutic modality given to patients withdrawing to improve their ability to communicate well verbal and non-verbal. This study aimed to determine the effect of Socialization Group Activity Therapy on communication skills in withdrawn patients, with a one group pre-test-post-test control design research design which is one type of quasi-experimental method. Samples were taken based on the quota with a total sample of 10 control groups and 10 TAKS treatment groups. Collecting data in this study by observation refers to the components of the verbal communication assessment. The test was carried out using the Wilcoxon non-parametric statistical method with the set error level α = 0.05. The results of Wilcoxon gave a Z value count = -2.209 p-value = 0.027 for the control group and a Z value = -2.499 p-value = 0.012 <0.05 for the SGAT treatment group. These two results suggest that statistically, the intervention has a significant effect on both the control group and the treatment group. From the results of the study, it can be concluded that there is a significant effect on the control group intervention with an average communication ability is sufficient, and there is a significant effect on the intervention group treatment with good communication skills on average. To increase human resources, especially in nursing, about SGAT, it is necessary to hold training on Socialization Group Activity Therapy.

Keywords: Group activity therapy, Communication, Clients, Withdrawal.

Introduction

Mental health problems have become a global concern because they are a major problem abroad. Even mental health has become a major issue and has become a resolution in the world health session, in Geneva, 2001, which all WHO member countries need to follow up because if not, it will create a burden for each country.

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Eleven percent (11%) of the world’s burden are mental and neurological disorders. Until 2020, it is anticipated that this burden will increase to 14.6%. Mental health problems will become “the global burden of disease” (Michard & Chaterina, 1999). This is a challenge for the “Public Health Policy” which traditionally pays more attention to infectious diseases. The standard measurement for global health needs has traditionally been the death rate from the disease. This causes mental disorders as if it is not a problem. With the existence of a new indicator, namely DALY (Disability Adjusted Life Year), it is known that mental disorders are a major health problem internationally(1).

Very fast socio-economic changes and uncertain political situations lead to higher unemployment, poverty, and crime rates, this situation can increase
The incidence of crises and mental disorders in human life. Psychosis is simply a mental disorder with a loss of sense of reality. This is known by the presence of disturbances in feelings (affect and emotions), thought processes, psychomotor and volition, in such a way that these things are not following reality. Schizophrenia is a form of psychosis that has often been found everywhere since time immemorial\(^1\).

The incidence and morbidity of schizophrenia mental disorders in the community is around 0.2 - 0.8%. If the total population of Indonesia based on the results of the 2010 census was 237,556,363 people, then the total population of Indonesia suffering from schizophrenia would be 4,751,127 people. Schizophrenic mental disorders, frequent disorders of social relations withdrawal, followed by symptoms of disturbed sleep patterns, anger, ineffective coping, changes in thought processes. Changes in self-concept and spiritual distress\(^2\).

Patient withdraws often symptoms of decreased verbal and non-verbal communication even to none, apathy (disregarding the surrounding environment), being alone (separating from others), decreased activity (not excited), disappointed, feeling useless, and avoiding interaction with other people. Patients with withdrawal need holistic and comprehensive handling and need to be equipped with the ability to communicate with other people in the group. Modality therapy is the main therapy in mental nursing. This therapy is given to change the patient’s behavior from maladaptive behavior to adaptive behavior. Socialization Group Activity Therapy is a therapeutic modality given to patients withdrawing to improve their ability to communicate both verbally and non-verbally (patients are trained to be able to introduce themselves, be able to get acquainted with group members, be able to converse with group members, be able to convey and discussing conversational topics, being able to convey and discuss personal problems to others, being able to convey opinions), so that after returning from the Psychiatric hospitals, patients can interact and be accepted in the family environment and society in general, thereby reducing the frequency of recurrence\(^3\).

The purpose of this study was to determine the effect of Socialization Group Activity Therapy on the communication skills of withdrawn patients at the Psychiatric hospitals of West Nusa Tenggara Province.

**Method**

The design of this study was to use one group pre-test-post test control design. Subjects in this study were 20 patients in five inpatient rooms of the Psychiatric hospital in West Nusa Tenggara Province. The independent variable in this study was Socialization Group Activity Therapy. The dependent variable in this study is communication skills. The instrument used in the form of observation (checklist) refers to the verbal communication assessment component. Data analysis using Wilcoxon.

**Result**

**Univariate Analysis**

<table>
<thead>
<tr>
<th>No</th>
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<th>Percentage (%)</th>
</tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>31-35</td>
<td>3</td>
<td>30%</td>
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<table>
<thead>
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<th>No</th>
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<th>Frequency</th>
<th>Percentage (%)</th>
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</thead>
<tbody>
<tr>
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<td>Elementary School</td>
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<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>Junior High School</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>3</td>
<td>Senior High School</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>
Based on table 1 shows that most of the respondents are in the 21-25 year age group, namely 4 respondents (40%). Most of the respondents are at the junior high school level, namely 4 respondents (40%). Most of the respondents were male, namely 7 respondents (70%). All respondents have sufficient communication skills (100%) before and after in the control group.

Table 2 Distribution of respondents in the treatment group

<table>
<thead>
<tr>
<th>No</th>
<th>Age</th>
<th>Frequency</th>
<th>Percentage (%)</th>
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</thead>
<tbody>
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<td>26-30</td>
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</table>

<table>
<thead>
<tr>
<th>No</th>
<th>Education</th>
<th>Frequency</th>
<th>Percentage (%)</th>
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</thead>
<tbody>
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<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>Junior High School</td>
<td>3</td>
<td>30%</td>
</tr>
</tbody>
</table>
Based on table 2, shows that the majority of respondents are in the 31-35 year age group, namely 6 respondents (60%). Most of the respondents are at the elementary education level, namely 5 respondents (50%). Most of the respondents were male, namely 7 respondents (70%). All respondents have sufficient communication skills, namely 10 respondents (100%) before treatment. Most of the respondents have good communication skills, namely 7 respondents (70%) and enough 3 respondents (30%) after treatment.

### Bivariate Analysis

Analysis of pre-test and post-test using non-parametric methods with the Wilcoxon sign rank test on SPSS for Windows version 15 with a P-value ≤ 0.05 or 95% confidence level. If the probability of error (p-value) is less than $\alpha$, then the test results are in the rejection area $H_0$, so that $H_a$ is used as a conclusion, on the other hand, if p-value is greater than $\alpha$, then $H_0$ is used as a conclusion. Because in this study the p-value is less than 0.05, $H_0$ is rejected.
results are smaller than the error level ($\alpha$), the hypothesis used is that the null hypothesis ($H_0$) is rejected, so it can be concluded that there is an effect of the intervention on communication skills in the control group. The calculation results are as follows; The test results are in the form of $Z = -2.295$ for the control group with $p$-value $= 0.022$ because the $p$-value $<0.05$ so it is in the rejection area $H_0$ ($p$-value $<\alpha$). As a result of the rejection of $H_0$, it can be concluded that communication skills in the post-test control group have a significant effect on improving communication in patients who withdraw. In the treatment group, the $p$-value results are smaller than the error level ($\alpha$), then the hypothesis used is that the null hypothesis ($H_0$) is rejected, so it can be concluded that there is an effect of the intervention on communication skills in the treatment group. The results of the calculation of $Z = -2.501$ for the TAKS treatment group with $p$-value $= 0.012 <0.05$ so that in the rejection area $H_0$ ($p$-value $<\alpha$) it can be concluded that TAKS in the treatment group has a significant effect on improving communication in patients who withdraw.

**Discussion**

The results of research conducted from 24 October 2011 to 6 November 2011 conducted at the Psychiatric hospitals of NTB Province on the effect of socialization group activity therapy on communication skills in withdrawing patients with a total of 20 respondents. In this study, the respondents were divided into two groups consisting of one group of 10 people who were given TAKS treatment and one group of 10 people who were not given SGAT treatment (control group). In the TAKS treatment group, there were seven sessions of Socialization Group Activity Therapy (SGAT). Researchers made observations using the observation guidelines before the SGAT was carried out and after the SGAT was carried out in each session. Whereas in the control group the researchers conducted observations using observation guidelines before nursing care was given and after nursing care was provided for seven days. Based on the results of observations using observation guidelines in the control group and the SGAT treatment group, the following results were obtained:

From table 1 the pre-test control group and table 2 the post-test control group shows that all respondents have sufficient communication skills (100%). According to Joseph(4), at the beginning of the meeting between nurses and patients, new communication was established, here the nurse introduced herself to the client by greeting her in a friendly manner, both verbally and non-verbally, eye contact had to be maintained. It is necessary to have nurses present both physically and psychologically when communicating with patients. Presenting oneself physically, namely the attention given through the appearance of the body, is important in interpersonal communication in the form of words. The development of communication skills in this group can be formed because: 1) the ability of group members will influence other groups so that interaction and communication will occur between groups that are given treatment; 2) Strength is the ability of group members to influence other groups (Stuart & Laraia); 3) Cohesivity is the strength of group members to achieve goals. To achieve this group cohesiveness, group members can encourage talking to one another(4).

Storytelling can build a common identity in a group. This theory suggests that an individual’s image of reality is guided or guided by a story that shows how an object should be believed, the story is created through interaction and symbolic communication in small groups, and is disseminated from one person to another. Respondents who have sufficient communication skills are 3 respondents (30%). During the observation, the respondents did not use body language (eye contact, facial expressions, and posture)(5). This is consistent with what Nurhasanah(6) stated, 2010 that facial expressions are often used as an important basis in determining interpersonal opinions, eye contact is very important in interpersonal communication. People who maintain eye contact during a conversation are expressed as trustworthy.

**Conclusion**

The average post-test score of the control group is better than the pre-test, but the communication skills are still in the sufficient category. The average post-test score of the TAKS treatment group showed that the communication skills of the withdrawn patient were mostly in the good category. There was a significant effect on the improvement of communication skills in patients who withdrew after being given Socialization Group Activity Therapy in the TAKS treatment group, this was proven based on the Wilcoxon test $p$-value $0.012 <\alpha 0.05$ and the control group with a $p$-value $0.022 <\alpha 0.05$ indicates that there is a significant effect on improving patient communication skills by withdrawing.

**Acknowledgment:** I would like to thank the respondents who participated.
Conflict on Interest: There is no conflict of interest to be declared

Source of Funding: None

Ethical Clearance: The study was approved by the health research ethics commission

Reference


Relationship between Workload and Work Stress of Post-Disaster Nurses in the Emergency Room of the Regional General Hospital in North Lombok Regency

Yahya Ulumuddin¹, Sismulyanto², Menap², Bq. Hilda Septiana³, Ovie Lestya Nurdianna¹, Nova Budiharjo¹, Mursaka¹

¹Postgraduate Student, ²Graduate School, Public Health Department, Universitas Qamarul Huda BadaruddinBagu, West Nusa Tenggara, Indonesia, ³Nurse at the Regional General Hospital of North Lombok, Regency, West Nusa Tenggara, Indonesia

Abstract

The workload is a condition where workers are faced with tasks that should be completed at a certain time. The excess workload can cause work stress. This often occurs in emergency room nurses where the emergency room nurse is part of the hospital which is the first destination for patients who experience an emergency to get first aid immediately. This study aims to identify the relationship between workload and work stress of nurses in the emergency room at North Lombok District General Hospital. In this study, researchers used a total sampling technique and obtained a sample of 27 nurses. The instrument used in measuring workload and work stress is a questionnaire. The data obtained were analyzed using the Spearman Rank Test statistical test. The results of this study using data analysis with the Spearman Rank Test statistical test can be seen from the relationship between workload and work stress which is determined by the results of workload analysis (quantitative) with work stress (physical) p = 0.041; with a significance level of p <0.05, this indicates that there is a relationship between workload and work stress of the nurse in charge. The conclusion of this research shows that workload has a relationship with the work stress of the nurse in charge. This research is recommended for hospitals as a consideration for the hospital management to adjust the workload with the abilities and expertise of nurses so that work stress does not occur.

Keywords: Emergency Room Nurses, Workload, Work Stress

Introduction

Nurses are health workers who play an important role in the hospital by providing health services in the form of comprehensive bio-psycho-socio-spiritual nursing care to individuals, families, groups, and communities, both healthy and sick, covering all processes of human life(1). The Emergency Unit (UGD) or Emergency Room (IGD) is a part of the hospital which is the destination for first-time patients who experience an emergency to get first aid immediately. Not only do first aid, but the emergency room nurse also carried out the process of recording cases and actions taken in the emergency room and the process of transferring patients from the emergency room to inpatient care if the patient needed intensive care and was required to be hospitalized. Factors that affect the workload of nurses are the patient’s constantly changing condition, the average number of hours of care needed to provide direct service to patients that exceed one’s ability, the desire to achieve work, high job demands, and documentation of nursing care(2).
Based on the results of research conducted by the Indonesian National Nurses Association(1), as many as 50.9% of Indonesian nurses who experience work stress, often feel dizzy, tired, unfriendly, lack rest due to too much workload, high income and inadequate income(3). According to the results of research conducted by the National Nurses Association Indonesia(1), there are 50.9% of nurses experience work stress. This can be seen from the many complaints of muscle and joint pain, heart palpitations, irritability, difficulty concentrating, apathy, feeling tired, and lust. eating decreases. The workload can be in the form of work stress, task or job, organization, and work environment. This is supported by the results of research by Hudaningsih(4) that there are 5 (five) major stressor sequences in nurses. First, due to excessive workload (as much as 82.2%), then due to unfair wages (57.9%), working conditions (52.3%) under workload (48.6%), and not being included in the taking decisions (44.9%).

Apart from these problems, another problem that can cause stress is limited human resources. Where the number of tasks has not been matched by an adequate number of nurses. The number of nurses and the unbalanced number of patients will cause fatigue in work because the patient’s need for nurse services is greater than the standard of nurse ability. Conditions like this will have an impact on the nurse’s psychological state such as fatigue, emotion, boredom, mood changes, and can cause stress to nurses. Workload fluctuations are another form of stress. An inappropriate situation like this creates anxiety, job dissatisfaction, and a tendency to leave work(2).

The North Lombok District Hospital Emergency Unit provides medical services for emergency patients, namely patients with death threats and need immediate help, patients who do not have a threat of death but need immediate help, and non-emergency patient services who come to the ER for 24 hours. North Lombok District Hospital’s working time is divided into 3 shifts, morning 6 hours, afternoon 6 hours, and night 12 hours, and for each shift, the number of nurses on duty is 6 people before the earthquake disaster. After the earthquake, it was divided into 2 shifts, each morning to night 12 hours, a night to morning 12 hours with a total of 6 nurses in each shift. Workload has a positive and significant effect on work stress. Knowing the Relationship between Workload and Work Stress of Post-Disaster Nurses in the Emergency Room at the North Lombok Regency Regional Hospital.

Method

This type of research is an analytical survey. The subjects in this study were 27 nurses in the IGD room at General Hospital North Lombok District. The independent variable in this study is workload. The dependent variable in this study is the work stress of nurses. The questionnaire about workload consisted of 17 statements in which 13 statements by the author of the adoption of the IGD nurse workload instrument from Nursalam(5) and 4 statements which the author modified himself based on Hudaningsih(4). The questionnaire about work stress consisted of 13 statements that the author adopted from Nursalam’s work stress instrument and modified from the symptoms of work stress. Data analysis using Spearman rho.

Result

Bivariate Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>Quantitative</th>
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<th></th>
<th></th>
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</thead>
<tbody>
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<td></td>
<td>Moderate</td>
<td>Weight</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
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<td>11,1</td>
<td>9</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>3</td>
<td>11,1</td>
<td>24</td>
</tr>
</tbody>
</table>
Based on Table 1, shows that of the 27 respondents who have a moderate workload (quantitative) with the category of moderate physical work stress (0%), the category of work stress (physical) is heavy (55.6%). While the workload (quantitative) is heavy with the category of moderate physical work stress (11.1%), the category of work stress (physical) is heavy (33.3%). Total workload (quantitative) is medium with physical work stress category (55.6%), workload (quantitative) heavy physical work stress category (44.4%).

Table 2 Cross-tabulation of the Relationship between Workload (quantitative) and Work Stress (psychological) for Post-Disaster Nurses

<table>
<thead>
<tr>
<th>No</th>
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<th></th>
<th></th>
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<td>Weight</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
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<td></td>
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<td>6</td>
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<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4</td>
<td>14,8</td>
<td>11</td>
<td>40,7</td>
<td>12</td>
<td>44,4</td>
<td>27</td>
</tr>
</tbody>
</table>

Based on Table 2, it shows that of the 27 respondents who have a moderate (quantitative) workload with a mild (7.4%) work stress category (7.4%), a moderate (25.9%) work stress category (25.9%), a work stress category (psychological) heavy (22.2%). While the workload (quantitative) is heavy with the category of work stress (psychological) light (7.4%), the category of work stress (psychological) is moderate (14.8%), the category of work stress (psychological) is heavy (22.2%). Total workload (quantitative) is in the category of work stress (psychological) (55.6%), the quantitative workload is heavy in the category of work stress (psychological) (44.4%).

Table 3 Cross-Tabulation of the Relationship between Workload (quantitative) and Work Stress (Social / Behavioral) for Post-Disaster Nurses

<table>
<thead>
<tr>
<th>No.</th>
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<th>P-value</th>
</tr>
</thead>
<tbody>
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<td></td>
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<td>Moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>%</td>
<td>N</td>
</tr>
<tr>
<td>1.</td>
<td>Moderate</td>
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</tr>
<tr>
<td>2.</td>
<td>Weight</td>
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<td>3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21</td>
<td>77,8</td>
<td>6</td>
</tr>
</tbody>
</table>
Based on Table 3, it shows that of the 27 respondents who have a moderate (quantitative) workload with a mild (social) work stress category (44.4%), a medium (11.1%) work stress category (11.1%), a work stress category (social) by weight (0%). While the workload (quantitative) is heavy with the category of work stress (social) light (33.3%), the category of work stress (social) is moderate (11.1%), the category of work stress (social) is heavy (0%). Total workload (quantitative) is in the category of work stress (social) (55.6%), the quantitative workload is heavy in the category of work stress (social) (44.4%).

Table 4 Cross Tabulation of the Relationship between Qualitative Workload and Physical Work Stress of Post-Disaster Implementing Nurses

<table>
<thead>
<tr>
<th>No.</th>
<th>Qualitative</th>
<th>Physical</th>
<th>P-value</th>
</tr>
</thead>
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<td>Weight</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>1.</td>
<td>Light</td>
<td>0</td>
<td>0,0</td>
</tr>
<tr>
<td>2.</td>
<td>Moderate</td>
<td>2</td>
<td>7,4</td>
</tr>
<tr>
<td>3.</td>
<td>Weight</td>
<td>1</td>
<td>3,7</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>11,1</td>
<td>24</td>
</tr>
</tbody>
</table>

Based on Table 4 shows that of the 27 respondents who have a light (qualitative) workload with a moderate (0%) work stress category (0%), a heavy (7.4%) work stress category. Workload (qualitative) was with the category of work stress (physical) was (7.4%), the category of work stress (physical) was heavy (66.7%). Workload (qualitative) is heavy with the category of work stress (physical) is (3.7%), category of work stress (physical) is heavy (14.8%). Total workload (qualitative) is light with the category of work stress (physical) (7.4%), workload (qualitative) is (74.1%) and workload (qualitative) is heavy with the category of physical work stress (18.5%).

Table 5 Cross-tabulation of the Relationship between Qualitative Workload and Psychological Work Stress of Post-Disaster Implementing Nurses

<table>
<thead>
<tr>
<th>No.</th>
<th>Kualitatif</th>
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<tr>
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<td>3.</td>
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<td>Total</td>
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<td>14,8</td>
<td>11</td>
<td>40,7</td>
</tr>
</tbody>
</table>
Based on Table 5, shows that of the 27 respondents who have a light (qualitative) workload with the category of work stress (psychological) light (0%), the category of work stress (psychological) is moderate (7.4%), work stress (psychological) is heavy (0%). Workload (qualitative) is with the category of work stress (psychological) light (11.1%), the category of work stress (psychological) is medium (25.9%), the category of work stress (psychological) is heavy (37.0%). Workload (qualitative) is heavy with the category of work stress (psychological) light (3.7%), the category of work stress (psychological) is moderate (7.4%), the category of work stress (psychological) is heavy (7.4%). Total workload (qualitative) light with work stress (psychological) (7.4%), medium workload (qualitative) with work stress (psychological) (7.4%), and heavy (qualitative) workload with stress category work (psychological) (18.5%).

### Table 6 Cross Tabulation of the Relationship between Workload (qualitative) and Social Work Stress of Post-Disaster Implementing Nurses

<table>
<thead>
<tr>
<th>No.</th>
<th>Qualitative</th>
<th>Social / Behavior</th>
<th>P-value</th>
</tr>
</thead>
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</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>1.</td>
<td>Light</td>
<td>2</td>
<td>7.4</td>
</tr>
<tr>
<td>2.</td>
<td>Moderate</td>
<td>15</td>
<td>55.6</td>
</tr>
<tr>
<td>3.</td>
<td>Weight</td>
<td>4</td>
<td>14.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>21</td>
<td>77.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 6, it shows that of the 27 respondents who have a light (qualitative) workload with the category of work stress (social / behavior) light (7.4%), the category of work stress (social / behavior) is (0%), the category of work stress (social / behavior) heavy (0%). Medium qualitative workload with work stress category (social / behavior) light (55.6%), work stress category (social / behavior) Medium (18.5%), job stress category (social / behavior) heavy (0%) . Workload (qualitative) is heavy with the category of work stress (social / behavior) light (14.8%), the category of work stress (social / behavior) is moderate (3.7%), the category of work stress (social / behavior) is heavy (0 %). Total workload (qualitative) light with work stress category (social/male) (7.4%), workload (qualitative) moderate with work stress category (social / behavior) (74.1%), workload (qualitative) weight with the category of work stress (social / behavior) (18.5%).

### Discussion

This study found a relationship between workload (quantitative) and work stress (physical) of post-disaster nurses in the emergency room of North Lombok District General Hospital as indicated by the results of the Spearmen rank test \( p = 0.041 \alpha <0.05 \), the level of correlation was \( p = 0.041 \). with a significance level of \( \alpha <0.05 \), this indicates that \( p <\alpha \) Ho is rejected and Ha is accepted, which means that there is a relationship between workload (quantitative) and work stress (physical) for post-disaster executing nurses in the emergency room of the North Lombok District General Hospital.

Judging from the results of the study, most of the 6 analyzed did not have a relationship, except for workload (quantitative) and work stress (physical). This can be due to an increase in workload (quantitative) accompanied
by a lot and variety of work done, continuous contact, lack of energy in doing work compared to the number of patients resulting in work stress (physical) on nurses which causes fatigue, feeling stiff muscles, increased pulse rate, loss of appetite, difficulty sleeping, and sore feet. The large number of jobs that exceeded the capacity caused the physical condition of nurses in the ER to become tired and easily tense. Nursing services in the emergency room are also very complex, which requires more technical skills and knowledge. The workload is so much to fulfill needs, handling problems, in the end, is very draining both physical energy and cognitive abilities. The stressful condition of emergency room nurses due to their already heavy workload should not be added to other burdens outside of their duties as emergency room nurses. An example is the guidance of practical students, the burden of organizational management, or other burdens which in turn get heavier so that the stress level of nurses increases.

Everyone has experienced stress and will experience it, but the levels are different and in different timeframes, Suliswati (6), states that stress is a comprehensive response from the body, both physically and mentally to any demands or demands, disturbing changes, threatening the individual’s sense of security and self-worth. Stressful experiences are personal and subjective. Stress occurs when the individual assesses that the situation that is in him is threatening. Working in the emergency room at every opportunity will meet patients who have various characteristics that have an impact on different conditions and workloads. For this reason, nurses act as a versatile staff, have initiative, have creative behavior and have broad insight with hard work motivation, are smart, sincere, and have quality.

Munandar’s theory (2) states that if the workload of nurses is high, the level of work stress experienced by nurses should also be high, where moderate workloads that are not resolved immediately will increase the level of stress at work, but this does not apply in all conditions. This can be seen from the research that has been done, namely that most of the workload has no relationship with work stress. The results of this study are consistent with those stated by Hudaningsih (4), where work stress is essentially influenced by several factors, including work environment, excess workload, deprivation stress, and high-risk jobs. Where nurses who experience work stress are caused by excessive workload both quantitatively and qualitatively which are not immediately resolved and the demands of other roles (tasks), namely non-nursing tasks. As a result, various complaints arise which include nurses feeling tired quickly even though they have rested, finding it difficult to concentrate, and feeling headaches during or after work which are symptoms of work stress.

Conclusion

The work stress experienced by nurses can occur because the number of actions that must be completed is not proportional to the number of existing nurses. Everyone has the opportunity to experience stress at work depending on how the individual can cope with the problem. The relationship between workload and work stress from the research results can be seen from the 6 items studied, which were obtained, namely: there is a relationship between workload (quantitative) and work stress (physical). As for workload (quantitative) with work stress (psychological), workload (quantitative) with work stress (social). Workload (qualitative) with work stress (physical), workload (qualitative) with work stress (psychological), and workload (qualitative) with work stress (social) have no relationship.

Acknowledgment: I would like to thank the respondents who participated.

Conflict on Interest: There is no conflict of interest to be declared

Source of Funding: None

Ethical Clearance: The study was approved by the health research ethics commission

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The Relationship between Environmental Temperature and Sleep Needs of Patients in Emergency Hospitals

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Abstract

Sleep is one of the basic human needs. Patients who are sick often need more sleep and rest than healthy people. Inadequate sleep and poor sleep quality can result in disturbed physiological and psychological balance. One of the factors that can affect the quality and quantity of sleep is the ambient temperature. The purpose of this study was to determine the relationship between environmental temperature and the fulfillment of the sleep needs of patients in the inpatient room. This type of research is an analytic survey with a cross-sectional design. The population in this study were all inpatients class III North Lombok Regency Emergency Hospital. The sampling technique used accidental sampling with a sample size of 71 people. Data analysis using Chi-Square. The results showed that the environmental temperature of the North Lombok Emergency Hospital was in the high category, namely 53.5%. Most of the patients’ sleep needs were in the insufficient category, namely 67.6%. There is a relationship between ambient temperature and the need for the sleep of patients in the Emergency Hospital of North Lombok Regency with an X² value of 34.054 with a p-value of 0.000 (p <0.05). The conclusion in this study is that the environmental temperature affects the patient’s sleep needs, where the higher the ambient temperature, the patient’s need for sleep becomes disturbed or insufficient. Suggestions in this study can provide a reference in improving service to patients, especially increasing the patient’s sleep needs such as facilities and infrastructure (air conditioning and ventilation) so that the room temperature is not hot.

Keywords: Environmental Temperature, Sleep Needs, emergency hospital, nurse

Introduction

Inadequate sleep and poor sleep quality can result in disturbed physiological and psychological balance. Physiological effects include a decrease in daily activities, feeling weak, a slow healing process, decreased immune system, and instability of vital signs. Meanwhile, the psychological impact includes depression, anxiety, and lack of concentration(1). According to Nurlela(1), people who are sick need rest and sleep more than when they are normal because the body is working hard to provide energy for recovery, but many aspects of the disease also make it difficult to meet their sleep and rest needs. The need for sleep is essential to everyone’s quality of life. Each individual has different sleep needs in quality and quantity. The quality and quantity of sleep are influenced by several factors that can indicate an individual’s ability to sleep and get the amount of sleep according to his needs. Factors that can affect the quality and quantity of sleep include illness, environment, fatigue, lifestyle, anxiety level, motivation, and drugs(2).

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Hospital is a health service institution that provides complete individual health services that provide inpatient, outpatient, and emergency services. The hospital also provides options for some of its residences, which cater to the upper-middle class to the lower middle class. The hospital strives to provide equitable health services for everyone without forgetting its social function. The quality of service in a hospital can be improved if it is supported by an increase in the quality of environmental care facilities. Inpatient rooms are a form of care facilities that are important for patient care. Inpatient is a term which means the process of patient care by health professionals due to certain diseases, where the patient is confined to a room in the hospital, if the patient requires treatment in the hospital or is staying in the hospital, middle-aged people who sleep too little or too much turns out to be more likely to experience cognitive decline and experience longer treatment.

The environmental condition of the inpatient room also affects the patient’s psychology, because the patient being treated is very sensitive to environmental stimuli. If the inpatient room is noisy, the air temperature is too hot or too cold, poor lighting, cleanliness, and tidiness are not maintained, it will indirectly interfere with the patient’s comfort to rest, thus prolonging the treatment process. The inpatient room should generate optimism so that it can help the patient’s healing process. The environment in which a person sleeps affects the ability to fall asleep. Good ventilation provides comfort for restful sleep. The size, hardness, and position of the bed affect the quality of a person’s sleep. Light levels, temperature, and sound can affect the ability to sleep. Some patients prefer to sleep with the lights turned off, dimmed, or kept on. Hot or cold temperatures cause the client to experience anxiety. Some people like quiet conditions for sleeping and some like sounds to help sleep such as soft music and television.

One of the causes of an uncomfortable environment is natural disasters, and one of them is an earthquake. Indonesia has a large area with many islands, located in the path of earthquakes and volcanoes. This condition makes it prone to various natural disasters. Some dangers can be caused, which can threaten life safety, natural damage, and environmental destruction if an earthquake occurs. The earthquake that hit Lombok caused many casualties in North Lombok Regency, the environment, and damaged office and hospital infrastructure. The Regional General Hospital of North Lombok Regency suffered 80% damage due to the Lombok, NTB earthquake on Sunday, August 5, 2018. The earthquake measuring 7 on the Richter scale destroyed all hospital facilities so that the room for patient services could not be used. Due to the destruction of hospital facilities, services were carried out at the emergency hospital.

Most of the hospitalized patients are at high risk of experiencing disturbed sleep patterns due to various factors. That sleep disturbance affects 45% of people aged 50 years and over and 68% of people who live in long-term care facilities. In the sentence above, it can be concluded that patients who experience sleep disorders are more prone to occur in hospitals, especially inpatient rooms. Based on the results of a preliminary study at the North Lombok Emergency Hospital, patient data after the earthquake decreased inpatients, before the earthquake the average monthly hospitalization reached 150-200 patients, while after the earthquake the average monthly patient was 85 patients. Inpatient services are carried out at the Emergency Hospital. The results of interviews with 10 patients found that all patients (10 people) could not sleep because of the hot weather and uncomfortable environment, while the temperature in the inpatient room of the Emergency Hospital was more than 25 °C-30 °C during the day and at night the weather is cold with temperatures ranging from 16 °C-20 °C. The purpose of this study was to determine the relationship between environmental temperature and the fulfillment of sleep needs in the inpatient room of the North Lombok
Method

This type of research is an analytical survey. The subjects in this study were 71 inpatients at the North Lombok Emergency Hospital. The independent variable in this study is ambient temperature. The dependent variable in this study is the need for sleep. The instrument used was in the form of a standardized questionnaire adopted by the Sleep Quality Questionnaire which was compiled based on 7 (seven) parameters modified from the PSQI questionnaire consisting of 19 questions. This questionnaire was modified based on the patient’s needs with a rating range of 0-3. The number of questionnaires was 7 items and there were additions at the end of the questionnaire questions about the patient’s perception of “self-report” in general about good or bad sleep quality. Validity and reliability test using Cronbach alpha. The validity test results obtained a value of 0.83-0.96 and the reliability test results obtained a value of 0.89 which indicates that this instrument is valid and reliable, so it can be used as a research instrument. Data analysis using chi-square.

Result

Univariate Analysis

Table 1 Frequency Distribution Based on Patient Characteristics

<table>
<thead>
<tr>
<th>Gender</th>
<th>F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>37(52.1)</td>
</tr>
<tr>
<td>Female</td>
<td>34 (47.9)</td>
</tr>
<tr>
<td>Total</td>
<td>71 (100.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>F (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-25 year</td>
<td>7 (5.9)</td>
</tr>
<tr>
<td>26-35 year</td>
<td>16 (22.5)</td>
</tr>
<tr>
<td>36-45 year</td>
<td>16 (22.5)</td>
</tr>
<tr>
<td>46-55 year</td>
<td>12 (16.9)</td>
</tr>
<tr>
<td>56-65 year</td>
<td>12 (16.9)</td>
</tr>
<tr>
<td>&gt;65 year</td>
<td>8 (11.3)</td>
</tr>
<tr>
<td>Total</td>
<td>71 (100.0)</td>
</tr>
</tbody>
</table>

Based on the table above, it was found that the sex of male patients was 37 (52.1%) patients while female patients were 34 (47.9%) patients. Most of the patients aged 26-35 years and 36-45 years were 16 (22.5%), while the lowest was 17-25 years old as many as 7 (5.9%) patients.
Based on table 2 above, it is found that the frequency distribution of the environmental temperature is mostly in the high category (> 24oC), namely 38 (53.5%) while the lowest is 17 (23.9%) with normal ambient temperature (22oC-24oC) totaling 16 (22.5%). The frequency distribution of the patient’s sleep needs was found to be sufficient category by 23 (32.4%) while less for 48 (67.6%) patients. The frequency distribution of the sleep quality of patients in the good category was 20 (28.2%) while 51 (71.8%) patients were bad.

### Bivariate Analysis

**Table 3: Cross Tabulation and Chi-Square Test between Environmental Temperature and Patient Sleep Needs**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Sleep needs</th>
<th>P value</th>
<th>X²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enough</td>
<td>Less</td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
<td>1.4</td>
<td>37</td>
</tr>
<tr>
<td>Normal</td>
<td>12</td>
<td>16.9</td>
<td>4</td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
<td>14.1</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>32.4</td>
<td>48</td>
</tr>
</tbody>
</table>
Based on table 3, cross-tabulation between ambient temperature and sleep needs, it was found that 38 (53.5%) patients with high temperature had enough sleep needs as much as 1 (1.4%) patients and fewer sleep needs as many as 37 (52.1%) patients, 16 (22.5%) patients with normal ambient temperature had sufficient sleep needs for 12 (16.5%) patients and less than 4 (5.6%) patients, while 17 (23.9%) patients had a low ambient temperature. by having adequate sleep needs as many as 10 (14.1%) patients and less as many as 7 (9.8%) patients. The results of statistical tests using chi-square obtained a value of $X^2_{34.054}$ with a p-value of 0.000 ($p <0.05$), meaning that there is a relationship between ambient temperature and sleep needs of patients in the North Lombok District Emergency Hospital.

**Discussion**

The need for sleep is critical to the quality of life of all patients. Each individual has different sleep needs in quality and quantity. Also, the quality and quantity of sleep are influenced by several factors that can indicate an individual’s ability to sleep and get the amount of sleep according to his needs. Factors that can affect the quality and quantity of sleep include illness, environment, fatigue, lifestyle, anxiety level, motivation, and drugs. The physical environment in which a patient sleeps is very important in the ability to fall asleep and stay asleep. Uncomfortable bed conditions, non-essential ventilation, noise from roommates, room doors that are frequently opened and closed, footsteps, telephone sounds, lighting that does not fit the bed, and room temperature that is too warm or cold can affect the patient’s sleep needs and prolong the recovery process of the sick individual\(^7\).

Based on table 3, cross-tabulation between ambient temperature and sleep needs, it was found that 38 (53.5%) patients with high temperature had enough sleep needs as much as 1 (1.4%) patients and fewer sleep needs as many as 37 (52.1%) patients, 16 (22.5%) patients with normal ambient temperature had sufficient sleep needs for 12 (16.5%) patients and less than 4 (5.6%) patients, while 17 (23.9%) patients had a low ambient temperature. by having adequate sleep needs as many as 10 (14.1%) patients and less as many as 7 (9.8%) patients. The results of statistical tests using the chi-square value obtained $X^2_{34.054}$ with a p-value of 0.000 ($p <0.05$), meaning that there is a relationship between ambient temperature and sleep needs of patients in the North Lombok Emergency Hospital. The results of this study are in line with study, which obtained a p-value of 0.039 ($p <0.05$), which means that there is a relationship between the environment and the patient’s sleep patterns. It is related to the transfer of heat through radiation consisting between the human body and the walls and objects that surround it, which can absorb or otherwise radiate heat. This result is also in line with Lukman’s\(^2\) research, there is a relationship between the comfort of the patient’s room and the need for sleep rest of the patient with a p-value of 0.019.

This research is also in line with Sastrowinoto’s theory that most patients are not aware of the comfortable atmosphere in the room. Only when the condition deviates from the limits of comfort will the patient experience discomfort. The feeling of discomfort can vary from annoying to painful, depending on the degree of disturbance from the temperature controller. Too hot can make you tired and drowsy, while too cold makes you uneasy and breaks down your tension. If the problem of temperature comfort is faced with a variety of different temperatures in the room it will be possible to find an economically balanced temperature range. This range is called the zone of vasomotor regulation because a lack of heat is maintained by regulating blood distribution. The temperature range between 22-24 °c (for tropical countries) is called the comfort zone.

Furthermore, if the temperature rises to beyond the comfortable limit, there will be excess heat and that heat will heat the edges of the body. Sweat will come out to moderate the core temperature, and it is called the zone of evaporation control (zone of evaporation control) Hani Yousef. The upper limit of this zone is the limit value of heat tolerance, and above this limit, the core temperature will increase which can result in short-term death due to heatstroke. While temperatures below the vasomotor control zone result in a lack of heat, heat loss is more than the rate of heat production by the body. This temperature is called the cooling zone. Initially, the heat loss will only affect the edges of the body which can tolerate a temporary lack of heat. However, if the heat loss or cooling continues, death will occur due to
freezing. According to Mazkur (8), hospital is a place for sick patients who are the source of disease transmission. If the temperature is low and the humidity is too high, it will be easier to breed bacteria, fungi, viruses, and various other germs. Thus, if temperature and humidity are not considered properly, it will cause harm to the hospital community.

Conclusion

Most of the environmental temperature of the North Lombok District Emergency Hospital was in the high category, amounting to 53.5%. Most of the patients’ sleep needs were in the insufficient category, namely 67.6%. There is a relationship between ambient temperature and the need for the sleep of patients at the North Lombok District Emergency Hospital.

Acknowledgment: I would like to thank the respondents who participated.

Conflict on Interest: There is no conflict of interest to be declared

Source of Funding: None

Ethical Clearance: The study was approved by the health research ethics commission

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Educational Program: Its Effect on Knowledge and Lifestyles among Paramedical Students with Polycystic Ovarian Syndrome (PCOS)

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Abstract

Background: Polycystic Ovarian Syndrome (PCOS) is one of the most common female endocrine disorders, which affect about 5%-10% of women worldwide during their reproductive age of 12–45 years. In addition, it can affect a woman’s menstrual cycle, fertility, hormones, and aspects of her appearance. Aim: To evaluate the educational program and its effect on knowledge and lifestyles among paramedical students with polycystic ovarian syndrome. Setting: The study conducted at two government colleges in Jordan. Study Design: A Quasi- experimental (pre-test and post-test) design. Sample: A purposive sample. Size: 68 students who confirmed with PCOS. Tools: Identification of students with PCOS tool, Assessment of lifestyle habits tool, PCOS structured interviewing questionnaire tool, follow up sheet, and Psychological assessment tool. Results: The present study findings revealed that a highly significant improvement in knowledge and lifestyle among the studied sample pre intervention compared to post and follow-up intervention P < 0.01. Additionally, 91.2% of the study sample feels improving regarding the knowledge which included in the educational program. Conclusion: The present study findings a significant improvement among studied sample’ knowledge and lifestyles post intervention. Also, the majority among the studied sample were feeling improve regarding the knowledge which included in the educational program. Recommendations: Applying screening program for PCOS in young students is a very important to reduce the long-term health complications associated with PCOS.

Keywords: Polycystic ovarian syndrome, Lifestyle, Educational program.

Introduction

Polycystic ovarian syndrome (PCOS) is one of the female widespread endocrinopathies and metabolic alterations that affect 5% to 10% of women worldwide during their reproductive age of 12–45 years. This may lead to changes in the menstrual cycle, cyst in the ovary, failure to conceive, and other health problems [9]. However, the exact underlying causes of PCOS are remaining unknown and largely unclear. Nevertheless, strong evidence supports the possibility the condition is probably due to a combination of genetic, epigenetic, and environmental factors, including in utero exposure to androgens in disease development. [19]

According to World Health Organization (WHO) in 2012, the statics indicated that PCOS affected 116 million (3.4%) of women worldwide. Although, up to 70 % of women suffer from PCOS remain undiagnosed [20]. Moreover, the variation in prevalence rates of PCOS depends on the select of different diagnostic criteria, which are includes the National Institutes of Health (NIH) criteria, censuses women are considered to have PCOS if they present with a combination of chronic oligo-anovulation and clinical or biochemical signs of hyperandrogenism. [6]
However, the Rotterdam criteria suggested the addition of a third criterion – the presence of polycystic ovaries – as well as a statement that any two of the three criteria are sufficient for a positive diagnosis of PCOS. In contrast, the Androgen Excess Society (AES) criteria depend on the presence of hyperandrogenism as a central feature of the disease in combination with oligo-anovulation and/or polycystic ovaries.\[^{14}\]

PCOS treatment strategies chiefly aim at resolving the four major elements of PCOS including regularity of menstrual periods, control of hyperandrogenism like acne and hirsutism, management of infertility, and insulin-resistant (IR) along with its associated risk factors includes type 2 diabetes mellitus, hyperlipidemia, and obesity.\[^{8}\] Lifestyle modification is considered the first-line treatment, of PCOS. For this reason, educational program play important role in increase awareness women among PCOS by improving their understanding of their condition and can address the expressed needs during change lifestyle such as increase physical activity.\[^{10}\]

In Jordan, incidence of polycystic ovarian syndrome is difficult to determine due to the community believed it is stigma, lead to poor statistics related this subject. In most studies reports are very rare regarding the clinical and biochemical features of Arabic women with PCOS.\[^{2}\] Currently, there is no cure for PCOS, but symptoms can be managed through medical therapy to prevent major negative consequences besides lifestyle modification.\[^{15}\] Lack of knowledge and negative lifestyle attitude toward PCOS are considered to be the major factor leading to this disorder. There is a need to increase awareness among students and improve their lifestyle behaviors to avoid major problems in the future.\[^{17}\]

**Aim of the Study:** To evaluate the educational program and its effect on knowledge and lifestyles among paramedical students with polycystic ovarian syndrome.

**Research Hypothesis:** Using of educational program among paramedical students with PCOS will improve their knowledge scores and their lifestyles than before applying the educational program.

**Subject and Methods**

**Study design:** A Quasi-experimental pre-test & post-test was used in this study.

**Setting:** The study conducting in two government colleges in Jordan.

1. Rafidah Al-Aslamia College of Nursing/ Midwifery and Paramedical.
2. Nusaiba Al-Maznieh College of Nursing/ Midwifery and Paramedical.

**Sample size and Technique:**
- All students in all grades of both colleges (745) were included to assess with PCOS. The students diagnosed with PCOS for the intervention study (68).
- A total number (68) of was a participant from Rufaida College (n= 48) and the (n= 20) was a participant from Nusaiba College.

**Sample type:** Purposive sample.

**Sample Criteria:** All students in all grades with previous diagnosis of PCOS, age from 18 to 25 years, not married and had no medical and gynecological problem except PCOS.

**Tools of Data Collection:** A data collection tools were developed by the researcher after reviewing the related literature, its including the following:-

**Tool (I): Identification of student with PCOS was used to assess clinical and biochemical parameters of PCOS.**

**Tool (II) PCOS Structured Interviewing Questionnaire:** It encompassed three main parts:-

**Part (1):** General and physical characteristics of the students such as age, residence, level of fathers and mother’s education, and family history of the polycystic ovarian syndrome and anthropometric measurements (height, weight, body mass index and waist circumference).

Part (2): The menstrual history of the students such as the age of menarche, cycle length, duration of menstrual
blood flow, and number and rhythm of menstrual cycles through the previous year.

Part (3): This part was used to assess students’ knowledge regarding polycystic ovarian syndrome such as (definition, causes, signs and symptoms, complications, and treatment). Student’s knowledge would be checked with a model key answer, the score range was assigned to each answer as follows; correct = 2 score, while incorrect = 1 score.

Tool (III): Assessment of Lifestyle Habits Tool: This tool was designed by the researcher in the Arabic language to assess the student’s lifestyles habits. It encompassed four main parts: food habits, physical activity, leisure time, and sleep pattern.

Tool (IV): Follow up sheet: Was constructed by the researcher to assess the outcome measures and was filled by the students.

Tool (V): Psychological Assessment Tool: This tool was developed by the researcher to assess psychological health such as anxiety, depression, and mood fluctuation for students related to lifestyle before & after the intervention. The score range was assigned to each answer as follows; no problem = 3 score, medium degree problems = 2, while large degree problems = 1 score.

Supported material:

The educational program was designed by the researcher and written in simple Arabic language using illustrated pictures to facilitate the students’ understanding the information about PCOS.

Content validity and reliability: All tools of data collections were developed and sent to three experts at gynecological department to assess the content. Also, assess reliability of tool through Coronbach alpha test = 0.826.

Ethical Considerations:

- An official approval was granted from the Scientific Research Ethical Committee in the Ministry of Health of Jordan to conduct the study in colleges mentioned above.
  - The aim of the study was explained to each student before applying the tools to gain her confidence and trust. And oral consent was obtained from each student before participating in the study.
  - Data was confidential and using coding system for it. The study did not cause any harmful effects on participating students. Each student has right to withdraw from the study at any time.

Field work:

The study was carried out through four phases: Preparatory, implementation, follow-up, and evaluation phase.

- Preparatory phase: The researcher reviewed the current advanced and past relevant literature related by using the available local and international books, magazines, and computer search, then designed and prepared tools for data collection.

- Implementation phase:

The study conducted from the beginning of October 2018 until July 2019. At the beginning of the interview, the researcher greeted the students, introduced herself to all students and explained the purpose of the current study; the researcher distributed the identification students with PCOS tool for all students and analyzed it to exclude the students without PCOS.

The researcher took the students included in the study who suffer from PCOS in another session. Oral approval of the student was obtained after explaining the purpose of the study. Then distribute all tools of research to all the years as (pre-test). The average time needed for the completion of each questionnaire was (30-50) minutes.

The study group was divided into subgroups (10 groups) and every group contained (5) students. The researcher has implemented 5 sessions for each group (5 days / week), 1 hour for each session according to the students’ schedule. In the first session, the researcher was distributed the educational program for the students
Based on their needs and baseline data obtained from pre-test.

After the final session, the post-test was conducted by using the same tool used in the pre-test. The researcher was repeated the post-test after three months of the conduction first post-test. The researcher has applied the follow-up after six months. The same previous fieldwork steps were applied to all subgroups in both colleges.

- **Follow-up phase:** It took nine months for students after receiving the educational program, the researcher followed up with the students for assuring that they followed the diet and exercise program.

- Evaluation phase: was started post-intervention to evaluate the effect of educational program on lifestyle for paramedical students with PCOS by using the same questionnaire used before the implementation of the program. In the six month, the follow up test was conducted.

**Results**

Figure (1): Shows that, 745 of the studied sample students were screened for PCOS, using Identification of student with PCOS tool. 90.87% of them were free from the symptom of PCOS, while 9.12% of them diagnosed of PCOS.

Table (1): Reveals that, more than two third of the studied sample (73.5%) had age ranged between 18-20 years with mean age 19.89 years, more than one third grade had 2nd grade, more than half of students’ lives in city , and the majority of the studied sample (80.9%) lives in the nucleolus family. Also, half of the studied sample had educated mothers at the secondary level, while (44.1%) of them had educated fathers at the university level.

Table (2): Shows that, there was a highly significant difference in all items related to the studied students’ lifestyle about diet pattern as compared pre, post, and follow-up intervention (P≤0.001) except the place of daily meals there was no statistical differences between pre, post, and follow up applying to the educational program.

Table (3): Clears that, there was a highly significant difference in studied students’ lifestyle regarding their exercise as compared pre, post, and follow-up applying to the educational program (P≤0.001). While there was no significant differences in times of exercise as compared pre, post, and follow-up applying to educational program (P>0.05).

Table (4): Illustrates that, there was a highly significant improvement in the studied students’ physical characteristics about weight, body mass index, and waist circumference as compared before and after the educational program.

Table (5): Demonstrates that, there was a highly significant improvement in the studied students’ knowledge about PCOS definition, causes, risk factors, signs and symptoms, and the healthy lifestyle of PCOS as compared to pre, post, and follow-up applying the educational program (P≤0.001).

![Figure (1): Percentage distribution of the students regarding the diagnosed of PCOS (n=745).](image)
Table (1): Frequency distribution of the students diagnosed with PCOS according to their general characteristics (n=68).

<table>
<thead>
<tr>
<th>General characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-20 years</td>
<td>50</td>
<td>73.5</td>
</tr>
<tr>
<td>21-23 years</td>
<td>15</td>
<td>22.1</td>
</tr>
<tr>
<td>24 - 25 years</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td><strong>Mean ± SD</strong></td>
<td>19.89±1.7</td>
<td></td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>35</td>
<td>51.5</td>
</tr>
<tr>
<td>Village</td>
<td>33</td>
<td>48.5</td>
</tr>
<tr>
<td><strong>Family type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nucleolus</td>
<td>55</td>
<td>80.9</td>
</tr>
<tr>
<td>Extended</td>
<td>13</td>
<td>19.1</td>
</tr>
<tr>
<td><strong>Mother education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Primary</td>
<td>11</td>
<td>16.2</td>
</tr>
<tr>
<td>Secondary</td>
<td>34</td>
<td>50.0</td>
</tr>
<tr>
<td>University</td>
<td>20</td>
<td>29.4</td>
</tr>
<tr>
<td><strong>Father education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Primary</td>
<td>14</td>
<td>20.6</td>
</tr>
<tr>
<td>Secondary</td>
<td>21</td>
<td>30.9</td>
</tr>
<tr>
<td>University</td>
<td>30</td>
<td>44.1</td>
</tr>
</tbody>
</table>

Table (2): Frequency distribution of the students diagnosed with PCOS according to their diet pattern pre, post, and follow up applying for the educational program (n=68).

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Follow up</th>
<th>X²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of meals/day</strong></td>
<td>NO  %</td>
<td>NO  %</td>
<td>NO  %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One meal/day</td>
<td>5  7.4</td>
<td>4  5.9</td>
<td>3  4.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two meals/day</td>
<td>35 51.4</td>
<td>16 23.5</td>
<td>14 20.6</td>
<td>33.18</td>
<td>0.001**</td>
</tr>
<tr>
<td>Three meals/day</td>
<td>11 16.2</td>
<td>33 48.5</td>
<td>42 61.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four meals or more/day</td>
<td>17 25.0</td>
<td>15 22.1</td>
<td>9 13.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Place of daily meals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside the house</td>
<td>13  19.1</td>
<td>16  23.5</td>
<td>22  32.4</td>
<td>4.903</td>
<td>0.297</td>
</tr>
<tr>
<td>Outside the house</td>
<td>41  60.3</td>
<td>35  51.5</td>
<td>30  44.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The college housing</td>
<td>14  20.6</td>
<td>17  25.0</td>
<td>16  23.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>Once a week</td>
<td>2-3 times a week</td>
<td>4 or more</td>
<td>( \chi^2 )</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------</td>
<td>-------------</td>
<td>------------------</td>
<td>-----------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>Eat meals from outside the home/week</strong></td>
<td>8</td>
<td>14</td>
<td>25</td>
<td>21</td>
<td>7.543</td>
</tr>
<tr>
<td>Rarely</td>
<td>11.8</td>
<td>20.6</td>
<td>36.8</td>
<td>30.9</td>
<td>8</td>
</tr>
<tr>
<td>Once a week</td>
<td>21</td>
<td>10</td>
<td>19</td>
<td>18</td>
<td>7.543</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>30.9</td>
<td>14.7</td>
<td>27.9</td>
<td>26.5</td>
<td>7.543</td>
</tr>
<tr>
<td>4 or more</td>
<td>48.5</td>
<td>14.7</td>
<td>13</td>
<td>12</td>
<td>7.543</td>
</tr>
<tr>
<td><strong>Type of highly used food/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39.544</td>
</tr>
<tr>
<td>Meat</td>
<td>8</td>
<td>5.9</td>
<td>14.7</td>
<td>10.3</td>
<td>39.544</td>
</tr>
<tr>
<td>Fish</td>
<td>4</td>
<td>6.8</td>
<td>8.8</td>
<td>8.8</td>
<td>39.544</td>
</tr>
<tr>
<td>Vegetables and fruits</td>
<td>10</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>39.544</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>25</td>
<td>13</td>
<td>19.1</td>
<td>10</td>
<td>39.544</td>
</tr>
<tr>
<td>Sugar food</td>
<td>16</td>
<td>10</td>
<td>14.7</td>
<td>5</td>
<td>39.544</td>
</tr>
<tr>
<td>Legumes</td>
<td>3</td>
<td>3</td>
<td>4.4</td>
<td>2</td>
<td>39.544</td>
</tr>
<tr>
<td>All of them</td>
<td>2</td>
<td>16</td>
<td>23.5</td>
<td>27</td>
<td>39.544</td>
</tr>
<tr>
<td><strong>Meals skip/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26.039</td>
</tr>
<tr>
<td>Rarely</td>
<td>9</td>
<td>13.2</td>
<td>14.7</td>
<td>15</td>
<td>26.039</td>
</tr>
<tr>
<td>Once a week</td>
<td>12</td>
<td>17.6</td>
<td>22</td>
<td>24.3</td>
<td>26.039</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>34</td>
<td>50.0</td>
<td>25</td>
<td>36.8</td>
<td>26.039</td>
</tr>
<tr>
<td>4 or more</td>
<td>13</td>
<td>31.1</td>
<td>16.2</td>
<td>9</td>
<td>26.039</td>
</tr>
<tr>
<td><strong>Eat fast food/week</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33.398</td>
</tr>
<tr>
<td>Rarely</td>
<td>11</td>
<td>16.2</td>
<td>23.5</td>
<td>32</td>
<td>33.398</td>
</tr>
<tr>
<td>Once a week</td>
<td>10</td>
<td>14.7</td>
<td>36.8</td>
<td>18</td>
<td>33.398</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>37</td>
<td>54.4</td>
<td>29.4</td>
<td>15</td>
<td>33.398</td>
</tr>
<tr>
<td>4 or more</td>
<td>10</td>
<td>14.7</td>
<td>10.3</td>
<td>3</td>
<td>33.398</td>
</tr>
<tr>
<td><strong>Eat sweets, chocolate, cake</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43.745</td>
</tr>
<tr>
<td>Once a week</td>
<td>11</td>
<td>16.2</td>
<td>49</td>
<td>72.1</td>
<td>43.745</td>
</tr>
<tr>
<td>2-3 times a week</td>
<td>20</td>
<td>29.4</td>
<td>19.1</td>
<td>9</td>
<td>43.745</td>
</tr>
<tr>
<td>4 or more</td>
<td>37</td>
<td>36.8</td>
<td>36.8</td>
<td>10</td>
<td>43.745</td>
</tr>
<tr>
<td><strong>Freq. eating fruits/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30.464</td>
</tr>
<tr>
<td>Sometimes</td>
<td>34</td>
<td>50.0</td>
<td>23.5</td>
<td>32</td>
<td>30.464</td>
</tr>
<tr>
<td>Once</td>
<td>25</td>
<td>36.8</td>
<td>45.6</td>
<td>34</td>
<td>30.464</td>
</tr>
<tr>
<td>Twice</td>
<td>7</td>
<td>10.3</td>
<td>22.1</td>
<td>3</td>
<td>30.464</td>
</tr>
<tr>
<td>Three more times</td>
<td>2</td>
<td>8</td>
<td>16.2</td>
<td>6</td>
<td>30.464</td>
</tr>
<tr>
<td><strong>Freq. eating meat/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35.200</td>
</tr>
<tr>
<td>Sometimes</td>
<td>43</td>
<td>63.2</td>
<td>20</td>
<td>11</td>
<td>35.200</td>
</tr>
<tr>
<td>Once</td>
<td>22</td>
<td>32.4</td>
<td>58.8</td>
<td>50</td>
<td>35.200</td>
</tr>
<tr>
<td>Twice</td>
<td>3</td>
<td>4.4</td>
<td>11.8</td>
<td>7</td>
<td>35.200</td>
</tr>
<tr>
<td><strong>Amount of water consumed daily in cups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.018</td>
</tr>
<tr>
<td>2 Cups</td>
<td>29</td>
<td>42.6</td>
<td>14.7</td>
<td>6</td>
<td>31.018</td>
</tr>
<tr>
<td>3-4 Cups</td>
<td>18</td>
<td>26.5</td>
<td>36.8</td>
<td>20</td>
<td>31.018</td>
</tr>
<tr>
<td>5-6 Cups</td>
<td>13</td>
<td>19.1</td>
<td>20.6</td>
<td>16</td>
<td>31.018</td>
</tr>
<tr>
<td>7-8 Cups</td>
<td>8</td>
<td>11.8</td>
<td>27.9</td>
<td>26</td>
<td>31.018</td>
</tr>
</tbody>
</table>

*significant (P < 0.05) non-significant (P>0.05) **highly significant (P≤0.001)
Table (3): Frequency distribution of the students diagnosed with PCOS according to their exercise pattern pre, post, and follow up applying for the educational program (n=68).

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Follow up</th>
<th>X 2</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Exercise regularly</td>
<td>NO %</td>
<td>NO %</td>
<td>NO %</td>
<td>49.095</td>
<td>0.001**</td>
</tr>
<tr>
<td>No</td>
<td>43 63.2</td>
<td>21 30.9</td>
<td>8 11.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td>9 13.2</td>
<td>14 20.6</td>
<td>13 19.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 a week</td>
<td>11 16.2</td>
<td>19 27.9</td>
<td>17 25.0</td>
<td>57.145</td>
<td>0.001**</td>
</tr>
<tr>
<td>3-4 a week</td>
<td>5 7.4</td>
<td>14 20.6</td>
<td>30 44.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Kind of sport practiced

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>7 25.0</td>
<td>20 29.4</td>
<td>25 36.8</td>
</tr>
<tr>
<td>Running</td>
<td>1 1.5</td>
<td>1 1.5</td>
<td>1 1.5</td>
</tr>
<tr>
<td>Aerobics exercise</td>
<td>6 8.8</td>
<td>13 19.1</td>
<td>12 17.6</td>
</tr>
<tr>
<td>Swimming</td>
<td>1 1.5</td>
<td>1 1.5</td>
<td>1 1.5</td>
</tr>
<tr>
<td>House sports machines</td>
<td>10 41.7</td>
<td>33 48.5</td>
<td>29 42.6</td>
</tr>
</tbody>
</table>

Times of Exercise

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>25 36.8</td>
<td>30 44.1</td>
<td>26 38.2</td>
</tr>
<tr>
<td>Afternoon</td>
<td>6 8.8</td>
<td>4 5.9</td>
<td>2 2.9</td>
</tr>
<tr>
<td>Evening</td>
<td>37 54.4</td>
<td>34 50.0</td>
<td>40 58.8</td>
</tr>
</tbody>
</table>

*significant (P < 0.05) non-significant (P>0.05) **highly significant (P≤0.001)
Table (4): Frequency distribution of the diagnosed studied sample according to the physical characteristics pre, post, and follow up applying the educational program (n= 68).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td><strong>Weight (Kg)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=60 kg</td>
<td>2</td>
<td>2.9</td>
<td>11</td>
<td>16.2</td>
</tr>
<tr>
<td>61-70 kg</td>
<td>12</td>
<td>17.6</td>
<td>36</td>
<td>52.9</td>
</tr>
<tr>
<td>71-80 kg</td>
<td>37</td>
<td>54.4</td>
<td>21</td>
<td>30.9</td>
</tr>
<tr>
<td>81-90 kg</td>
<td>14</td>
<td>20.6</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>&gt;90kg</td>
<td>3</td>
<td>4.4</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>76.6 ±7.7kg</td>
<td>68.6±6.6kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Body Mass index (kg / m²)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight &lt;18.5 (kg / m²)</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Normal weight 18.5-24.9 (kg / m²)</td>
<td>2</td>
<td>2.9</td>
<td>20</td>
<td>29.4</td>
</tr>
<tr>
<td>Over weight 25-29.9 (kg / m²)</td>
<td>43</td>
<td>63.2</td>
<td>45</td>
<td>66.2</td>
</tr>
<tr>
<td>Obese 30-39.9 (kg / m²)</td>
<td>22</td>
<td>32.4</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>29.1 ± 2.2</td>
<td>26.1±1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Waist circumference (cm)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;76 cm</td>
<td>0</td>
<td>0.0</td>
<td>11</td>
<td>16.2</td>
</tr>
<tr>
<td>76-80 cm</td>
<td>5</td>
<td>7.4</td>
<td>28</td>
<td>41.2</td>
</tr>
<tr>
<td>81-88 cm</td>
<td>31</td>
<td>45.6</td>
<td>14</td>
<td>20.6</td>
</tr>
<tr>
<td>≥88 cm</td>
<td>32</td>
<td>47.1</td>
<td>15</td>
<td>22.1</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>90.7±7.2</td>
<td>81.4±6.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (5): Frequency distribution of the students diagnosed with PCOS regarding their knowledge about PCOS pre, post, and follow up applying the educational program (n=68).

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre intervention</th>
<th>Post intervention</th>
<th>Follow up</th>
<th>X²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct</td>
<td>Incorrect</td>
<td>Correct</td>
<td>Incorrect</td>
<td>Correct</td>
</tr>
<tr>
<td>Definition of PCOS</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Definition of menstrual cycle</td>
<td>2</td>
<td>2.9</td>
<td>66</td>
<td>97.1</td>
<td>57</td>
</tr>
<tr>
<td>Female internal genital organs</td>
<td>15</td>
<td>22.1</td>
<td>53</td>
<td>77.9</td>
<td>53</td>
</tr>
<tr>
<td>Causes of PCOS</td>
<td>2</td>
<td>2.9</td>
<td>66</td>
<td>97.1</td>
<td>48</td>
</tr>
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<td>Risk factors of PCOS</td>
<td>7</td>
<td>10.3</td>
<td>61</td>
<td>89.7</td>
<td>57</td>
</tr>
<tr>
<td>Signs &amp; symptoms of PCOS</td>
<td>3</td>
<td>4.4</td>
<td>65</td>
<td>95.6</td>
<td>60</td>
</tr>
<tr>
<td>Complications of PCOS</td>
<td>4</td>
<td>5.99</td>
<td>64</td>
<td>4.1</td>
<td>62</td>
</tr>
<tr>
<td>Investigations of PCOS</td>
<td>5</td>
<td>7.49</td>
<td>63</td>
<td>2.6</td>
<td>64</td>
</tr>
<tr>
<td>Treatment of PCOS</td>
<td>13</td>
<td>19.1</td>
<td>55</td>
<td>80.9</td>
<td>59</td>
</tr>
<tr>
<td>Healthy life style (diet &amp; exercise) of PCOS</td>
<td>10</td>
<td>14.7</td>
<td>58</td>
<td>85.3</td>
<td>61</td>
</tr>
</tbody>
</table>

*significant (P < 0.05) non-significant (P>0.05) **highly significant (P≤0.001)

Discussion

Polycystic ovarian syndrome is a complex gynecological endocrine disorder that affects many adolescent girls and women of child-bearing age. It is described by a combination of signs and symptoms of androgen excess and ovarian dysfunction in the absence of other specific diagnoses. In addition, PCOS may occur at birth but does not cause symptom until puberty. [7]

Therefore, the current study aimed to evaluate the educational program and its effect on knowledge and
lifestyles among paramedical students with polycystic ovarian syndrome. The results of the current study aimed to test the research hypothesis “Using of educational program among paramedical students with PCOS will improve their knowledge scores and their lifestyles than before applying the educational program”. Additionally, this study is quasi-experimental (pre-test and post-test) design conducted in two government colleges in Jordan.

Regarding the distribution of the total studied sample, the finding of the current study revealed that, the prevalence of PCOS was found to be 9.12% among the total study sample.

The finding in the current study is congruent with the study conducted by Vidya Bharathi, et al., [21] in India to assess the prevalence of PCOS, which reported that 10% of the Indian women suffered from PCOS. On the contrary, the finding of the current study does not match with the finding of the study conducted by Biradar & Shamanaewodi [9] who reported that, the prevalence of PCOS was 23.8%. From the researcher’s point of view, the prevalence of PCOS in the current study was within the worldwide range (5%-10%) according to the National Institute of Health 2012.

Regarding the distribution of the study sample according to their general characteristics, the current study revealed that, more than two-thirds of them had from 18-20 years old, with mean age 19.89 years, and the majority of them live in nucleolus family. Moreover, more than half of them live in the city. Also, half study sample mothers educated at the secondary level, while less than half of fathers educated at the university level.

The findings in the current study are congruent with the study conducted by Shrivastava & Jagdev [18] who studied the effectiveness of self-instructional module on knowledge regarding polycystic ovarian syndrome among B.Sc. nursing students of selected nursing college and stated that, the age of the majority of the participated students was between 17 to 20 years and more than half of them lived in the city.

On the contrary, the finding of the current study does not match with the finding of the study conducted by Mazia [12] who studied knowledge and awareness of polycystic ovarian syndrome among university students in Narayangonj and mentioned that, the age of more than two-thirds of the participants ranged from 21 to 25 years old.

Regarding the studied samples diet pattern revealed that, there was a highly significant difference related to the studied students’ lifestyle about diet pattern as compared pre, post, and follow-up intervention.

The current study is in agreement with Pitchai, et al., [16] who studied the awareness of lifestyle modification in females diagnosed with polycystic ovarian syndrome in India and reported that, the majority of the studied sample altered their diet primarily in diet composition after intervention.

In the same line, present result is supported by Batool, et al., [4] who studied the mean intake of different dietary factors in young females with polycystic ovarian disease in comparison with control individuals and revealed that, dietary interventions focused on improvement of diet quality such as diet with low fat and high fiber content is advised for patients with PCOS.

Regarding the studied samples exercise pattern, the current study reported that, there was a highly significant difference in the studied students’ lifestyle regarding their exercise pattern compared pre, post, and follow-up applying to the educational program.

The current study is in agreement with study done by Abdolahian, et al., [1] who studied the effect of lifestyle modifications on anthropometric, clinical, and biochemical parameters in adolescent girls with PCOS in Iran and revealed that, exercise interventions were associated with significant changes in the menstrual cycles, also improvement in metabolic and hormonal findings.

From the researcher’s point of view, this result may be because the majority of students had a wish to good body image and conceive in the future.

Regarding the studied sample knowledge about PCOS, the current study revealed that, there was a highly significant difference regarding their knowledge about PCOS as compared to pre, post, and follow up applying the educational program.
The present result is supported by Mohamed [13] who studied the effect of a educational program on the level of knowledge regarding polycystic ovarian syndrome among adolescent girls and stated that there is a highly statistically significant improvement in students’ knowledge immediately after program implementation. In the same line, the current study is supported by Rawat et al., [17] who reported that, the mean post-test score was higher than that the pre-test mean knowledge score after intervention.

From the researcher’s point of view, this result may be due to the clarity and consistency of the educational sessions and using suitable teaching methods.

Regarding anthropometric measures of the studied sample, the current study revealed that, there was a highly significant difference in all items concerning the studied students’ anthropometric measures (weight, body mass index, and waist circumference) as compared pre, post, and follow-up applying the educational program.

The present result is in agreement with study done by Marzouk et al., [11] who studied the impact of lifestyle modification program on menstrual irregularity among overweight or obese women with PCOS and concluded that, significant improvement in body mass index, and waist circumference post intervention. Similarly, this result is in agreement with Almukhtar [3] who studied the effect of an educational program about polycystic ovarian syndrome knowledge on adolescent female students in Iraq and indicated that, presence of significant improvement in adolescent female students’ weight and their body mass index.

On the contrary, the finding of the current study did not match with the finding of the study conducted by Mani et al., [10] who studied the effectiveness of structured education programs in women with polycystic ovary syndrome and stated that, structured education programs did not increase physical activity or improve biochemical markers in overweight and obese women with PCOS.

From the researcher’s point of view, this result may be due to adherence to the instructions and diet system that affect their anthropometric measures positively.

**Conclusion**

Applying of an educational program for students with PCOS will significant improvement knowledge scores and also lifestyles. The conclusion of present study will support the hypothesis of study and aim.

**Recommendations**

1. Applying screening program for PCOS in young students is a very important to reduce the long-term health complications associated with PCOS.

2. Providing an educational program about knowledge related to PCOS and hazards effects on reproductive health for paramedical students.

3. Integrating health education and counseling to support the student suffering from PCOS and their families for decreasing obesity which effect on students lifestyle.

**Conflict of Interest**: Not present any conflict

**Funding**: Self-funding, without any external source.

**References**


Study of Socio-Demographic Profile of Deaths due to Burns in Autopsies Conducted at Gandhi Medical College, Bhopal

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Abstract

In India, incidence of burn injuries is quite high due to widespread illiteracy, old customs like dowry and use of kerosene for lighting and cooking; poverty, overcrowding and unemployment, other social & emotional factors, lack of safety measures at industrial setup & lack of adequate healthcare services. Although, mortality in cases of burns has been reduced considerably by modern advance healthcare services, yet death due to burns is not an uncommon event.

The study was carried out with the aim to study the various demographic parameters related to deaths due to burns such as age, sex, occupation, socio-economic status, marital status, locality and source of fire.

It was a 1.6 years prospective study of cases of burns autopsied at the mortuary of Gandhi medical college, Bhopal. The relevant information was obtained from inquest papers, history provided by relatives of the deceased and postmortem examination.

On data analysis, it was found that incidence of burns was found to be higher higher in females (55.0%) as compared to males (45.0%). young adults between the age group of 21-30 years have been the major victims of burns (41.00%). In both sexes, majority of the burn cases were married (74%). Most of the burn cases belonged to middle class, were housewives (51 %), and from rural areas (75 %). Hence, steps need be taken by Govt., NGOs and medical professionals to reduce the mortality due to burns.

Keywords: burns, demographic, incidence, post mortem.

Introduction

Invention of fire was one of the greatest achievement of the human civilization. It is a double edged sword for man. Burn is an injury produced by application of dry/moist heat such as fire flame, boiling liquids, corrosive chemicals, radiant heat or some heated substances like metal, glass to the body. Local injury to the body by heat may result from dry heat, application

of hot bodies, licking by flames result in simple burns, moist heat leads to scald, corrosive chemicals result in corrosive burns. Electric spark, discharges, flashes & lightning leads to Electric burns.18

Every year more than 02 million people sustain burns in India.4 As per WHO, women in the South East Asia region have highest rate of burns, accounting for 27% of global burn deaths and nearly 70% of burn deaths in the region.19

In India, incidence of burns is quite high due to widespread illiteracy, old customs like dowry, and use of kerosene for lighting, cooking, poverty; overcrowding and unemployment, other social & emotional factors, lack of safety measures at industrial setup & lack of
adequate healthcare services. Although, mortality in cases of burns has been reduced considerably by advanced healthcare services, yet death due to burns is not an uncommon event.

This study was conducted to study the various demographic parameters related to deaths due to burns such as age, sex, occupation, socio-economic status, marital status, locality and source of fire.

**Material and Methods**

Present study was carried out in the Department of Forensic Medicine and Toxicology, at Gandhi Medical College & associated Hamidia Hospital, Bhopal for a period of 1.6 years.

All the burn cases either admitted or directly brought dead to the Hamidia Hospital Bhopal, cases with proper hospital records and cases of spot death due to burns were included. Out of those, 100 cases were selected for the study, by simple random sampling.

The detailed information pertaining to case such as age, sex, residence, marital status, education, occupation, date & time of the incidence, date & time of death, place of burns & alleged cause of burns, source of catching fire etc. were collected from accompanying police personal, relatives, friends, neighbors or any other available person present at the time of incidence, by a questionnaire. Thorough & complete post-mortem examination was done in each case and autopsy reports analyzed with the relevant laboratory reports.

**Results and Discussion**

On analyzing the data, following results were obtained:

**I. Sex wise distribution of cases**

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>37</td>
<td>37.0%</td>
</tr>
<tr>
<td>Female</td>
<td>63</td>
<td>63.0%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

Out of the 100 cases, included in the study, there were 37 males (37.0%) and 63 females (63.0%). Thus, females outnumbered males and male female ratio was 1:1.702. This is similar to the findings of Mangal HM and Pathak A (2007) who studied a total of 300 cases and found M: F ratio was 1:2.7. Buchade D et al (2011) also observed preponderance of female over male with a M:F ratio of 1:1.69. Harish D et al (2013) in their retrospective study comprising a total of 2042 medico-legal autopsies in which deaths due to burns comprised 381 (19%) cases observed male: female ratio of 1:1.7. Khandare SV and Pawale DA (2014) carried out a retrospective study of 1500 autopsies out of which 120 were deaths due to burns. Female preponderance was observed, with 77.5% and 22.5% deaths due to burns in females and males respectively.

Females were more prone to the burn injuries because of their domestic activities which require association with fire sources. Moreover, Indian women wear dresses like the sari and the salwar-kurta with dupatta, which are often made of synthetic material, covering almost the whole body. Such clothes make them prone to burn injuries.

This is contradictory to the study by Memchoubi and H. Nabachandra (2007) who observed slight male
II. Age wise distribution of cases

Graph -1: Age and Sex wise distribution of burn deaths (n=100)

During the study period, maximum incidence was noted in females (31.00%) as well as males (10.00%) in the age group of 21-30 years. Similar findings have been reported by Harish D et al\textsuperscript{18}, Memchoubi and H. Nabachandra (2007)\textsuperscript{17}, Mazumder A and Patowary A (2013)\textsuperscript{16}, Chawla R et al (2011)\textsuperscript{5} and Ande JD et al (2013)\textsuperscript{2}. The age group 21-30 years is the young adult group and is the most common age for marriage. High incidence may be explained by the fact that young adults are generally active and exposed to hazardous situations both at home and at work.

III. Distribution of cases according to Marital status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Male No.</th>
<th>Female No.</th>
<th>Total No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>23</td>
<td>51</td>
<td>74 (74%)</td>
</tr>
<tr>
<td>Unmarried</td>
<td>13</td>
<td>11</td>
<td>24 (24%)</td>
</tr>
<tr>
<td>Widow</td>
<td>0</td>
<td>1</td>
<td>1 (1.00%)</td>
</tr>
<tr>
<td>Widower</td>
<td>1</td>
<td>0</td>
<td>1 (1.00%)</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>63</td>
<td>100 (100%)</td>
</tr>
</tbody>
</table>
Most of the victims i.e. 74 (74%) were married and 24 (24.00%) were unmarried with married-unmarried ratio of 3.08:1. Out of the females, 51 (81%) were married and 11 (17.40%) were unmarried, in contrast to males where 23 (62%) were married and 13 (35%) were unmarried. 1 (1.5%) case was widow and 1 (2.7%) case was widower. Harish D et al (2013)\textsuperscript{10}, GowriS et al (2012)\textsuperscript{7}, Buchade D et al (2011)\textsuperscript{4}, Mangal HM and Pathak A (2007)\textsuperscript{15} and Gaffar UB et al (2008)\textsuperscript{6} also reported that maximum incidence was among married females in their early years of marriage, this is because of the marital maladjustment and bride burning for the want of dowry in recently married females.

IV. Distribution of cases based on Locality

Graph-2 depicts Locality wise distribution of burn cases

Majority of the victims i.e. 75 (75.00%) belonged to rural (village) areas and rest 25 (25.00%) were from urban (city) areas. Gandhi Medical College and Hamidia hospital, Bhopal is a tertiary health care institute surrounded by villages on 3 sides. Burn victims due to serious nature of illness and because of medicolegal reasons have been referred to this apex hospital. Gaffar UB et al (2008)\textsuperscript{6} in their study also noted that maximum number of victims were from rural areas (68.4%) and less number of cases from urban areas (31.6%).
V. Occupation wise distribution of cases

51 (81%) cases who suffered burn injuries were housewives followed by 2 (3.00%) females who were students and 10 (16.00%) were dependent/unemployed. In males, maximum cases reported were dependent/unemployed, accounting to be 11 (30.00%) followed by 9 (24%) who were farmers and laborers 9 (24%). Similarly, Aggarwal BBL and Chandra J (1970)\(^1\) observed that all the females of 3rd decade and some of 2nd decade who suffered burn injuries were housewives. Haralkar SJ and Rayate M (2005)\(^9\) also observed in their study of 343 admitted burn cases that 49.85% were housewives, 6.2% agri-labourers, 10.2% non agri-labourers, 3.5% own business and unemployed 11.08% and doing no work were 18.06%. Female preponderance is due to involvement of females in the kitchen work. Similar observation were made by Harish D et al (2013)\(^{10}\) and Chawla R et al (2011)\(^5\).

VI. Distribution of cases according to Socio-Economic status

Graph-4: depicts distribution of burn cases according to socio economic status
According to Kuppuswamy’s classification of socio economic status, this study showed maximum number of burn cases belonging to middle class i.e. 83 (83%) cases, with 53 (53%) females. Minimum cases were in upper middle class i.e. 7 out of which 5 were females.

**VII. Distribution of cases based on Source of Catching Fire**

![Graph-5: depicts distribution of burn cases according to Source of Catching Fire](image)

The source of fire was kerosene (lamp (chimney)/kerosene stove/pouring of kerosene) in 79 (79.00%) cases, being the commonest one; while gas (stove/cylinder) was involved in 12 (10%) cases and anghiti/chullha in 8 (6.67%). Overall, the universal source of fire in the household for cooking purposes were responsible for 94 (94.00%) instances of the victims catching fire. Kerosene lamp (chimney) is very widely used in rural areas for lighting purpose. In most of the cases, mishandling of chimney results in it falling over body and catching fire, as observed in most of the cases. Fire due to electricity was responsible for 02 (02.00%).

The observations of this study is in agreement with studies of Jayaraman V et al (1993)\(^{12}\), Singh D et al (2003)\(^{20}\), Bilwani PK and Gupta R (2003)\(^{3}\) and Gupta R et al (2012)\(^{8}\). This was probably because kerosene is cheap and easily accessible and it was mostly included in the household or kitchen materials. Similar facts had been previously emphasized in studies by Ho WS et al (2002)\(^{11}\) and Jaiswal AK et al (2007)\(^{13}\).

**Conclusion**

It could be concluded from the present study that burn deaths have been found to be much more prevalent in females as compared to males, most of which were housewives, in young adults of age 21-30 years, with preponderance in married population, mostly residing in rural areas with maximum number of burn cases seen in middle class, kerosene lamp being the most common source of catching fire.

As the problem of thermal deaths still persists in our country, the government along with various working groups and the NGOs, including the doctors need to put in more sincere efforts. Dowry deaths, curse to our so-called modern society, are still prevalent, in spite of stringent laws and amendments in the acts. Strict implementation of the Anti-dowry Act would go a long way in bringing down the incidence of these so called ‘accidents’.

Following the safety instructions like putting the lights off while going out, wearing fitted and cotton cloths while cooking, not leaving a fire source unattended etc. will definitely help to reduce the incidence of burn injuries. The NGOs and social groups must arrange a periodic effort in educating the rural people. Steps should be taken not only to minimize burn mortality but also to prevent and reduce their incidence at least in cases where human errors and human greed plays a significant role.

Conflict of Interest: None

Source of Funding: self with assistance from the institute.

Ethical Clearance: The study protocol was approved by the Institutional Ethics Committee of Gandhi Medical College, Bhopal.

References
18. Modi NJ. Injuries from burns, lightning and electricity, Asphyxiants. Modi’s Textbook of Medical Jurisprudence and Toxicology. 20th Ed.

Hypertension among Elderly in Indonesia: Analysis of the 2018 Indonesia Basic Health Survey

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2 Researcher, Center of Research and Development of Humanities and Health Management, Ministry of Health, Jakarta, Indonesia

Abstract

The study aims to analyze descriptive statistics of the prevalence of hypertension among the elderly in Indonesia. The data derived from the 2018 Indonesia Basic Health Survey. The analysis was performed statistically descriptive. The analysis was carried out with a sample of 58,666 elderly. The results show that the prevalence of hypertension based on doctor’s diagnosis was 32.6%, the highest in the age group ≥80 years (37.4%), higher in women (36.9%), and the richest elderly (34.4%). The prevalence of hypertension among elderly people in Indonesia who are currently taking antihypertension drugs was 89.2%, tends to be higher in urban (89.6%) and women (89.4%), better education (92.3%), the richest (90.7%). The proportion of routinely taking hypertension medication in the elderly population with hypertension in Indonesia was 58.9% routine, 30.3% non-routine, and 10.1% not taking medication. The highest proportion of elderly with hypertension who regularly took medication was in the 60-69 age group (59.1%), lived in urban (62.8%), and male (59.1%). It was concluded that the hypertension prevalence among elderly people in Indonesia was dominated by the ≥80 age group and the female elderly. More than half of the elderly adhere to taking hypertension medication routinely according to doctor’s instructions, the highest in the 60-69 age group, and more among male elderly. The prevalence of hypertension tends to be higher among the elderly who live in urban and increases with the better of education and better wealth status.

Keywords: hypertension, elderly, big data, community health, public health.

Background

In five decades, the percentage of elderly people in Indonesia has approximately doubled to 8.97% (23.4 million). Female elderly (9.47%) were more numerous than male elderly (8.48%)1. The number of elderly people continues to increase every year, in 2019 amounting to 9.7 million people, in 2025 it is predicted to increase by 12.54 million people2. In line with the increase in life expectancy, the health problems faced are increasingly complex. With the increase in the number of elderly people, the tendency for degenerative diseases is increasing, including hypertension3,4.

Hypertension is a serious medical condition that significantly increases the risk of heart, brain, kidney, and other diseases, which are the leading cause of premature death worldwide. An estimated 1.13 billion people worldwide suffer from hypertension, two-thirds of whom live in low- and middle-income countries. In 2015, 1 in 4 men and 1 in 5 women developed hypertension. Less than 1 in 5 people with hypertension have the problem under control. The global target for non-communicable diseases is to reduce the prevalence of hypertension by 25% by 20255.

Over the past 10 years (2000-2010), the prevalence of hypertension fell by 2.6% in high-income countries but increased by 7.7% in low- and middle-income countries. In high-income countries, awareness, therapy, and control of hypertension have increased compared to low and middle-income countries. This condition shows
The 2018 Indonesia Basic Health Survey uses a definition of hypertension based on the Joint National Committee (JNC) 7 criteria, namely if systolic blood pressure 140 mmHg or diastolic blood pressure 90 mmHg. Based on the JNC 8 guideline, there was a change in the target systolic blood pressure in patients aged≥60, namely systolic 150 mmHg and diastolic 90 mmHg compared to the target systolic 140 mmHg and diastolic 90 mmHg in the previous guideline. This is an important point because in the management of hypertension in a patient population aged≥60, it is difficult to reach the systolic target of 140 mmHg as recommended by the JNC 7 guideline. This difficulty is not only experienced by doctors in Indonesia but also in other countries. The method of measuring blood pressure and the criteria used will determine the diagnosis of hypertension.

Hypertension complications can affect various target organs such as the heart, brain, kidney, eyes, peripheral arteries. The organ damage depends on the patient’s high blood pressure and how long it has been uncontrolled and untreated for the high blood pressure. Age-related changes in the cardiovascular system influence the development of hypertension and heart failure in the elderly. Based on the background description, this study aims to analyze descriptive statistics of the prevalence of hypertension among the elderly in Indonesia.

### Materials and Methods

The study employed the 2018 Indonesia Basic Health Survey data. The 2018 Indonesia Basic Health Survey was a national-scale survey conducted by the Indonesian Ministry of Health. Population in this study was the elderly in Indonesia (≥60 y.o.). With the multi-stage cluster random sampling method, it was a weighted sample of 58,666 elderly.

The determination of hypertension based on the measurement results follows the guideline JNC 7 criteria, namely if the systolic was ≥140 mmHg and or diastolic ≥90 mmHg. In this study, the hypertension prevalence consists of hypertension according to the doctor’s diagnosis or was currently taking antihypertension drugs. The analysis was carried out by statistical descriptive by observing the distribution by province and demographic characteristics elderly. The demographic characteristics of the elderly were age group, type of place of residence, gender, education level, work type, and wealth status.

### Results and Discussion

Table 1 presents the proportion of hypertension prevalence among the elderly by demographic characteristics. Table 1 describes the hypertension prevalence among elderly in Indonesia, which is dominant in the ≥80 age group (37.4%), female (36.9%), and the richest (34.4%).

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>hypertension diagnosis by a doctor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>· 60-69</td>
<td>30.7</td>
</tr>
<tr>
<td>· 70-79</td>
<td>35.5</td>
</tr>
<tr>
<td>· ≥80</td>
<td>37.4</td>
</tr>
<tr>
<td><strong>Place of residence</strong></td>
<td></td>
</tr>
<tr>
<td>· Urban</td>
<td>35.2</td>
</tr>
<tr>
<td>· Rural</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Table 1. The prevalence of hypertension among the elderly by demographic characteristics (n=58,666)
Cont.. Table 1. The prevalence of hypertension among the elderly by demographic characteristics (n=58,666)

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>Prevalence (%)</th>
<th>95% CI</th>
<th>Total (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27.1</td>
<td>26.3-27.9</td>
<td>25,739</td>
</tr>
<tr>
<td>Female</td>
<td>36.9</td>
<td>36.2-37.7</td>
<td>32,927</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>33.7</td>
<td>32.4-35.0</td>
<td>11,091</td>
</tr>
<tr>
<td>Didn't graduate from elementary school</td>
<td>32.0</td>
<td>30.9-33.1</td>
<td>15,770</td>
</tr>
<tr>
<td>Elementary school</td>
<td>32.4</td>
<td>31.4-33.5</td>
<td>18,179</td>
</tr>
<tr>
<td>Junior high school</td>
<td>33.8</td>
<td>31.9-35.8</td>
<td>4,854</td>
</tr>
<tr>
<td>Senior high school</td>
<td>31.9</td>
<td>30.1-33.7</td>
<td>5,896</td>
</tr>
<tr>
<td>College</td>
<td>32.4</td>
<td>30.0-35.0</td>
<td>2,877</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not works</td>
<td>39.1</td>
<td>38.3-40.0</td>
<td>27,922</td>
</tr>
<tr>
<td>Public servant/army/police</td>
<td>30.6</td>
<td>26.2-35.4</td>
<td>792</td>
</tr>
<tr>
<td>Private sector</td>
<td>21.5</td>
<td>17.5-26.0</td>
<td>808</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>28.9</td>
<td>27.2-30.7</td>
<td>6,114</td>
</tr>
<tr>
<td>Farmer</td>
<td>24.0</td>
<td>23.1-24.9</td>
<td>15,833</td>
</tr>
<tr>
<td>Fisherman</td>
<td>21.4</td>
<td>15.9-28.1</td>
<td>249</td>
</tr>
<tr>
<td>Labor/Driver/Maid</td>
<td>26.2</td>
<td>23.7-28.8</td>
<td>2,940</td>
</tr>
<tr>
<td>Others</td>
<td>34.5</td>
<td>32.4-36.7</td>
<td>3,801</td>
</tr>
<tr>
<td><strong>Wealth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>31.5</td>
<td>30.3-32.8</td>
<td>11,995</td>
</tr>
<tr>
<td>Poorer</td>
<td>31.4</td>
<td>30.0-32.7</td>
<td>11,042</td>
</tr>
<tr>
<td>Middle</td>
<td>32.4</td>
<td>31.1-33.7</td>
<td>10,788</td>
</tr>
<tr>
<td>Richer</td>
<td>32.9</td>
<td>31.6-34.2</td>
<td>11,140</td>
</tr>
<tr>
<td>Richest</td>
<td>34.4</td>
<td>33.2-35.6</td>
<td>13,702</td>
</tr>
</tbody>
</table>

Source: The Riskesdas 2018
This finding is in line with previous research which states that daily diet, adipose activity, and psychosocial stress can cause higher blood pressure with age and an increase in income. Epidemiological surveys show a progressive increase in blood pressure with increasing age. The incidence of hypertension is higher in women after menopause because of the decrease in the hormone estradiol which has a protective effect on the structure, tone of blood vessels, and vasodilation of the endothelium of blood vessels, thereby inhibiting damage to blood vessels. Previous studies have found that older females suffer from hypertension than males and the degree of hypertension in a female is heavier than in male.

The prevalence of hypertension based on the doctor’s diagnosis in Indonesia tends to be higher in urban areas than in rural areas. In contrast to the findings of this study, studies in Africa inform that a higher prevalence of hypertension occurs in rural areas. This is due to lifestyle changes such as lack of physical activity and dietary modifications.

The prevalence of hypertension is relatively equal at all levels of education. Meanwhile, the unemployed group showed the highest prevalence of hypertension compared to other occupational groups.

Table 2. The proportion of hypertension based on taking antihypertension drugs among the elderly in Indonesia (n=58,666).

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Hypertension based on taking antihypertension drugs</th>
<th>%</th>
<th>95% CI</th>
<th>n (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· 60-69</td>
<td></td>
<td>89.4</td>
<td>88.5-90.2</td>
<td>11,408</td>
</tr>
<tr>
<td>· 70-79</td>
<td></td>
<td>89.6</td>
<td>88.3-90.7</td>
<td>5,678</td>
</tr>
<tr>
<td>· ≥80</td>
<td></td>
<td>86.9</td>
<td>83.8-89.5</td>
<td>1,699</td>
</tr>
<tr>
<td><strong>Place of Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Urban</td>
<td></td>
<td>89.6</td>
<td>88.6-90.5</td>
<td>10,921</td>
</tr>
<tr>
<td>· Rural</td>
<td></td>
<td>88.7</td>
<td>87.8-89.6</td>
<td>7,864</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Male</td>
<td></td>
<td>88.9</td>
<td>87.8-89.9</td>
<td>6,840</td>
</tr>
<tr>
<td>· Female</td>
<td></td>
<td>89.4</td>
<td>88.5-90.2</td>
<td>11,945</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· No education</td>
<td></td>
<td>88.3</td>
<td>86.5-89.9</td>
<td>3,668</td>
</tr>
<tr>
<td>· Didn't graduate from elementary school</td>
<td></td>
<td>89.3</td>
<td>88.0-90.5</td>
<td>4,954</td>
</tr>
<tr>
<td>· Elementary school</td>
<td></td>
<td>88.3</td>
<td>87.0-89.5</td>
<td>5,791</td>
</tr>
<tr>
<td>· Junior high school</td>
<td></td>
<td>89.8</td>
<td>87.5-91.8</td>
<td>1,611</td>
</tr>
<tr>
<td>· Senior high school</td>
<td></td>
<td>91.6</td>
<td>89.5-93.3</td>
<td>1,845</td>
</tr>
<tr>
<td>· College</td>
<td></td>
<td>92.3</td>
<td>89.5-94.4</td>
<td>917</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Not works</td>
<td></td>
<td>89.2</td>
<td>88.2-90.1</td>
<td>10,736</td>
</tr>
<tr>
<td>· Public servant/army/police</td>
<td></td>
<td>96.6</td>
<td>93.4-98.3</td>
<td>238</td>
</tr>
</tbody>
</table>
Table 2. The proportion of hypertension based on taking antihypertension drugs among the elderly in Indonesia (n=58,666).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Proportion</th>
<th>CI</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private sector</td>
<td>90.8</td>
<td>84.2-94.8</td>
<td>170</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>88.7</td>
<td>86.2-90.8</td>
<td>1,734</td>
</tr>
<tr>
<td>Farmer</td>
<td>88.4</td>
<td>87.0-89.7</td>
<td>3,733</td>
</tr>
<tr>
<td>Fisherman</td>
<td>72.8</td>
<td>51.9-86.9</td>
<td>52</td>
</tr>
<tr>
<td>Labor/Driver/Maid</td>
<td>90.5</td>
<td>87.1-93.1</td>
<td>756</td>
</tr>
<tr>
<td>Others</td>
<td>90.5</td>
<td>87.9-92.6</td>
<td>1,288</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wealth</th>
<th>Proportion</th>
<th>CI</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest</td>
<td>88.1</td>
<td>86.6-89.5</td>
<td>3,717</td>
</tr>
<tr>
<td>Poorer</td>
<td>88.9</td>
<td>87.3-90.3</td>
<td>3,401</td>
</tr>
<tr>
<td>Middle</td>
<td>88.9</td>
<td>87.0-90.5</td>
<td>3,433</td>
</tr>
<tr>
<td>Richer</td>
<td>89.2</td>
<td>87.6-90.5</td>
<td>3,600</td>
</tr>
<tr>
<td>Richest</td>
<td>90.7</td>
<td>89.3-91.9</td>
<td>4,634</td>
</tr>
</tbody>
</table>

Source: The Riskesdas 2018

Table 2 illustrates the prevalence of hypertension according to a doctor’s diagnosis or currently taking antihypertensive drugs based on demographic characteristics. The prevalence of hypertension among elderly people in Indonesia who are currently taking antihypertensive drugs is 89.2%. The data shows that most hypertension sufferers who have been diagnosed by a doctor have already undergone therapy. Based on the characteristics, the prevalence of hypertension while taking medication is relatively the same in all age groups and tends to be higher in urban areas (89.6%). Female elderly tend to be higher (89.4%) than male elderly (88.9%). Previous research has informed that there is a gender relationship with the quality of life of elderly people with hypertension, namely that male is 3.33 times more likely to experience a poor quality of life.

The prevalence of hypertension based on taking medication tends to be higher in the elderly with better education levels and wealth status. With a better education level, the elderly have knowledge and understanding of the importance of drug therapy for hypertension. Better wealth status also makes it easier for hypertensive elderly people to buy and take hypertension medication. Previous studies stated that knowledge of hypertension affects attitudes towards preventing complications of hypertension. Based on occupation type, public servants are the group with the highest prevalence of hypertension based on taking medication.

Compliance with taking antihypertensive drugs regularly are respondents who are diagnosed with hypertension by a doctor, who take antihypertensive drugs routinely according to doctor’s instructions, or take anti-hypertensive drugs every day (self-initiative). Previous research found that there was a significant relationship between gender, length of suffering from hypertension, history of other diseases, and regularity of taking medication with the quality of life of the elderly participating in chronic disease control programs at the Public Health Center.

Table 3 shows the proportion of routinely taking hypertension medication among the elderly in Indonesia. It was informed that 58.9% were routine, 30.3% not routine, and 10.1% did not take medication. These data indicate that only a portion of the elderly is obedient to taking hypertension medication regularly. In addition to the diagnostic and therapeutic management of hypertension, it is very important in the clinical
evaluation of hypertensive patients to ensure treatment adherence and optimize the therapeutic scheme and routine blood pressure monitoring\textsuperscript{14}.

The highest proportion of elderly with hypertension who regularly took medication was in the 60-69 age group (59.1%), lived in urban (62.8%), and male (59.1%). The proportion of routinely taking hypertension medication among the elderly in Indonesia increases along with the higher education level and better wealth status. Elderly groups with public servant/army/police jobs show the highest proportion of routinely taking hypertension medication. Better education levels are often associated with better output in health\textsuperscript{15,16}. Meanwhile, poor education is informed as a barrier to achieving good performance in the health sector\textsuperscript{17,18}.

Previous research states that male elderly have a higher level of medication adherence than female. Based on education level, higher education level has lower adherence to taking medication than low education level\textsuperscript{19}. The elderly who have a high level of education certainly have knowledge and understanding of the illness they are suffering from. Previous study found that there was a relationship between knowledge and motivation of patients with adherence to taking antihypertensive drugs\textsuperscript{20}. Meanwhile, another study states that the factor affecting the level of compliance of hypertensive patients is monthly income. Income will affect a person’s lifestyle. High incomes will tend to be more consumptive because they can buy things that are needed\textsuperscript{21}.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Taking of antihypertensive drugs</th>
<th>N (adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Routine</td>
<td>Not routine</td>
</tr>
<tr>
<td></td>
<td>% 95% CI</td>
<td>% 95% CI</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>59.1 57.8-60.5</td>
<td>30.2 29.0-31.5</td>
</tr>
<tr>
<td>70-79</td>
<td>58.9 56.9-60.9</td>
<td>30.7 28.9-32.6</td>
</tr>
<tr>
<td>≥80</td>
<td>57.5 54.0-61.0</td>
<td>29.4 26.5-32.5</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>62.8 61.3-64.3</td>
<td>26.8 25.4-28.2</td>
</tr>
<tr>
<td>Rural</td>
<td>53.5 52.1-54.9</td>
<td>35.2 33.9-36.5</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>59.1 57.3-60.8</td>
<td>29.9 28.3-31.5</td>
</tr>
<tr>
<td>Female</td>
<td>58.8 57.5-60.2</td>
<td>30.6 29.3-31.8</td>
</tr>
</tbody>
</table>
Table 3. The proportion of routine taking antihypertensive drugs in the elderly in Indonesia (n=58,666).

<table>
<thead>
<tr>
<th>Education</th>
<th>No education</th>
<th>Elementary school</th>
<th>Junior high school</th>
<th>Senior high school</th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>No education</td>
<td>55.4</td>
<td>52.9-57.8</td>
<td>32.9</td>
<td>30.7-35.2</td>
<td>11.7</td>
</tr>
<tr>
<td>Didn’t graduate from elementary school</td>
<td>56.2</td>
<td>54.1-58.3</td>
<td>33.1</td>
<td>31.2-35.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Elementary school</td>
<td>57.4</td>
<td>55.5-59.3</td>
<td>30.9</td>
<td>29.2-32.8</td>
<td>11.7</td>
</tr>
<tr>
<td>Junior high school</td>
<td>62.7</td>
<td>59.0-66.2</td>
<td>27.2</td>
<td>23.9-30.7</td>
<td>10.2</td>
</tr>
<tr>
<td>Senior high school</td>
<td>68.9</td>
<td>65.6-72.1</td>
<td>22.7</td>
<td>19.9-25.7</td>
<td>8.4</td>
</tr>
<tr>
<td>College</td>
<td>70.8</td>
<td>66.4-74.8</td>
<td>21.5</td>
<td>17.9-25.6</td>
<td>7.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Not works</th>
<th>Public servant/army/police</th>
<th>Private sector</th>
<th>Entrepreneur</th>
<th>Farmer</th>
<th>Fisherman</th>
<th>Labor/Driver/Maid</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not works</td>
<td>60.5</td>
<td>59.1-62.0</td>
<td>28.7</td>
<td>27.4-30.0</td>
<td>10.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public servant/army/police</td>
<td>72.9</td>
<td>64.6-79.8</td>
<td>23.7</td>
<td>17.2-31.8</td>
<td>3.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private sector</td>
<td>63.8</td>
<td>52.4-73.8</td>
<td>27.0</td>
<td>17.9-38.7</td>
<td>9.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>60.6</td>
<td>57.1-63.9</td>
<td>28.1</td>
<td>25.1-31.4</td>
<td>11.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmer</td>
<td>50.8</td>
<td>48.6-53.0</td>
<td>37.6</td>
<td>35.4-39.8</td>
<td>11.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisherman</td>
<td>46.0</td>
<td>30.7-62.2</td>
<td>26.7</td>
<td>16.0-41.2</td>
<td>27.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor/Driver/Maid</td>
<td>61.1</td>
<td>55.5-66.5</td>
<td>29.4</td>
<td>24.6-34.7</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>62.1</td>
<td>58.2-65.8</td>
<td>28.4</td>
<td>25.1-32.0</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wealth status</th>
<th>Poorest</th>
<th>Poorer</th>
<th>Middle</th>
<th>Richer</th>
<th>Richest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest</td>
<td>54.0</td>
<td>51.7-56.3</td>
<td>34.1</td>
<td>31.9-36.4</td>
<td>11.9</td>
</tr>
<tr>
<td>Poorer</td>
<td>55.6</td>
<td>53.0-58.2</td>
<td>33.3</td>
<td>30.8-35.8</td>
<td>11.1</td>
</tr>
<tr>
<td>Middle</td>
<td>57.5</td>
<td>54.9-60.0</td>
<td>31.4</td>
<td>29.1-33.8</td>
<td>11.1</td>
</tr>
<tr>
<td>Richer</td>
<td>58.6</td>
<td>56.1-60.9</td>
<td>30.6</td>
<td>28.4-32.9</td>
<td>10.8</td>
</tr>
<tr>
<td>Richest</td>
<td>66.6</td>
<td>64.6-68.6</td>
<td>24.0</td>
<td>22.3-25.9</td>
<td>9.3</td>
</tr>
</tbody>
</table>

Source: the Riskesdas 2018
Conclusions

The prevalence of hypertension among the elderly in Indonesia tends to increase with age, was higher for women, lives in urban areas, and tends to get higher with increasing education levels and wealth status. Based on the routine taking medication, more than half of the elderly who adhere to taking hypertension medication routinely according to doctor’s instructions, the highest in the 60-69 age group, live in urban, male, and increase with higher education levels and better wealth status.

Acknowledgments: The author would like to thank the National Institute Research and Development, the MOH of the Republic of Indonesia, who has agreed to allow the Riskesdas 2018 data to be analyzed in this article.

Source of Funding: Self-funding

Ethical Clearance: The research had an ethical clearance that was approved by the national ethical committee (ethic number: LB.02.01/2/KE.378/2019). Informed consent was used during data collection, which considered aspects of the data collection procedure, voluntary, and confidentiality.

Conflict of Interest: The authors declare no conflict of interest, financial or otherwise.

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Enhancing Self Efficacy and Resilience through Integrated Intervention among Sexually Abused Girl Children

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Abstract

Child sexual abuse has been found widespread all over the world. The national crime records bureau (NCRB) point out that, in India, one out of four children will be a causality of sexual mistreatment in each hour. Over the fear of being sexually abused, one in every five children doesn’t feel secure. The traumatic experience of sexually being abused children is associated with low self – efficacy, defined as the belief in one’s own ability to effectively function and exercise control within a situation(1). Decreased level of self-efficacy due to sexually being abused also increases the level of negative mental health and behavioral outcomes such as posttraumatic stress disorder (2). Child sexual abuse has been linked to numerous psychological and behavioral consequences for survivors throughout their lifetime. Resilience is critical for coping as it means children are better able to deal with life circumstances. Better coping is preventive in the sense that children with resilience resources are better equipped to avoid the development of future problems. The present study identifies the effectiveness of the integrated intervention on enhancing self-efficacy and Resilience among sexually abused girl children. 37 sexually abused children were part of the study. The sample was selected from Government Nirbhaya Home located in Quilon District in Kerala. Based on the statistical analysis the results are discussed and conclusions are arrived at.

Keywords: - sexually abused children, Resilience, self efficacy, integrated intervention, kerala

Introduction

According to the World Health Organization (3) child sexual mistreatment (CSA) as “the involvement of a child in a sexual pastime that she or he does no longer completely realize, is unable to give knowledgeable consent to, or for which the child isn’t developmentally prepared and can’t provide consent, or that violence the laws or social taboos of society…” (4) study carried out by means of India’s ministry of girls and women increased, 53% of children surveyed stated they had been subjected to some shape of sexual abuse. The stressful revel in of sexual abuse, in particular in early life and early life, is associated with low self – efficacy (1). Self-efficacy is the belief which you are able to appear an undertaking or managing a state of affairs. A child with high self-efficacy believes they have got the skills to assist them to steer via lifestyles and reach their dreams. The decreased feel of self-efficacy because of CSA turned into observed to be expecting negative effect, which became associated with expanded charges of self - damage and suicidality (5–7).

Integrated Intervention

Resilience as the capacity of people to cope with stress and catastrophe, and also used to indicate a characteristic of resistance to future negative events (8). Mindfulness-based interventions aim to decorate interest and decrease chronic harsh self-judgments”. Mindfulness facilitates to connect one to the existing movement and the entirety going on inside the movement: mind, feelings, sensations, etc (9).Mindfulness-based interventions concentrate on physical, emotional, and psychological symptoms children who have experienced trauma might be experiencing (10).

Art therapy is a form of expressive therapy that makes use of the creative process of making artwork
to enhance someone’s physical, mental, and emotional well-being. Art therapy over conventional talk therapy is that sexual abuse sufferers might also be threatened with results in the event that they were to “tell,” so drawing their secrets and techniques can be much less scary than “telling” them in phrases. Solution-focused brief therapy (SFBT) places consciousness on a person’s present and future circumstances and desires in preference to past stories. In this goal-orientated therapy, the symptoms or problems bringing a person to remedy are commonly no longer targeted. SFBT uses Miracle questions, Exception questions, Coping questions, Scaling questions, Time-out, Problem– loose communicate, Accolades and Task to become aware of the resources that are available to the client and useful resource healing from PTSD.

Kerala is also known as god’s own country; also have top positions in many social crimes, now Kerala facing the alarming rate of sexual crime activity against children each day. The 2011censes reports revealed that 10.4% of 333.38 lakhs of Kerala’s population are children. Kerala accounted for 4.4% of all the recorded number of crimes against children and in terms of rate of total cognizable crimes ranks 9th in India. The present study intends to examine the integrated intervention to enhance self-efficacy and resilience among sexually abused girl children in Kerala. This study looks at might assist and concerned authorities to help out the deprived situation.

Method

Objective of the Study

Find out the efficacy of Integrated Intervention on improving the Self-efficacy of sexually abused children.

Discover out the usefulness of Integrated Intervention on enhancing the Resilience of sexually abused children.

Hypotheses

1. There will be a significant difference in self-efficacy among the sexually abused girl children between Before, After and Follow up phase of the integrative intervention program.

2. There will be a significant difference in Resilience among the sexually abused girl children between Before, After and Follow up phase of the integrative intervention program.

Sample

Participants: the data for the study was collected from children age group 10 to 18 using purposive sampling. 37 sexually abused girl children are selected for the study from Nirbhaya Licensed Home Quilon – Kerala.

Intervention

Integrated intervention method was used to help the sexually abused children cognitive-behavioral problems. During the integrated intervention four techniques were used namely Art therapy, Solution-focused therapy, Mindfulness meditation. Art Therapy, half-hour sessions in a day, In the first session – sitting in a circle, making two groups – prepare a play, drawing, dance or song to introduce them to the group. In the second session – task completion (with clay) in the third session – little discussion will be held about different kinds of symbols (personal, cultural and global) they have to create these symbols in a drawing.

Solution Focused Therapy the proposed program will consist of three, half-hour sessions and will include homework tasks that are to be completed outside of the counseling session. Each session will start with an ice breaker activity and provide step – by step instructions. The participants will begin to focus on solutions and start searching for expectations of their problem in the first session. In the second session, the participants will clarify their strength and continue to monitor where they are in the stages of recovery and to celebrate their progress. Between the second and third session, the participant’s homework is to pretend that their miracle has happened and they begin to live life differently. In the third and final session, the participants review the outcome of their homework experience and develop a further plan of action in the Oder to make their miracle more concrete. Mindfulness practice mediation the combination of hatha yoga, meditation, and mindful–breathing. Mindfulness practice intervention consisted of 30 minutes of classes. Each class started with a warm-
up and guided breathing exercises. The group then did a 10-part yoga sequence practices, followed by either a game or story demonstrating the importance of yoga practice and ended with a guided meditation.

**Tools**

- 10 item the general self-efficacy scale by (13). Responses are made on a 4-point scale and the range from 10 to 40.

- 30 items Resilience is developed by (8). Among the 30 items, 20 items are positively loaded items and 10 are negatively loaded. The resilience consists of 30 items rated on a 5-point scale (most appropriate = 5, appropriate to a large = 4, moderately appropriate = 3, marginally appropriate = 2, not at all appropriate = 1) A higher score indicates higher resilience.

**Research Design**

Pretest, post test, and follow-up experimental method were used to identify the effectiveness of the Integrated Intervention.

**Statistics**

Mean, SD, ANOVA, Post hoc tests were used to analyze the data. SPSS 16 software was used to process the data.

**Results and Discussions**

The data collected and analyzed and the results are discussed accordingly.

---

**Table 1 Mean and standard deviation between the three phases testing on Self efficacy among the sexually abused children.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th>Follow-up</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Self efficacy</td>
<td>37</td>
<td>23.76</td>
<td>5.30</td>
<td>33.14</td>
<td>1.47</td>
<td>33.59</td>
<td>1.65</td>
</tr>
</tbody>
</table>

**Table 2 Results of ANOVA for Self efficacy and degree of freedom using Greenhouse – Geisser estimate of Sphericity**

<table>
<thead>
<tr>
<th>Measures</th>
<th>Type III sum of Squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Efficacy</td>
<td>2281.027</td>
<td>2</td>
<td>1140514</td>
<td>104.169</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>788.306</td>
<td>72</td>
<td>10.949</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3 Post Hoc test using Bonferroni correlation between the three phases of testing on Self efficacy**

<table>
<thead>
<tr>
<th>Measure</th>
<th>(I) Test</th>
<th>(J) Test</th>
<th>Mean Difference (I-J)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Efficacy</td>
<td>Pre test</td>
<td>Post Test</td>
<td>- 9.378*</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follow – Up</td>
<td>-9.838*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post test</td>
<td>Follow – Up</td>
<td>-.459*</td>
<td>.008</td>
</tr>
</tbody>
</table>
Table 1 shows the mean and SD of the sexually abused girl children self-efficacy in the pre-test, post-test and follow-up test which indicated that mean value improved in the post and follow-up test compared with a pre-test. Table 2 shows the results of repeated measures ANOVA and it reveals that there are significant differences in self-efficacy among sexually abused girl children.

In table 3 Post-Hoc analysis revealed that difference between pre-test, post-test and follow-up in self-efficacy. The mean values between pre-test and post-test found to be significant ($MD = -9.378, p=.000$) and the difference between pre-test and follow-up test also found to be significant ($-9.838, p=.000$). Difference between post-test and follow-up results were found to be significant ($MD = -4.59, P=0.000$). Overall results revealed that self-efficacy was significantly improved after the integrated intervention. (14-16) Found that Yoga can assist survivors of sexual abuse heal through providing desire, which encourages self-efficacy and decision-making. Survivors are able to establish private barriers and consider in their very own hooked up limits. (17) The effect of a solution-focused brief therapy will improve self-efficacy in socially withdrawn school children. (18) Found that art therapists had low-level burnout and moderate-or high-level self-efficacy.

### Table 4 Mean and slandering deviation between the three phases testing on Resilience

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Before Mean</th>
<th>SD</th>
<th>After Mean</th>
<th>SD</th>
<th>Follow-up Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilience</td>
<td>37</td>
<td>83.68</td>
<td>5.74</td>
<td>103.95</td>
<td>2.47</td>
<td>105.24</td>
<td>3.38</td>
</tr>
</tbody>
</table>

### Table 5: Results of ANOVA for Resilience and degree of freedom using Greenhouse–Geisser estimates of Sphericity

<table>
<thead>
<tr>
<th>Measures</th>
<th>Type III sum of Squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilience</td>
<td>10825.297</td>
<td>2</td>
<td>5412.649</td>
<td>318.208</td>
<td>.000</td>
</tr>
</tbody>
</table>

### Table 6: Post Hoc test using Bonferroni correlation between the three phases of testing on Resilience.

<table>
<thead>
<tr>
<th>Measure</th>
<th>(I) Test</th>
<th>(J) Test</th>
<th>Mean Difference (I-J)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resilience</td>
<td>Pre test</td>
<td>Post test Follow-Up</td>
<td>-</td>
<td>20.270*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>21.568*</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Post test</td>
<td>Follow-Up</td>
<td>-</td>
<td>1.297*</td>
</tr>
</tbody>
</table>
Table 4 shows the mean and SD of the sexually abused girl children resilience in the pre-test, Post-test and follow up test which indicated that mean value improved in the post and follow up test compared with a pre-test. Table 5 shows the results of repeated measures ANOVA and it reveals that there are significant differences in resilience among sexually abused girl children. In table 6 Post – Hoc analysis revealed that difference between pre-test, post-test and follow up results in resilience. The mean values between pre-test and post test found to be significant

\( MD = -20.270, p=.000 \) and the difference between pre-test and follow up test also found to be significant \((-21.568, p=.000)\). Difference between post-test and follow up results were found to be significant \((MD.-1.297, P=.000)\). Overall results revealed that resilience was significantly improved after the integrated intervention. (19) Art therapy is successful in reducing anxiety and depression in preschool-aged girls and also developing strengths using arts to normalize and enhance resilience. (20) Study shows that mindfulness mediation support to reducing the depression and anxiety, trauma – related symptoms and improved the coping self and quality of life.

**Conclusion**

The sexual abuse of children is a shape of maltreatment that provokes reactions of indignation and incomprehensibility in all cultures. CSA is, regrettably, extensive trouble that influences more than 1 out of 5 women and one out of 10 men worldwide. The present study intends to examine the integrated intervention to enhance self - efficacy and resilience among sexually abused girl children in Kerala. The result shows that integrated intervention helped to improve self - efficacy and resilience of sexually abused girl children, so as to enable them the society with a high amount of self-efficacy and bounce back from the setbacks they had in their life.

**Implications**

- Integrated Intervention can be implement in the government Nirbhaya Homes were the sexually abused children are staying

- Government and non-government organizations working in child trauma prevention program may use of integrated intervention program.

**Ethical Clarence** – Taken from Department committee on Ethics

**Source of Funding:** - Self

**Conflict of Interest:** - Nil

**References**

10. A Randomized Trial of Mindfulness-Based


16. Hutchinson JC. Yoga As Therapeutic Intervention with Survivors of Sexual Abuse: A Systematic Review. :45.


Knowledge and Practice Regarding Environmental Sanitation of School Childrens

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Abstract

The environment is one of the major determinants of the health of an individual, family, and community. People’s health is affected by the quality of the place they live and work, the air they breathe, the water they drink and the food they consume, etc. Therefore, this study was performed to assess the knowledge and practice regarding the environmental sanitation of school childrens in the selected school of Haldwani Uttarakhand. Objectives are to assess the knowledge & practice and find out the correlation between knowledge and practice of school-going children regarding environmental sanitation. Methodology- The study was acquired as a descriptive design. 50 students of 12-16 years were selected by a simple random sampling technique. Structured questionnaires and self-reported practice questionnaires were used for data collection. Result-the Results showed that out of 50 samples 42% of student had inadequate knowledge, 54% had moderate knowledge and 4% had adequate knowledge level of environmental sanitation and in practice area 2% of student had inadequate, 6% had a moderate level, 92% had an adequate level of practice. The correlation between knowledge and practice is 0.145543 regarding environmental sanitation. Thus the study was concluded that the students having less knowledge of environmental sanitation but the practice level is good.

Keywords: Knowledge, Practice, School Children, School Environment Sanitation.

Introduction

A school is an establishment designed to provide learning spaces and a learning environment for the student’s teacher under the leadership of the teachers. A school is a place that not only provides education to children but also a learning environment. After stepping out of the house it plays a vital role in the development of a child. It includes cognitive as well as the creative development of the child.¹ The environment denotes the physical-biological and social world in which the system or man exists. It is the total of all external conditions and influences on the developmental cycle of biotic elements over the earth’s surface. The environment indicates all of the internal and external conditions, circumstances, and influences surrounding or affecting the development and behavior of a person or group.² Sanitation is the process of maintaining the cleanliness and health of the premises, including the provision of a sewer system and a clean water supply. Sanitation systems are designed to care for human health by providing a hygienic environment that will stop the transmission of disease, mainly through the fecal-oral route.¹ A Healthy school environment can be created if there is a regular supply of safe water proper means of collection removal and disposal of waste matter, regular cleanliness, and sanitation condition good lighting.³ School environment sanitation and health facilities are an important public

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Contact details -(+91-7906546658)
A survey among school children in various part of India revealed that about half of the ailment found are related to unsanitary conditions and lack of personal hygiene and recent reports also showed that 22 percent did not have appropriate toilets for girls, 58 percent of preschools had no toilet at all and 56 percent of preschools had no water on the premises.

**Objective**

1. To assess the knowledge of school children regarding school environment sanitation.
2. To assess the practice of school children regarding school environment sanitation.
3. To find out the correlation between knowledge and practice of school children regarding school environment sanitation.

**Operational definition**

**Knowledge** - In this study, it refers to correct responses of children to the items listed in the questionnaires to school environmental sanitation on safe drinking water supply, food hygiene, toilet facilities, and waste disposal.

**Practice** - In this study, it refers to practices performed by school children regarding school environmental sanitation like maintaining a clean classroom, drinking safe water, hand washing before and after having food, and after using urinal and toilet, proper disposal of waste.

**School Children** - In this study it refers to the school-going children studying in 8 and 9 standards.

**School Environment Sanitation** - In this study it refers to the cleanliness maintained in the school environment such as physical structure, safe drinking water supply, food hygiene, toilet facilities, and waste disposal.

**Variable** –

**Research variable** - knowledge and practice among school children regarding school environment sanitation.

**Demographic variable** - Age, Gender, Standard of study, Religion, Father education, Mother education, Father occupation, Mother occupation, Type of family.

**Methodology**

- **Research Approach**: Quantitative research was found suitable for the study.
- **Research Design**: Descriptive research design was adopted for the study.
- **Setting for the study**: The study is to be conducted in the selected school Nawar Khera in golapar, Haldwani.
- **Population**: School going children of golapar.
- **Sample**: Children who are aged between 12-16 years going to school.
- **Simple Size**: The estimated sample size is 50.
- **Sample Technique**: For the data collection as per the study objective we select between 12–16 years by simple random sampling technique in the school of Golapar.

**Inclusion criteria** –

- Children age between 10-16 years.
- Children who are available during the study period.

**Exclusion criteria**-

- Children who are sick during data collection.

**Development and Description of the Tool**:

The tool used for the study consist of three section-

**Section 1**: Socio-demographic data.

**Section 2**: Structured knowledge questionnaires.

**Section3**: Self-reported practice questionnaires.

**Section -1: Socio-Demographic data**

This section consists of student age, gender, religion, the standard of a student, mother education, father education, mother occupation, father occupation, type of family.
Section-2: Knowledge Questionnaire

This section consists of 23 structured questionnaires to assess the knowledge of school-going children regarding school environment sanitation. The structured knowledge questionnaires were assessing knowledge of five areas. each area consists of 5 questions except food hygiene.

1. General concepts
2. Knowledge regarding water facilities in the school.
3. Knowledge regarding food hygiene in school.
4. Knowledge regarding toilet facilities in the school.
5. Knowledge regarding waste disposal in school.

Section -3: Practice Questionnaire

This section consists of 10 self-reported practice questionnaires to assess the practice of school-going children regarding school environment sanitation.

Plan for data analysis-

The analysis was performed:
- Descriptive statics i.e., frequency and percentage were used for demographic variables, knowledge, and practice regarding environmental sanitation.
- Co-relation formula is used to co-relate between knowledge and practice regarding environmental sanitation.

Results

Section –I

Socio-demographic variables

The most of the Students 70% belongs to age 13-15year, 66% were girls, 60% students studying in 7-8th standard, 100% students belong to Hindu religion, 64% students father were educated similarly 66% students mother also educated, 66% students father were employed, 80% students mothers were nonemployed and 58% students belong to a joint family.

Section II

Knowledge level of school-going regarding environment sanitation

This section deal with the description of a knowledge questionnaire of school-going children regarding environmental sanitation.

Table 1 - Mean % of knowledge questionnaire

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Category</th>
<th>No of question</th>
<th>Mean</th>
<th>Mean %</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General concepts</td>
<td>5</td>
<td>3.26</td>
<td>65.2%</td>
<td>1.175</td>
</tr>
<tr>
<td>2</td>
<td>Water sanitation</td>
<td>5</td>
<td>2.58</td>
<td>51.6%</td>
<td>0.904</td>
</tr>
<tr>
<td>3</td>
<td>Food hygiene</td>
<td>3</td>
<td>1.8</td>
<td>60%</td>
<td>1.144</td>
</tr>
<tr>
<td>4</td>
<td>Toilet facility</td>
<td>5</td>
<td>3.38</td>
<td>67.6%</td>
<td>1.141</td>
</tr>
<tr>
<td>5</td>
<td>Waste disposal</td>
<td>5</td>
<td>1.98</td>
<td>39.6%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>23</td>
<td>13</td>
<td>56.52174</td>
<td>3.675623</td>
</tr>
</tbody>
</table>
Table 2- Knowledge level percentage of the student

<table>
<thead>
<tr>
<th>Knowledge level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate Knowledge</td>
<td>21</td>
<td>42%</td>
</tr>
<tr>
<td>Moderate Knowledge</td>
<td>27</td>
<td>54%</td>
</tr>
<tr>
<td>Adequate Knowledge</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>

Practice level of school-going regarding environment sanitation

Table 3- Mean, Mean % and SD of practice questionnaire on environmental sanitation

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Category</th>
<th>No of question</th>
<th>Mean</th>
<th>Mean %</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Practice questionnaire</td>
<td>10</td>
<td>9.58</td>
<td>95.8%</td>
<td>1.144463</td>
</tr>
</tbody>
</table>

Table 4- Practice level percentage of students

<table>
<thead>
<tr>
<th>S.no</th>
<th>Practice Level</th>
<th>Score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inadequate</td>
<td>≤ 5</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>6-8</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>Adequate</td>
<td>9-10</td>
<td>46</td>
<td>92%</td>
</tr>
</tbody>
</table>

Section IV-

The co-relation between knowledge and practice regarding environmental sanitation

This section deal with the description co-relation between knowledge and practice regarding environmental sanitation.

Table 5- Co-relation between knowledge and practice level.

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean %</th>
<th>Co-relation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>56.52174 %</td>
<td></td>
</tr>
<tr>
<td>Practice</td>
<td>95.8%</td>
<td>0.145543</td>
</tr>
</tbody>
</table>
**The Result**

The result shows the correlation between knowledge and practice regarding environmental sanitation is very low \(0.145543\).

**Discussion**

India has made quick development in ending open defecation throughout the United States that is having a massive impact on enhancing water, sanitation, and hygiene (WASH). Only a few years ago, in 2015, most of India’s population of around 568 million people suffered the humiliation of defecating in fields, forests, bodies of water, or another public area due to lack of access to toilets. India alone accounted for 90 percent of the people in South Asia and half of the 1.2 billion people in the world that defecated in the open.\(^5\) A lack of handwashing infrastructure and sources in school areas also have unpleasant effects on school-going children. It can enhance the spread of diseases among students. Maximum of the schools did not have handwashing facilities.\(^6\) So the School is key for the cognitive, creative, and social development of children. A child learned the advantage of sanitation and high-quality hygiene behavior in the school. Only that child is the medium for carrying those messages far away from the school walls, bringing lasting improvement not only to his or her health and wellbeing but also to that of the family and the wider community.\(^6\)

By 2019, according to the most recent estimates, the number of people without access to toilets has reduced significantly by an estimated 450 million people. A wonderful achievement, only feasible because of the *Swacch Bharat Mission* (SBM) (Clean India Campaign), led by the great Prime Minister of our country. UNICEF has been a bigheaded partner of the *Swacch* Bharat Mission.\(^5\)

Possibly the most important lesson from experience is that School Sanitation and Hygiene Education is an ‘approach to life’ rather than an academic subject that can be taught with a focus on theory and written examinations.\(^7\)

After these statics, the author correlates the finding with other areas. Because in every area we need to neat and clean. So the best and fundamental education is stared at the school however our study focuses to assess the knowledge and practice regarding the environmental sanitation of school children.

**Findings related to the knowledge level of school-going regarding environment sanitation**

The findings of the present study were consistent with the study conducted by Shilunga Anna P. K. (2018) conducted a descriptive study to assess the Knowledge, attitudes, and practices of primary school learners on sanitation and hygiene practices Ohangwena region. The objective of the study is to assessing and describing the knowledge, attitudes, and practices of primary school learners towards sanitation and hygiene; the sample size is 450 learners which were grade five, six, and seven primary school learners. The majority of these learners (42.3%) who did not have the correct knowledge were in the lower grades, 5 and 6. The analysis showed that 62.9% knew. In the practice area, 92.2% of learners confirmed that they did, correct practice and the remaining 7.8% did not do so the result indicated that younger learners in lower school grades, have poorer knowledge, attitudes, and practices towards hygiene and sanitation than older learners irrespective of their gender, school circuits or location. This is a sound conclusion because, as learners become grown-up, they become more aware and take precautions about hygiene and sanitation issues.\(^8\)

The findings of the present study were consistent with the study conducted by Joseph N, Bhaskaran U, Saya GK, Kotian SM, Menezes RG (2012) Environmental sanitation and health facilities in schools of an urban city of south India. The objective of the study is to assess the school environment, sanitation, and health-related facilities and to compare the availability of these facilities between government, aided, and private schools. the result shows that Out of the 30 schools surveyed, four were government, 12 were aided and 14 were private schools. Overcrowding was seen in one-third of schools. More than a quarter of schools had no water purification facility. No periodically Water storage space units were cleaned. Toilets were not adequate in 10(33.3%) and not separated for boys and girls in 8(26.7%) schools. This was concluded that a maximum number of schools in urban area were found to be falling short of several essential requirements regarding sanitation and health facilities which need to be rectified.\(^9\)
Limitation

The study was limited to a part of India and involves only the school children. The sample size is limited to 50. And the result cannot be generalized because of individual differences and biases.

Recommendations

This study can be conducted in large sample size and community areas also.

We can compare the knowledge and practice regarding environmental sanitation.

We can also access knowledge and awareness regarding the government program related to sanitation.

We can also conduct a hygiene training program for the students and community people.

Conflict of Interest: There is no conflict of interest among the authors.

Conclusion

This study offers insights into the level of knowledge and practices of learners towards sanitation and hygiene that if addressed may positively impact hygiene promotion and practices in primary schools. Our study shows the knowledge and practice level in school-going children in Haldwani. Based on a study finding in the level of knowledge and practice out of our total population we find that the student has 42% inadequate 54% moderate and 4% Adequate knowledge level in Practice level 2% has Inadequate, 6% Moderate and 92% Adequate.

Ethical clearance- Taken from ethical committee of the institute

Source of Funding- Self

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2. Swarnkar Keshav; Text book of community Health Nursing ;Third edition. Published by N.R.Brothers Indore page no.139-140
4. UNICEF a manual on school sanitation and hygiene water, environment and sanitation technical guideline series no.si sep 1998.
Post-Concussion Syndrome and Factors Associated With Post-Concussion Syndrome Following Mild Traumatic Brain Injury

Vibol Bo¹,², Chatkhane Pearkao³

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Abstract

Background: Traumatic Brain Injury (TBI) is a worldwide public health concern especially in developing countries. This study was conducted to describe the prevalence, severity symptoms and determine factors associated with post-concussion syndrome (PCS) following mild traumatic brain injury (MTBI).

Methods: A cross-sectional study was carried out with 218 patients following MTBI after discharged hospital from one week to one year at Odor Meanchey Provincial Hospital (OMCPH) and Anlong Veng Referral Hospital (AVRH). Multiple linear regression was applied to determine factors association.

Results: Of the total 218 patients following MTBI, 79.4% had symptoms of PCS, with 5.8% re-hospitalization due to PCS. The most frequently occurring symptoms in PCS following MTBI were from headache 71.7%, being irritable 68.8%, forgetfulness 66.5%, fatigue 62.4%, and taking longer to think 57.2%. Marital status ß=-.236, p=.001, loss of consciousness (LoC) at the time of injury ß=-.205, p=.003, length of hospitalization ß=.288, p<0.001, and readmission ß=-.271, p<0.001 were statistically associated with PCS following MTBI.

Conclusion: Majority of patients had symptoms of PCS. The most frequent symptoms were headache, being irritable, and forgetfulness. Socio-demographic and injury characteristics factors play an essential role in PCS following MTBI.

Keywords: Socio-demographics, Injury characteristics, mild traumatic brain injury, post-concussion syndrome

Introduction

Traumatic Brain Injury is a world public health and socioeconomic problem. Approximately 69 million patients suffered from TBI globally and MTBI accounted for 75%-90% of TBI(1). MTBI is generally influenced by 42 million patients annually around the globe(2). About 5 to 10% of the population has a history of MTBI in their lives event(3). MTBI refers to an instance of being injured to the brain which damages to the head caused by an external force(4). External forces probably result from subsequent events including the head being struck by an object, the head striking an object, the head experiencing an acceleration/deceleration movement without direct external trauma to the brain, a foreign body penetrating the head, and forces generated from events including a blast or explosion, or other forces(5). An external physical force probably provokes a change in conditions of consciousness, cognitive or physical functioning impairment, and behavioral or emotional functional interference leading to brain damage(6). The major causes of MTBI are from falls, motor accidents, accidentally hit again something, brain striking on something, a violent attack brain trauma (blast trauma),

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and injuries related with sports\(^7\). According to American Academy of Neurology, MTBI can be categorized into 3 grades based on the following symptoms such as first grade in the confusion without amnesia and LoC in concussion; the second grade is the confusion with amnesia and no LoC in concussion; the third grade is LoC with a concussion\(^8\).

A complication of MTBI is a significant issue for patients with post-MTBI. Bedaso stated that 41.5% of MTBI cases experienced PCS with at least 3 symptoms after a head injury such as headache, restlessness, fatigue, and double vision\(^9\). Some previous studies found that 82% of patients with MTBI after 3-12 months experienced at least one of PCS, 40.3% decreased life satisfaction, 33% had functional impairment for 3 months after injury, and only 22.4% were still not fully functional condition post-injury 1 year\(^10\). Similarly, 84% of MTBI had post-traumatic complaints and 45% had emotional distress for 6 months after injury\(^11\), the low function of cognitive and decreased quality of life (QoL)\(^12\), and chronic symptoms\(^13\). There are many symptoms of PCS including headaches, fatigue, vertigo/dizziness, irritability, emotional lability or irritability, cognitive difficulty (concentration), sleep disturbance and anxiety\(^14\). Many factors associated with PCS following MTBI including retrograde amnesia, difficulty concentrating, disorientation, insomnia, loss of balance, sensitivity to noise, visual disturbance, severity of bodily injury, duration of LoC, duration of PTA, intracranial abnormality, time tested post-injury, possible symptom exaggeration, poor effort, depression, traumatic stress\(^15\), experienced LoC, pre-injury psychological problem and younger age\(^16\).

Cambodia is one of many developing and low-income countries with a total of approximately 16 million population. According to the 2014 Cambodia Demographic and Health Survey (CDHS), the prevalence of injury from accidents was 72,958 cases and 17 suffered from an injury and 1 died among 1,000 people\(^17\). Describing the prevalence, severity symptoms, and determining factors associated with PCS is extremely crucial for healthcare providers and patients with MTBI. Therefore, this study aimed to describe the prevalence, severity symptoms and factors associated with PCS following MTBI. The results from these findings are extremely crucial to prevent patients from the consequences of post-MTBI as the major causes of patients lose productivity, readmission, disability, and mortality rate for early intervention.

**Methods and Materials**

This cross-sectional study was applied to a purposive sampling method. A questionnaire phone call interview was conducted to collect data from July to September 2020. The study was conducted at OMCPH and AVRH, which was under supervised from OMCPHD, Cambodia. All fulfilled patients from the inclusion criteria were purposively chosen proportional to the size of the samples to a total of 218 patients.

**Dependent Variables**

The dependent variable was PCS following MTBI. The Revermead Post-Concussion Syndrome Questionnaire (RPQ) was utilized to assess patients ‘experience of each of 16 items (0: not experienced at all, 1: no more of a problem, 2: mild problem, 3: moderate problem, and 4: severe problem). A total of 64 scores were summed from 16 questions, representing that higher scores indicate greater severity of PCS.

**Independent Variables**

The independent variables (IVs) were age, sex, marital status, education level, employment, cause of MTBI, LoC, alcohol consumption, length of hospitalization, other sustained injuries, duration of PCS occurring, and readmission.

**Statistical Analysis**

All analyses were performed using the Statistical Package of Social Science (SPSS). Demographic characteristics (age, sex, marital status, education level, and employment) and Injury Characteristics (cause of MTBI, LoC, alcohol consumption, length of hospitalization, other sustained injuries, duration of PCS occurring, and readmission) were analyzed by using descriptive statistics, which reported frequency and percentage for category variable, mean, standard
deviation, minimum, and maximum for continuous variable. Multiple linear regression was utilized to predict the association between IVs and PCS following MTBI.

**Results**

Among 218 recruited patients aged from 18 to 83 years, the mean age was 35-year-old ($SD = 15.292$), 59.2% were patients aged from 18 to 35 years old. 72.9% were males and 60.1% were married (see table 1).

The average year of education was 6.36 years ($SD = 4.047$), 44% and 39.4% completed secondary and primary school respectively. Most patients 81.2% were employed.

**Table 1: The Patient Demographic Data ($n = 218$)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (year) Range=18-83 unit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-35</td>
<td>129</td>
<td>59.2</td>
</tr>
<tr>
<td>36-55</td>
<td>61</td>
<td>28.0</td>
</tr>
<tr>
<td>≥56</td>
<td>28</td>
<td>12.8</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>59</td>
<td>27.1</td>
</tr>
<tr>
<td>Male</td>
<td>159</td>
<td>72.9</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>131</td>
<td>60.1</td>
</tr>
<tr>
<td>Single</td>
<td>87</td>
<td>39.9</td>
</tr>
<tr>
<td><strong>Education level Range=0-18 unit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>23</td>
<td>10.6</td>
</tr>
<tr>
<td>Primary education (1-6 years)</td>
<td>86</td>
<td>39.4</td>
</tr>
<tr>
<td>Secondary education (7-12 years)</td>
<td>96</td>
<td>44.0</td>
</tr>
<tr>
<td>Tertiary education (13 years or higher)</td>
<td>13</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>41</td>
<td>18.8</td>
</tr>
<tr>
<td>Employed</td>
<td>177</td>
<td>81.2</td>
</tr>
</tbody>
</table>

$\bar{x} =$ Mean, $SD =$ standard deviation
Motor vehicle collision (MVC) accounted for 70.6%, followed by 29.4% from Non-Motor vehicle collision (non-MVC). 69.7% were LoC during the time of injury, and more than one third 39.4% consumed alcohol at the time of injury.

The mean days of the patient’s hospitalization were 3.41 ($SD = 2.106$).

More than half (54.6%) had other sustained injuries at the time of injury.

79.4% had PCS happened after MTBI and 90.8% had 1-24 weeks of PCS happened after MTBI. The majority of the participants 94.2% did not readmit to the emergency department (ED) (table 2).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cause of MTBI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor vehicle collision</td>
<td>154</td>
<td>70.6</td>
</tr>
<tr>
<td>Non-Motor vehicle collision</td>
<td>64</td>
<td>29.4</td>
</tr>
<tr>
<td>LoC at the time of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>152</td>
<td>69.7</td>
</tr>
<tr>
<td>No</td>
<td>66</td>
<td>30.3</td>
</tr>
<tr>
<td>Alcohol Consumption at the time of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>86</td>
<td>39.4</td>
</tr>
<tr>
<td>No</td>
<td>132</td>
<td>60.6</td>
</tr>
<tr>
<td>LoH Range =1-12 days</td>
<td>$\bar{x} = 3.41$, $SD=2.106$</td>
<td></td>
</tr>
<tr>
<td>Mode=2</td>
<td>Mdn=3.00</td>
<td></td>
</tr>
<tr>
<td>Other sustained injuries at the time of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>119</td>
<td>54.6</td>
</tr>
<tr>
<td>No</td>
<td>99</td>
<td>45.4</td>
</tr>
<tr>
<td>The signs and symptoms happen after MTBI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>173</td>
<td>79.4</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>20.6</td>
</tr>
<tr>
<td>The duration of signs and symptoms happened after MTBI</td>
<td>$n=173$</td>
<td></td>
</tr>
<tr>
<td>1-24 weeks</td>
<td>157</td>
<td>90.8</td>
</tr>
<tr>
<td>25-48 weeks</td>
<td>16</td>
<td>9.2</td>
</tr>
<tr>
<td>The readmission/revisit to the ED</td>
<td>$n=173$</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>5.8</td>
</tr>
<tr>
<td>No</td>
<td>163</td>
<td>94.2</td>
</tr>
</tbody>
</table>

Mdn = median, $sd$ = standard deviation
The finding displayed the mean scores of PCS ranged from 1-42 were 14.66 (SD=9.739). The most frequently occurring PCS following MTBI were from headache (71.7%), being irritable (68.8%), forgetfulness (66.5%), fatigue (62.4%), and taking longer to think (57.2%). The least five occurring symptoms were feeling depressed (46.2%), sleep disturbance (43.4%), noise sensitivity (38.7%), double vision (29.5%), and nausea or vomiting (22.5%) (see table 3).

Headache $\bar{X}=1.34$ $(SD=1.002)$ and being irritable $\bar{X}=1.31$ $(SD=1.015)$ are the most severe symptoms while nausea or vomiting $\bar{X}=0.32$ $(SD=0.636)$ and double vision $\bar{X}=0.50$ $(SD=0.826)$ are the least severe symptoms compared to other symptoms of PCS.

### Table 3: Post-Concussion Syndrome ($n=173$)

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>n (%) Frequency of symptoms</th>
<th>$\bar{X}(SD)$ severity of symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range 1-42-unit, Min = 1, Max = 42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headaches</td>
<td>124 (71.7)</td>
<td>1.34 (1.002)</td>
</tr>
<tr>
<td>Being irritable</td>
<td>119 (68.8)</td>
<td>1.31 (1.015)</td>
</tr>
<tr>
<td>Forgetfulness</td>
<td>115 (66.5)</td>
<td>1.27 (1.017)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>108 (62.4)</td>
<td>1.11 (.979)</td>
</tr>
<tr>
<td>Taking longer to think</td>
<td>99 (57.2)</td>
<td>1.06 (.998)</td>
</tr>
<tr>
<td>Feeling frustrated or impatient</td>
<td>97 (56.1)</td>
<td>.98 (.979)</td>
</tr>
<tr>
<td>Feelings of dizziness</td>
<td>97 (56.1)</td>
<td>1.00 (1.006)</td>
</tr>
<tr>
<td>Blurred vision</td>
<td>91 (52.6)</td>
<td>.99 (1.043)</td>
</tr>
<tr>
<td>Light sensitivity</td>
<td>86 (49.7)</td>
<td>.90 (.998)</td>
</tr>
<tr>
<td>Poor concentration</td>
<td>81 (46.8)</td>
<td>.83 (.967)</td>
</tr>
<tr>
<td>Feeling depressed or tearful</td>
<td>80 (46.2)</td>
<td>.82 (998)</td>
</tr>
<tr>
<td>Restlessness</td>
<td>80 (46.2)</td>
<td>.80 (.950)</td>
</tr>
<tr>
<td>Sleep disturbance</td>
<td>75 (43.4)</td>
<td>.79 (1.001)</td>
</tr>
<tr>
<td>Noise sensitivity</td>
<td>67 (38.7)</td>
<td>.65 (.901)</td>
</tr>
<tr>
<td>Double vision</td>
<td>51 (29.5)</td>
<td>.50 (.826)</td>
</tr>
<tr>
<td>Nausea and/or vomiting</td>
<td>39 (22.5)</td>
<td>.32 (.636)</td>
</tr>
<tr>
<td>Total</td>
<td>173 (100)</td>
<td>14.66 (9.739)</td>
</tr>
</tbody>
</table>

Simple linear regression analysis on factors associated with PCS following MTBI
Employment ($p=.368$), alcohol consumption at the time of injury ($p=.329$), another sustained injury ($p=.07$), and duration of PCS occurring ($p=.396$) were not significantly associated with PCS following MTBI (table 4).

Age was statistically significantly associated with PCS following MTBI ($p=.003$). PCS increased by 0.224 with every increase in age. Age explained 50% of the variance in PCS.

Length of hospitalization is statistically associated with PCS ($p=.000$). PCS increased by 0.282 with every increase in the length of hospitalization, which explained 8% of the variance in PCS.

Sex ($p=.012$), marital status ($p=.00$), an education level ($p=.003$), causes of MTBI ($p=.011$), LoC at the time of injury ($p=.048$), and readmission ($p=.001$) were predicted to be statistically significantly associated with PCS but with every decreased score on each factor.

PCS decreased by 0.191 on sex, 0.273 on marital status, 0.223 on education, 0.192 on causes of MTBI, 0.150 on LoC at the time of injury and 0.246 on readmission.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Constant</th>
<th>β</th>
<th>$R^2$</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>9.627</td>
<td>0.224</td>
<td>0.50</td>
<td>8.991</td>
<td>.003</td>
</tr>
<tr>
<td>Sex</td>
<td>21.68</td>
<td>-0.191</td>
<td>0.37</td>
<td>6.5</td>
<td>.012</td>
</tr>
<tr>
<td>Marital status</td>
<td>22.207</td>
<td>-0.273</td>
<td>0.075</td>
<td>13.784</td>
<td>.00</td>
</tr>
<tr>
<td>Education level</td>
<td>18.12</td>
<td>-0.223</td>
<td>0.05</td>
<td>8.94</td>
<td>.003</td>
</tr>
<tr>
<td>Employment</td>
<td>11.71</td>
<td>0.069</td>
<td>0.005</td>
<td>.814</td>
<td>.368</td>
</tr>
<tr>
<td>Cause of MTBI</td>
<td>17.549</td>
<td>-0.192</td>
<td>0.037</td>
<td>6.548</td>
<td>.011</td>
</tr>
<tr>
<td>LoC at the time of injury</td>
<td>18.86</td>
<td>-0.150</td>
<td>0.023</td>
<td>3.96</td>
<td>.048</td>
</tr>
<tr>
<td>Alcohol consumption at the time injury</td>
<td>12.21</td>
<td>0.075</td>
<td>0.006</td>
<td>.958</td>
<td>.329</td>
</tr>
<tr>
<td>Length of hospitalization</td>
<td>10.14</td>
<td>0.282</td>
<td>0.08</td>
<td>14.77</td>
<td>.000</td>
</tr>
<tr>
<td>Other sustained injury</td>
<td>18.54</td>
<td>-0.138</td>
<td>0.019</td>
<td>3.32</td>
<td>.07</td>
</tr>
<tr>
<td>Duration of PCS occurs</td>
<td>14.866</td>
<td>-0.065</td>
<td>0.004</td>
<td>0.726</td>
<td>.396</td>
</tr>
<tr>
<td>Readmission</td>
<td>34.52</td>
<td>-0.246</td>
<td>0.06</td>
<td>10.99</td>
<td>.001</td>
</tr>
</tbody>
</table>

$P < .05 = $ Significant
Multiple linear regression analysis on factors associated with PCS following MTBI

Marital status, LoC at the time of injury, length of hospitalization, and readmission are significant predictors of PCS with ($R^2 = .243$, $F(4,168) = 13.492, p-value < .001$).

The results revealed that marital status ($\beta = -.236$, $p = .001$), LoC at the time of injury ($\beta = -.205$, $p = .003$), length of hospitalization ($\beta = .288$, $p < .001$), and readmission ($\beta = -.271$, $p < .001$) were statistically associated with PCS following MTBI.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>$\beta$</th>
<th>p</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>44.149</td>
<td>&lt;.001</td>
<td></td>
<td>31.515</td>
</tr>
<tr>
<td>Marital status</td>
<td>-4.715</td>
<td>-.236</td>
<td>.001</td>
<td>-7.378</td>
</tr>
<tr>
<td>LoC at the time of injury</td>
<td>-4.534</td>
<td>-.205</td>
<td>.003</td>
<td>-7.527</td>
</tr>
<tr>
<td>Length of hospitalization</td>
<td>1.313</td>
<td>.288</td>
<td>&lt;.001</td>
<td>.709</td>
</tr>
<tr>
<td>Readmission</td>
<td>-11.269</td>
<td>-.271</td>
<td>&lt;.001</td>
<td>-16.918</td>
</tr>
</tbody>
</table>

$P < .05 = $ Significant, $R = .496, R^2 = .243, R^2$ Adjust = .224, $F (4, 168) = 13.492$

### Discussion and Recommendation

#### Discussion

The results of prevalence, severity symptoms, and factors associated with PCS following MTBI represent several aspects of the respondents with MTBI after a hospital discharged.

This current study showed that headache and being irritable symptoms are the most common dangerous symptoms that patients need to be cautious because it has been the main leading causes of patients into the severity following MTBI. This study is consistent with a study conducted in Hawassa city Ethiopia\(^9\). The most frequently occurring symptoms of PCS following MTBI were headache, being irritable, and forgetfulness. This study demonstrated that headache, dizziness, and fatigue accounted for 56.88%, 44.5%, and 49.54%, respectively. However, a study demonstrated that up to 84% of 910 participants reported one or more post-traumatic complaints ($\bar{X} = 5.8, SD = 4.6$), which headache accounted for 51%, dizziness 55%, and fatigue 56% at 2 weeks following MTBI\(^11\). The difference could be the variation in study setting, health care system, and socio-economic conditions among study respondents.

A study conducted in New Zealand (NZ) stated the top five symptoms of PCS frequently happened at one year following MTBI were headache, fatigue, forgetfulness, poor concentration, and taking longer to think\(^12\). Similarly, this study demonstrated the top five frequently occurring symptoms of PCS less than one year were headache, being irritable, forgetfulness, fatigue, and taking longer to think. It could be considered that PCS symptoms are universal and not unique to TBI and can happen as a result of other medical status or acute illness.

Socio-demographic characteristic such as age and sex were not significantly associated with PCS following MTBI. This present study is in line with other previous
studies conducted in Ethiopia and America\(^{(9,15)}\). This finding indicated that there was no effect on PCS symptoms of some demographic data from the subjects.

Marital status had a statistically significant association with PCS. This is probably because those who get married have the high responsibilities for supporting family and taking good care of their children which make them have less time to take rest post-injury. This present study is consistent with studies in Morocco\(^{(18)}\).

Educational level and the cause of MTBI found no significant association with PCS. The results stated that there was no difference among education level and the cause of MTBI of the participants. This is probably participants received the same level of health care services following MTBI. This current study is in line with a study conducted in America\(^{(15)}\).

Employment, alcohol consumption, and duration of PCS occurring were not significantly associated with PCS. The differences may be these variables have no impact on PCS. A study in Norway revealed that there was a negative association between alcohol use and PCS following MTBI\(^{(19)}\). This study is consistent with studies conducted in Sweden\(^{(20)}\).

LoC at the time of injury was significantly predicted with PCS. This means that those who have LoC at the time of injury have the severity of the axonal injury and severe injury than those who no LoC even though they have MTBI. Consistent with a study conducted in America\(^{(16)}\).

The participants who stayed longer in the hospital had higher scores than those who stay shorter in the hospital. Patients who stayed longer in the hospital could be at higher risks with PCS because might be they had other sustained injuries at the time of injury compared to those who had a single MTBI. However, the study by Voomolen\(^{(21)}\) found no significant association between a number of days of patients being hospitalized and PCS.

Other sustained injuries at the time of injury were not significantly predicted with PCS. The results in this study demonstrated that other sustained injuries at the time of injury could not influence the nerve system, which is closely linked to the brain, therefore, it negatively impacted the occurring of PCS. This is in contrast with a study in Finland\(^{(22)}\).

Readmission had a significant prediction with PCS. The findings of the present study indicated that those who were not readmitted to the hospital, PCS scores decreased .271 (p=.001) which was supported by a study conducted in Southeastern America\(^{(23)}\).

**Conclusion**

Majority of patients had occurring PCS following MTBI, with roughly 5.8% being revisited in the hospital. Headache and being irritable are the most severe symptoms while nausea or vomiting and double vision are the least severe symptoms. Marital status, LoC at the time of injury, length of hospitalization, and readmission are statistically associated with PCS following MTBI among patients admitted at a surgical unit in OMCPH and AVRH.

**Recommendations**

The following recommendations were highly considered.

**National level:**

Clinical education and self-care counselling by providing booklets, videos, or applications for MTBI patients, family members, and caregivers should be offered by health care providers to enhance other diseases and PCS-related knowledge.

**Local level:**

Family members, caregivers especially MTBI patients should be encouraged to enrol in health education for the prevention of PCS following MTBI.

**Future study:**

Longitudinal studies on PCS following MTBI require to be conducted with head trauma and follow up with MTBI patients and address how people benefit from the intervention program and reduce the patient’s readmission rate.
**Ethical Considerations:** This research was conducted after getting approval from Khon Kaen University Ethics Committee in Human Research (No. HE632156) and National Ethics Committee for Health Research (No. 122 NECHR), MoH of Cambodia for protecting the rights of the participants.

**Acknowledgement:** The authors would like to express sincere appreciation and gratitude to the OMCPHD which supervised OMCPH and AVRH for this study.

**Conflict of Interest:** No conflicts of interest were disclosed.

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**References**


Influence of Knowledge about Cardio-Cerebrovascular Disease Symptoms on Self-Management Behaviors in Patients with Atrial Fibrillation

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Abstract

Aim: This study aimed to assess stroke risk and Cardio-cerebrovascular symptom knowledge in patients with atrial fibrillation, and to determine the relationship between knowledge and self-management in these patients.

Methods: Using a cross-sectional study design, 120 patients from an outpatient clinic were recruited from two medical centers. Data were collected using a structured questionnaire, and data on risk factors and clinical characteristics were collected from patients’ medical records. The data were analyzed by one-way analysis of variance, Pearson correlation coefficient, and hierarchical multiple linear regression analysis.

Results: The risk of stroke was estimated to be 82.5%. For the assessment of patient cardio-cerebrovascular symptom knowledge the correct answer rate was as 37%. Hierarchical regression analysis showed that knowledge about cardio-cerebrovascular disease symptoms was a significant predictor, explaining an additional 28.3% of the variance of self-management behaviors.

Conclusions: These results suggest the need for education programs that include information about cardio-cerebrovascular disease symptoms and the risks of stroke occurring as a complication, in order to enhance self-management behaviors in patients with atrial fibrillation.

Key words: Atrial fibrillation, Cardiovascular disease, Cerebrovascular disease, Knowledge, Self-management

Introduction

In atrial fibrillation (AF), the most common arrhythmia, electrical flow occurs in various parts of the atrium, causing irregular and rapid tremors of heart contraction[1]. In a study of 1,483 elderly people over 60 years of age, atrial fibrillation was diagnosed by electrocardiogram screening in 1.0% of participants in their 60s, 3.3% in their 70s, and 7.2% in their 80s[2]. The prevalence rate is expected to increase with the aging population[3]. AF presents symptoms such as palpitations, dizziness, fainting, and chest pain, and increases the risk of heart failure with reduced ventricular function and stroke due to blood clots formed by the accumulation of blood[3]. Complication morbidity doubles mortality in women and increases mortality in men by 1.5 fold[3], increases risk of stroke by 5 times, risk of heart failure by 3 times, and dementia by 2 times[1].

In one stroke registration study, 19% of ischemic cerebral infarction was found to be caused by AF[4]. AF was reported to have high severity and mortality[5]. In

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most patients with AF, their condition is associated with hypertension, diabetes, and hyperlipidemia, which are risk factors for cardio-cerebrovascular disease (CVD)\(^6\). According to AF management guidelines, antithrombotic treatment should be determined by estimating the stroke risk of AF patients to prevent the occurrence of CVD\(^1\). Because the choice of AF treatment depends on symptoms and stroke risk, it is necessary to first understand the stroke risk level of AF patients in order to effectively manage AF.

One study found that most patients with AF were unaware of their risk for CVD. In that study, the high-risk group showed no difference in stroke perception compared with the low-risk group\(^7\). In order to prevent delays in the treatment of stroke, raising awareness of the symptoms is essential. The American Heart Association provides AF patient education that includes stroke risk categories and stroke symptoms\(^8\). AF guidelines suggest that appropriate treatment to prevent aggravation of the disease includes awareness of possible heart failure\(^1\). Therefore, patients with AF, a disease that can progress to fatal CVD, should be assessed and provided with adequate education on the symptoms related to the expected complications. Self-management in patients with AF requires continuous medication and lifestyle management to prevent disease exacerbation and to prevent complications\(^3\). Self-management behavior strategies include preventive health behaviors, such as perception of disease that recognizes symptoms and risk factors, drug side effects management, pulse monitoring for symptom monitoring, and awareness of complications\(^9\). Patients with AF need to understand the importance of early detection and coping with CVD in order to improve their lifestyle and prevent complications by adjusting to long-term treatment. Therefore, it is necessary to confirm whether knowledge about symptoms affects the self-management behavior of patients with AF.

**Aims**

The purpose of this study was to assess the risk of stroke, CVD symptom knowledge, and self-management behavior, and to identify the factors that affect self-management behavior in patients with AF.

- Determine participant stroke risk, CVD symptom knowledge, and self-management behavior.
- Explore differences in CVD symptom knowledge and self-care behavior according to the general characteristics of the participants and the risk of stroke.
- Identify the effect of patient CVD symptom knowledge on self-management behavior.

**Method**

**Study design and participants**

This study used a descriptive research design. The study participants were patients with AF who visited outpatient cardiac units at two general hospitals. The inclusion criteria were official diagnoses of AF and AF for more than 3 months. The exclusion criteria were having been diagnosed less than 3 months prior to the study and changed treatment within the past 3 months. Using the G*Power 3.1 program, the number of participants was determined based on the calculations of previous studies\(^10\), with a median effect size of 15, regression analysis with a significance level of 0.05, a power of 80%, and 8 independent variables (age, gender, education level, family structure, economic status, duration of illness, stroke risk, and knowledge about symptoms). Considering a dropout rate of 10%, it was determined 125 initial participants were required to ensure a total of at least 109 participants. Data were collected on 123 patients. There were 3 incomplete questionnaires, and therefore the data from 120 participants were analyzed.

**Measures**

**Stroke risk**

The CHA\(_2\)DS\(_2\)-VASc score (congestive heart failure, hypertension, age \(\geq 75\) [doubled], diabetes mellitus, prior stroke or transient ischemic attack [doubled], vascular disease, age 65–74, female) was used to assess the risk of stroke\(^11\). In the calculation of the CHA\(_2\)DS\(_2\)-VASc score, 1 point is added to the score for the presence of congestive heart failure, hypertension, diabetes, or vascular disease, 2 points for being female, 2 points for having a history of stroke, 2 points for being over 75 years of age, and 1 point for being between 65 and 74 years of age. A combined score of 0 indicates low risk, 1
indicates medium risk, and 2 or more indicates high risk.

**Cardio-cerebrovascular (CVD) symptom Knowledge**

CVD symptom knowledge was measured by the American Heart Association’s revised instrument for warning signs of stroke, myocardial infarction, and heart failure\(^{[12]}\). Items of the instrument are on five stroke symptoms, five myocardial infarction symptoms, and seven heart failure symptoms. In the scoring of the measurement, a correct answer is given 1 point. “Do not know” or incorrect answers are given 0 points. The total score ranges from 0 to 17 points. Higher scores indicate more CVD symptom knowledge. For this instrument, the Kuder-Richardson 20 in study\(^{[12]}\) and in the current study were .74 and .91, respectively.

**Self-management behaviors**

A questionnaire developed by Xu et al\(^{[13]}\) was used to measure self-management behaviors of patients with AF. Permission to translate the questionnaire into Korean was obtained from the original authors. The questionnaire was back-translated by a bilingual person proficient in both Korean and English. The Korean version was validated using content validity. The original questionnaire consisted of 13 items: 4 items on adherence to medication regimen, international normalized ratio monitoring, periodic follow-up, and daily pulse self-examination, and 6 on healthy lifestyle. The questionnaire items were measured on a 4-point Likert scale that ranged from 1 (“neither agree nor disagree”) to 4 (“strongly agree”); the scores ranged from 13 to 52, with higher scores indicating greater self-management behaviors. Cronbach’s \( \alpha \) in Xu et al\(^{[13]}\) and in the current study were .86 and .79, respectively.

**Data Collection**

Data collection was carried out from March 2017 to September 2017 at the two outpatient cardiac units. Consent was obtained from the medical teams and medical staff. The questionnaire was self-administered, and the researcher and research assistant provided assistance when necessary. The questionnaire took about 20-30 minutes to complete. The terms of AF prevalence and stroke risk were checked with the electronic medical records.

**Ethical Consideration**

This study was conducted after approval from the research ethics committee of the institution (IRB No. 2017-02-007-004) collecting the data. The researcher explained the purpose, methods, and anonymity of the study to the study participants and informed them that taking part in the study was voluntary. Each participant provided prior written informed consent.

**Data Analysis**

Data were analyzed using IBM SPSS 22.0. Instrument reliability was assessed using Cronbach’s \( \alpha \). Data on general characteristics, disease-related characteristics, stroke risk, CVD symptom knowledge, and self-management behavior were analyzed via real numbers, percentage, average, and standard deviation. Self-management behaviors was verified by Kolmogorov-Smirnov test (score = .065, \( p = .120 \)), and the assumption of equal variance was confirmed by Levene’s statistics. Differences in CVD symptom knowledge and self-management behaviors were determined using a one-way analysis of variance, and post-hoc testing was performed with the Scheffé test. The correlation between CVD symptom knowledge and self-management behavior was examined using Pearson’s correlation coefficients, and a hierarchical regression analysis was performed to determine the effect on self-management behavior. In the testing of the regression model for multicollinearity, it was found that the correlation was .03 ~ .59, less than 0.8, the tolerance was 0.98, 0.1 or more, and the variation inflation factor was 1.37, less than 10. The Durbin-Watson statistic was 2.39, close to 2. There was no problem of autocorrelation.

**Results**

**Demographic and disease-related characteristics of the participants**

The average age of the participants was 69.3 ± 11.5 years, and 71 were males (59.2%). With regard to education level, 42.5% had elementary school education and under, and 85.0% lived with their families. The mean duration of AF was 46.2 ± 39.1 months. The major
Comorbidities were hypertension (56.7%), diabetes (25.8%), and peripheral vascular disease (17.5%). Among the medication used by the participants, 37.5% were new oral anticoagulants; 33.3% of the patients used warfarin. The risk of stroke, assessed by the CHA²DS²-VASc score, was 7.5% in the low-risk group, 10.0% in the middle-risk group, and 82.5% in the high-risk group. The most common risk factor for stroke, as determined by the CHA²DS²-VASc score, was an age of 65 years or over (66.7%), followed by hypertension (56.7%), being female (40.8%), and having diabetes (25.8%) (Table 1).

**CVD symptom knowledge and self-management behavior**

The average score for CVD symptom knowledge was 6.30 ± 5.12 points, out of a possible 17 points, with a correct answer rate of 44% for stroke, 34% for myocardial infarction, and 32% for heart failure. The average score for self-management behavior was 35.32 ± 6.51, out of a possible 52 points (Table 2). The correlation between CVD symptom knowledge and self-management behavior was examined by univariate analysis (r=.57, p<.001).

**Differences in CVD symptom knowledge and self-management behaviors according to participant characteristics and stroke risk**

There were statistically significant differences in CVD symptom knowledge according to age (F = 4.51, p = .012) and education level (F = 6.88 p <.001). Self-management behaviors were significantly different according to age (F = 6.49 p = .002), education level (F = 6.29 p = .001), and duration of disease (F = 3.97 p = .021). However, there was no statistically significant difference in CVD symptom knowledge and self-management behavior according to the type of disease, type of medication taken, and risk of stroke (Table 1).

**The effects of CVD symptom knowledge on self-management behavior**

In the first step of the hierarchical regression analysis, age, education, and duration of illness, which were significantly affected by self-management behavior, were included in the model as independent variables (Adj R² = .10, F = 5.42, p <.001). In the second step CVD symptom knowledge increased by 28.3% (β = 0.53, ΔR² = .28, p <.001). In the final model, age (β = -.14, p = .041) and CVD symptom knowledge (β = .53, p = <.001) were identified as significant influencing factors. The total explanatory power of the final model was 38% (Adj R²=.38, F=17.21, p<.001).

**Table 1 Differences of CVD Symptom Knowledge and Self-management behaviors by Subjects’ Characteristics (N=120)**

<table>
<thead>
<tr>
<th>Variables Categories</th>
<th>n (%) or M±SD</th>
<th>CVD symptom knowledge</th>
<th>Self-management behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M±SD</td>
<td>t or F (p)</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>&lt;65a</td>
<td>40 (33.3)</td>
<td>8.08±4.77</td>
<td>4.51 (.012)</td>
</tr>
<tr>
<td>65 ~ 74b</td>
<td>35 (29.2)</td>
<td>6.17±5.31</td>
<td>a&gt;c†</td>
</tr>
<tr>
<td>≥75c</td>
<td>45 (37.5)</td>
<td>4.82±4.87</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>71 (59.2)</td>
<td>6.49±4.78</td>
<td>0.25 (.621)</td>
</tr>
<tr>
<td>Women</td>
<td>49 (40.8)</td>
<td>6.02±5.61</td>
<td></td>
</tr>
</tbody>
</table>
**Table 1 Differences of CVD Symptom Knowledge and Self-management behaviors by Subjects’ Characteristics (N=120)**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Level</th>
<th>N (%)</th>
<th>Mean ± SD</th>
<th>t-Test</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>≤Elementary schoola</td>
<td>51 (42.5)</td>
<td>5.08±5.12</td>
<td>6.88 (.001)</td>
<td>c&gt;a,b†, d&gt;b†</td>
</tr>
<tr>
<td></td>
<td>Middle schoolb</td>
<td>24 (20.0)</td>
<td>4.21±4.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High schoolc</td>
<td>23 (19.2)</td>
<td>9.22±3.88</td>
<td>33.13±7.61</td>
<td>c&gt;a†, d&gt;b†</td>
</tr>
<tr>
<td></td>
<td>≥College</td>
<td>22 (18.3)</td>
<td>8.36±5.01</td>
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<tr>
<td><strong>Living with</strong></td>
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<tr>
<td></td>
<td>Spouse or Children</td>
<td>102 (85.0)</td>
<td>6.09±4.87</td>
<td>1.16 (.282)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alone</td>
<td>18 (15.0)</td>
<td>7.50±6.34</td>
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<tr>
<td><strong>Monthly income (10,000Won)</strong></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>&lt;200</td>
<td>82 (68.3)</td>
<td>6.39±5.44</td>
<td>0.08 (.778)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥200</td>
<td>38 (31.7)</td>
<td>6.11±4.40</td>
<td></td>
<td></td>
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<tr>
<td><strong>Alcohol drinking</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>37 (30.8)</td>
<td>5.87±5.11</td>
<td>1.94 (.166)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>83 (69.2)</td>
<td>7.27±5.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Yes</td>
<td>18 (15.0)</td>
<td>8.28±5.14</td>
<td>3.22 (.075)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>102 (85.0)</td>
<td>5.95±5.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time since diagnosed (month)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>≤12a</td>
<td>34 (28.4)</td>
<td>6.50±5.40</td>
<td>0.21 (.808)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13₂35b</td>
<td>19 (15.8)</td>
<td>6.84±5.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥36c</td>
<td>67 (55.8)</td>
<td>6.04±4.77</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Comorbidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes‡</td>
<td>97 (80.3)</td>
<td>6.35±4.77</td>
<td>1.06 (.306)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
<td>68 (56.7)</td>
<td>6.09±5.06</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
<td>31 (25.8)</td>
<td>7.10±4.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peripheral vascular disease</td>
<td>21 (17.5)</td>
<td>5.90±5.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heart failure</td>
<td>19 (15.8)</td>
<td>6.52±5.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Previous stroke</td>
<td>17 (14.2)</td>
<td>6.13±4.53</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>5 ( 4.2)</td>
<td>3.60±2.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antiplatelets</td>
<td>30 (25.0)</td>
<td>6.90±4.95</td>
<td>1.028 (.392)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOAC</td>
<td>45 (37.5)</td>
<td>6.82±5.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warfarin</td>
<td>40 (33.3)</td>
<td>5.60±5.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CHA²DS²-VASc score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low risk (0)</td>
<td>9 ( 7.5)</td>
<td>7.71±4.36</td>
<td>1.05 (.353)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate risk (1)</td>
<td>12 (10.0)</td>
<td>7.27±4.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High risk (&gt;2)</td>
<td>99 (82.5)</td>
<td>5.92±5.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 Levels of CVD Symptom Knowledge (N=120)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories (items)</th>
<th>Range</th>
<th>M±SD</th>
<th>Correct answer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD symptom knowledge, Total (17)</td>
<td>0 ~ 17</td>
<td>6.30±5.12</td>
<td>37.0</td>
<td></td>
</tr>
<tr>
<td>Stroke (5)</td>
<td>0 ~ 5</td>
<td>2.21±2.11</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction (5)</td>
<td>0 ~ 5</td>
<td>1.71±1.54</td>
<td>34.0</td>
<td></td>
</tr>
<tr>
<td>Heart failure (7)</td>
<td>0 ~ 7</td>
<td>2.28±2.15</td>
<td>32.0</td>
<td></td>
</tr>
</tbody>
</table>

CVD, cardio-cerebrovascular disease

Table 3 Influence of CVD Symptom Knowledge on Self-management behaviors adjusted for Covariates by Hierachical Regression Analysis (N=120)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td>β</td>
<td>t</td>
<td>p</td>
<td>B</td>
<td>SE</td>
</tr>
<tr>
<td>(Constant)</td>
<td>51.15</td>
<td>8.54</td>
<td>6.49</td>
<td>&lt;.001</td>
<td>42.97</td>
<td>3.74</td>
<td>6.33</td>
</tr>
<tr>
<td>Age (years)</td>
<td>-1.12</td>
<td>0.90</td>
<td>-.17</td>
<td>-1.62</td>
<td>.026</td>
<td>-0.85</td>
<td>0.52</td>
</tr>
<tr>
<td>Education</td>
<td>1.40</td>
<td>0.83</td>
<td>.83</td>
<td>1.68</td>
<td>.095</td>
<td>0.74</td>
<td>0.45</td>
</tr>
<tr>
<td>Time since diagnosed(Month)</td>
<td>0.01</td>
<td>0.02</td>
<td>.04</td>
<td>0.46</td>
<td>.644</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>CVD symptom knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.85</td>
<td>0.12</td>
<td>.53</td>
</tr>
</tbody>
</table>

Adj. $R^2=.10$, F=5.42, p=.001 Adj. $R^2=.38$, $\Delta R^2=.28$, F=17.21, p=.001

CVD, cardio-cerebrovascular disease

Discussion

The purpose of this study was to provide basic data for nursing interventions targeted at patients with AF, through the assessment of stroke risk, CVD symptom knowledge, and self-management behavior. The average age of the participants was 69.3 years, and 82.5% of the high-risk group had experienced stroke. In a previous study, the mean age of patients with AF was 74 years, and 87.7% were in the high-risk group[14]. One possible reason for the difference in the percentage of high-risk patients between the present study and the previous study may be that the average age of the participants in the present study was lower than that of the previous study.
As indicated by the scoring system of the CHA₂DS₂-VASc score, the risk of stroke increases with age. The risk factors found in a study by Tze-fan[15] differed from those in the present study in complications age, hypertension, being female, and heart failure. AF has been found to be 2.7 times higher in patients with hypertension, 1.6 times higher in patients with heart failure, and 1.3 times higher in patients with diabetes, according to the associated risk of stroke[16]. Comorbidities should be managed together to reduce the risk of cardio-cerebrovascular disease. However, in patients with coronary artery disease, accompanying diseases such as hyperlipidemia and hypertension have not been recognized as risk factors[17]. Since patients with AF are expected to have similar risk factors, it is necessary to emphasize the need for self-management of comorbid diseases to reduce the risk of stroke. The average score for CVD symptom knowledge was 6.30 ± 5.12 points, out of 17 possible points, in the present study, with a correct answer rate of 37%. It was much lower than the previous study[12], which reported a correct answer rate of 62% with using the same measurement tool. Emphasis on the prevent stroke[18], early education of AF patients, and appropriate coping measures should be promptly provided. In particular, for knowledge about heart failure symptoms, the average rate of correct responses was 32%, which was lower compared with stroke and myocardial infarction symptoms. In order to raise awareness of CVD, it is necessary to plan interventions that focus on prevention of disease progression and exacerbation, and health promotion. The average score for self-management behavior in the present study was 35.32 ± 6.51, which was lower than that of a previous study[13] that used the same measurement tool. The average score in that study was 38.6. Lack of information on diseases and complications is likely to be an obstacle to effective self-management behavior.

In the present study, there were significant differences in CVD symptom knowledge by age and education level. In a study of patients with AF, conducted by the American Arrhythmia Association knowledge about stroke symptoms was higher with age and more education, similar to the results of the present study[19]. Education should be provided to groups of patients with AF that are at higher risk for stroke, and levels of AF management should be assessed to improve patient knowledge about acute symptoms of stroke and coping with symptoms.

In this study, hierarchical regression analysis was performed to determine the effect of symptom knowledge on self-management behavior when controlling the effects of general and disease-related covariates. In the univariate analysis, age, education level, and duration of illness were the significant influencing factors for age, and the explanatory power was 10%. Symptom knowledge was increased to 38%. In other words, symptom knowledge was a significant factor that increased 28% of self-management behavior. These findings support those of a previous study that indicated that disease-related knowledge is a highly influencing factor of self-management behavior in patients with heart failure[20]. In older patients, poorer self-management behavior is expected due to decreased understanding of the disease, slower awareness of the disease, and more difficulty in changing lifestyle behaviors. Therefore, before nursing intervention, personalized strategies should be provided after evaluating the age and learning competencies of the patient. One previous study found that patients with AF had a high level of uncertainty and depression that could affect self-management behavior[9]. In the future, it is necessary to conduct repeated studies to identify the influencing factors of self-management behaviors, including symptom knowledge and psychosocial variables, in patients with AF.

This study had two major limitations. First, results from the sample of outpatients may not be generalizable to all patients with AF. Second, this was a cross-sectional study that used self-reported data, and the causal relationships among stroke risk, knowledge, and self-management behavior could not be inferred. However, this study is meaningful in that it demonstrates that in patients with AF, knowledge about symptoms related to complications is insufficient for effective self-management.

**Conclusions**

In this study, 82.5% of patients with AF were at high risk for stroke. The rate of correct CVD symptom knowledge was 37%. The level of self-management
behavior for AF management was 35.32 ± 6.51, which was not high. Results of the hierarchical regression analysis indicated that CVD symptom knowledge was an independent factor of self-management behavior, and explanation ability was 38%. In order to improve self-management behavior in patients with AF, it is necessary to provide education that focuses on warning symptoms of complications such as stroke, myocardial infarction, and heart failure and is tailored to the age and knowledge level of the patient.

References
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Association of Thyroid Function with Metabolic Parameter in IDD Clinic Patients, Magelang Research and Development Center

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1Researcher, Magelang Unit of Health Research and Development, National Institute of Health Research and Development, Ministry of Health, Indonesia

Abstract

Metabolic parameters, such as lipid and glucose metabolism, blood pressure, and body weight, are influenced by thyroid hormones. Thyroid dysfunction may lead to the development of the metabolic syndrome. The study aimed to analyze the relationship between thyroid dysfunction and metabolic parameters in IDD clinic patients, Magelang Research and Development Center. A cross-sectional study of 83 patients who met the inclusion and exclusion criteria. Total cholesterol, LDL, HDL, TSH, and free T4 concentration had been measured in all subjects. BMI and blood pressure were measured. Concentrations of lipids, triglycerides, free T4, and TSH were analyzed. The mean age of the patient was 33.5 ± 8.6 of whom 6 (7.2 %) subclinical hypothyroidism, 17 (20.5 %) overt hyperthyroidism, and 17 (20.5 %) had subclinical hyperthyroidism. There was positive relationship between TSH and systolic; whereas, FT4 was associated with BMI, systole, and diastole after adjustment for age. Overt hyperthyroidism had significantly higher odds of hypertension after adjustment for age and BMI (OR 5.557 (1.310-23.578), p<0.05). Hyperthyroidism may induce hypertension.

Keywords: thyroid function, triglycerides, lipid, blood pressure

Introduction

Thyroid hormone plays an important role in glucose1 and lipid metabolism2, blood pressure3 and body weight4, as it regulates energy metabolism and thermogenesis. All of them are related with various metabolic parameters. Thyroid dysfunction may lead to the development of metabolic syndrome1,5. The occurrence of dyslipidemia, increased blood pressure, increased fasting blood glucose levels, and abdominal obesity is some of the risk factors for metabolic syndrome6.

Research has shown that thyroid hormones directly and indirectly impact the cardiovascular system7 and especially hypertension8. Patients with thyroid diseases, such as hyperthyroidism, often have signs and symptoms of cardiovascular changes, leading to increased cardiac output and hypertension (cardiac arrhythmias, hypercoagulopathy, stroke, and pulmonary embolism). In the hyperthyroid patient, systolic blood pressures had usually elevated, but not in diastolic blood pressures9. Overt hypothyroidism causes an elevate in blood pressure and lipid10.

Metabolic syndrome and thyroid dysfunction are very common endocrine disorders and are associated with various metabolic aspects, morbidity and mortality11. The metabolic syndrome may increase in hypothyroidism or subclinical hypothyroidism. Both together have a major impact on individual health regarding cardiovascular and metabolic risk factors, especially in the elderly5. Therefore, the aim of this study was to evaluate the association of thyroid dysfunction with metabolic parameter in a patient with a goiter who came to the IDD clinic of Magelang Research and Development Center (R&DC).
Method

We conducted a cross-sectional study on IDD clinic patients, Magelang Research and Development Center during 2018. The study was nested within the principal study focused to evaluate the relationship between thyroid functions and lipid profiles in women of childbearing age with goiter. We excluded patients if they had complications from other metabolic diseases such as diabetes mellitus (DM). The ethics committee of the Islamic University of Indonesia approved the protocol for this study. The minimum sample estimate required is 83 samples, using a diagnostic test with 95% CI and 95% test power. Data and sample characteristics were collected by questionnaire-based interviews. Data collection on physical indicators, health status, and disease history were carried out by clinical examination by an experienced doctor. Nutritional status (height, weight) was determined and collected anthropometry by measuring height using Microtoise and weighing it using Seca digital scale.

Biochemical indicator data including TSH, free-T4 (fT4), LDL, HDL, and total cholesterol were obtained by taking blood without fasting from the veins as much as 3.5 ml according to procedures taken by the health analyst. The blood was rotated at 3000 rpm for 10 minutes to be separated between plasma and serum. The resulting serum was divided into 5 tubes for the examination of TSH, fT4, LDL, HDL, and total cholesterol. The serum was stored in a freezer at -20°C before analysis. The analysis of TSH, fT4, LDL, HDL, and total cholesterol used the ELISA method.

TSH reference range 0.31–2.50 mIU and no thyroid medication was defined as euthyroid. Other thyroid test results such as TSH> 2.50 and 0.80 ≤ FT4 ≤ 2.00 are considered subclinical hypothyroidism; TSH> 2.50 and FT4 <0.80 for real hypothyroidism; TSH <0.30 and 0.80 ≤ FT4 ≤ 2.00 as subclinical hyperthyroidism; and TSH <0.30 and FT4 > 2.00 as overt hyperthyroidism. The criteria for hypertension were defined according to the Joint Interim Statement (JIS) as systolic blood pressure (SBP) ≥ 130 mmHg or diastolic blood pressure (DBP) ≥ 85 mmHg while not taking any hypertension medication. Decrease in HDL-C as determined by serum HDL-C <40 mg / dl in men and <50 mg / dl in women or on special medication. Hypertriglycerdeemia is determined by serum triglycerides ≥ 150 mg / dl or by specific treatment. Hypercholesterolemia is determined by serum LDL-C >100 mg / dl and hypercholesterolemia is determined by total serum cholesterol> 200 mg / dl.

Characteristics and laboratory data of patients are presented as mean ± SD for normal distribution variables and median (min-max) for non normal distribution variables. Data were compared between different groups of thyroid function, using ANOVA or Kruskal Wallis based on variables distribution. Linear regression was used to calculate the correlation between serum TSH and FT4 values with metabolic variables. The effect of related variables on the dependent variable was evaluated using the nonstandard coefficient β. Chi-square test was used to compare cases of metabolic variables between different thyroid function groups. Multivariate logistic analysis was used to calculate the odds of case metabolic variables adjusted for age and BMI; and evaluate the association between thyroid dysfunction and metabolic variables. Data analysis was performed using SPSS 22.0 software with a statistical significance value of p-values <0.05.

Result

Table 1. Characteristics of the patients by thyroid function grup.

<table>
<thead>
<tr>
<th></th>
<th>Euthyroid (N=43)</th>
<th>Overt hyperthyroidism (N=17)</th>
<th>Subclinical hyperthyroidism (N=17)</th>
<th>Subclinical hypothyroid (N=6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>34.6 ± 8.24</td>
<td>31.6 ± 8.19</td>
<td>34.5 ± 9.37</td>
<td>27.5 ± 9.31</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>54.4 ± 9.13</td>
<td>45.9 ± 5.96</td>
<td>51.4 ± 10.18</td>
<td>50.7 ± 9.37</td>
</tr>
</tbody>
</table>
Values are presented as mean ± SD ; p_Values are for comparison with euthyroid subject; p<0.05; ** p<0.01; *** p<0.000

Mean age of patients (n = 83) was 33.5 ± 8.6; 43 (51.8%) of the participant were euthyroid, 6 (7.2 %) subclinical hypothyroidism, 17 (20.5 %) overt hyperthyroidism, and 17 (20.5 %) had subclinical hyperthyroidism. There were significant differences in BMI, total cholesterol, LDL-C, HDL, LDL, systolic, fT4, and TSH between overt hyperthyroid subjects and the euthyroid group. Subclinical hyperthyroid patients had significantly lower total cholesterol, LDL, and TSH values than the euthyroid group (Table 1). Subclinical hypothyroid patients had significantly higher values of TSH than the euthyroid group. There was positive associations for TSH with systolic by linear regression analysis; the significance had disappeared after adjusted for age and M BMI. FT4 had associated with BMI, systolic, and diastolic after adjustment for age (Table 2).

Table 2. Association of thyroid hormones levels with lipid and blood pressure parameter.

<table>
<thead>
<tr>
<th>N=83</th>
<th>Model</th>
<th>TSH (mIU/l)</th>
<th>fT4 (ng/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>β</td>
<td>R²</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>1</td>
<td>0.729</td>
<td>0.531</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.144</td>
<td>0.589</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>1</td>
<td>0.749</td>
<td>0.561</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.649</td>
<td>0.609</td>
</tr>
<tr>
<td>HDL-C (mg/dl)</td>
<td>1</td>
<td>0.002</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.474</td>
<td>0.406</td>
</tr>
<tr>
<td>LDL-C (mg/dl)</td>
<td>1</td>
<td>0.565</td>
<td>0.320</td>
</tr>
</tbody>
</table>
The proportion of hyper-cholesterolemia (0.0%) and hyper LDL-C (0.0%) were significantly lower in patients with overt hyperthyroidism than in other groups (p < 0.05). A significant odds ratios for proportion hypertension was observed only in overt hyperthyroidism (OR: 5.557, 95% CI: 1.310-23.578, p=0.020) (Table 3).

Table 3. Comparison of cases of metabolic variables in thyroid function groups.

<table>
<thead>
<tr>
<th>Thyroid Function</th>
<th>Model</th>
<th>%cases</th>
<th>%cases</th>
<th>OR (95% CI)</th>
<th>%cases</th>
<th>OR (95% CI)</th>
<th>%cases</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyper-triglyceremia</td>
<td>1</td>
<td>18.6</td>
<td>0.0</td>
<td>NA</td>
<td>0.0</td>
<td>NA</td>
<td>33.3</td>
<td>2.188 (0.339-14.095)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>NA</td>
<td></td>
<td>3.543 (0.373-33.650)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyper cholesterol</td>
<td>1</td>
<td>30.2</td>
<td>0.0*</td>
<td>NA</td>
<td>11.8</td>
<td>0.308 (0.061-1.543)</td>
<td>50.0</td>
<td>2.308 (0.410-12.985)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>NA</td>
<td>0.328 (0.063-1.699)</td>
<td>3.067 (0.462-20.342)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced HDL-C</td>
<td>1</td>
<td>27.9</td>
<td>47.1</td>
<td>2.296 (0.718-7.342)</td>
<td>23.5</td>
<td>0.795 (0.216-2.928)</td>
<td>50.0</td>
<td>2.583 (0.456-14.623)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>3.358 (0.928-12.143)</td>
<td>0.940 (0.246-3.601)</td>
<td>2.880 (0.453-18.312)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyper LDL-C</td>
<td>1</td>
<td>76.7</td>
<td>0.0***</td>
<td>NA</td>
<td>70.6</td>
<td>0.727 (0.206-2.565)</td>
<td>83.3</td>
<td>1.515 (0.158-14.529)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>NA</td>
<td>0.719 (0.192-2.688)</td>
<td>2.117 (0.206-21.778)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
<td>38.1</td>
<td>56.3</td>
<td>2.089 (0.650-6.716)</td>
<td>29.4</td>
<td>0.677 (0.201-2.282)</td>
<td>33.3</td>
<td>0.813 (0.133-4.955)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td>5.557 (1.310-23.578)*</td>
<td>0.690 (0.172-2.769)</td>
<td>2.112 (0.193-23.173)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P-Values are for comparison with euthyroid subject: * p<0.05; ***p<0.000; Model 1 : Crude ; Model 2 : Adjusted for age and BMI
Discussion

This study showed that overt hyperthyroidism is associated with a higher risk of hypertension. In hyperthyroid patients, systolic blood pressure is usually elevated, not diastolic blood pressure. Thyroid hormones have a direct and indirect cellular effect on the cardiac-renal-vascular system. Excess T3 causes tachycardia, diminished systemic vascular, increased cardiac preload and ventricular contractility, resulting in increased cardiac output and hypertension. The results of a study in Hong Kong stated that 591 patients with hyperthyroidism, 9% were accompanied by hypertension, and the prevalence of heart failure was higher in patients with hypertension. Hyperthyroidism caused high cardiac output and increased heart rate, decreased peripheral vascular resistance, and circulatory hyperdynamics. This condition results in increased sodium absorption and blood volume due to decreased renal perfusion pressure and activation of the angiotensin-aldosterone axis.

The thyroid gland makes hormones (T4 and T3), and the synthesis of the hormone thyroid is regulated by TSH. Thyroid hormone is transported across the cell membrane and regulate gene expression by binding thyroid hormone receptors to provide genomic and nongenomic effects. Thyroid hormone disruption will result in inhibition of gene expression including the cellular signaling pathway of gluconeogenesis, lipogenesis, insulin signaling, and adenylate cyclase signaling. The non-genomic effect associated with thyroid hormones will cause changes in the cell membranes and cytoplasm include regulation of mitochondrial metabolism, increased glucose uptake, regulating ion pump concentrations on cell membranes, regulation of lipid metabolism in the liver, and heart rate control.

The hyperthyroid group was significantly lower in total cholesterol, HDL-C, and LDL-C than in the euthyroid group (Table 1). The subclinical hypothyroidism group had higher lipid levels than euthyroid; it’s not that different. The thyroid hormone plays an important role during the transport of lipoproteins. Excess thyroid hormone may increase the induction of coenzyme 3-hydroxy-3-methyl-glutaric-CoA reductase (HMG-CoA reductase) in the liver by stimulating cholesterol synthesis so that cholesterol levels decrease. Thyroid hormones also control the sterol regulator element-binding protein-2 (SREBP-2) which regulates the expression of low-density lipoprotein (LDL) receptors. Cholesteryl ester transfer protein (CETP) had influenced by thyroid hormone, which functions to stimulate the conversion of HDL to very-low-density-lipoprotein (VLDL) in the liver.

We found significant positive associations of free T4 with BMI systole and diastole after adjusted for age. High levels of circulating thyroid hormones in the body alter the levels of several other hormones and peptides which have potential effects on blood pressure. Some studies have reported hyperthyroidism can increase levels of endothelin-1 and its receptor. Endothelin-1 can induce hypertension through a direct effect on blood vessel tone, causes salt and water retention, and patient with salt-sensitive hypertension have high levels. Increased endothelin-1 in the atrial increases the risk of atrial fibrillation by promoting atrial inflammation, remodeling, and cardiac myocyte hypertrophy. The development of atrial fibrillation in a patient with hyperthyroidism had associated with endothelin-1, independent of age. Besides, there is increased arterial stiffness and upregulation of erythropoietin synthesis at high T3 levels, resulting in increased intravascular volume. These changes create a hyperdynamic state with a cardiac output of 50-300 percent higher than those in normal.

After adjusting for age, there was a significant positive association between free T4 and BMI, systole, and diastole. High levels of circulating thyroid hormone in the body have a possible effect on blood pressure. Overt hyperthyroidism can increase the endothelin-1 level and its receptors resulting in vascular tone, leading to salt and water retention, and an increase in blood pressure. The risk of atrial fibrillation increases with the increase in endothelin-1 in the atria. The development of atrial fibrillation in patients with hyperthyroidism had associated with endothelin-1, independent of age. Besides, there is increased arterial stiffness and upregulation of erythropoietin synthesis at high T3 levels, resulting in increased intravascular volume; 50-300 percent higher than euthyroid.
It had estimated that the prevalence of thyrotoxicosis patients with hypertension is around 20-68%\textsuperscript{21}. Hyperthyroid patients, elderly, have a higher risk of developing high blood pressure than younger hyperthyroid patients or non-hyperthyroid patients of the same age range\textsuperscript{9}. Compared with essential hypertension, the diagnosis of hypertension due to hyperthyroidism is accompanied by other symptoms of hyperthyroidism, such as tachycardia, anxiety or weight loss\textsuperscript{22}. Several studies have shown that hyperthyroid patients are more likely to experience a blunt drop in blood pressure at night, which is at risk of causing target organ damage due to hypertension\textsuperscript{21}.

**Conclusion**

This study shows that hyperthyroidism is associated with a higher risk of hypertension. It is necessary to examine hyperthyroidism in patients with hypertension, especially in older patients. So that the diagnosis of thyrotoxicosis can be made early even though elderly hypertensive patients have very mild symptoms of hyperthyroidism.

**Acknowledgement**

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**Ethical Clearance**: Taken from University of Islam Indonesia Yogyakarta, Indonesia.

**Source of Funding**: this research supported by University of Islam Indonesia Yogyakarta, Indonesia.

**Conflict of Interest**: The authors confirm that there are no conflicts of interest.

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Hospital Accessibility in Indonesia

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Abstract

The government’s task is to ensure easy access for the public to the health facilities needed. The study aimed at analyzing ecologically the factors related to the accessibility of hospitals in Indonesia. The ecological analysis conducted using secondary data from the Ministry of Health of the Republic of Indonesia report in 2018. The study takes all provinces as samples. Apart from households easily accessible to the hospital, five other variables analyzed as independent variables were total population, population density, poverty depth index, poverty severity, and population percentage completing primary education. Data were analyzed using a scatter plot. The study results found that the higher the total population in a province, the higher the percentage of households easily accessible to the hospital in that province. The higher the population density in an area, the higher the percentage of households access to the hospital in that area. On the other hand, the higher the poverty depth index in a region, the lower the percentage of households easily accessible to the hospital in that province. Moreover, the higher the poverty severity index in a region, the lower the percentage of households easily accessible to the hospital in that region. Finally, the higher the percentage of the population completing primary education in a province, the higher the percentage of households easily accessible to the hospital in that province. It concluded that five independent variables were analyzed related to the accessibility of hospitals in Indonesia.

Keywords: hospital access, ecological analysis, equity, poverty, healthcare performance.

Introduction

Health services are a fundamental right for all people. The government is obliged to provide this. Health care is a broad concept that describes the dimensions of the relationship between supply and demand. The experts define access to health services as the timely use of health services by individuals to obtain the best health outcomes¹. Dimensions of public access or affordability to health services are one dimension of the quality of health services. These dimensions mean that public access to health services should not be hindered by all conditions or easily reached by the community. Barriers may arise in geographical, social, economic, organizational, and linguistic conditions (communication)².

Accessibility of health care facilities is not the only factor that determines patients in choosing health services. The quality of medical personnel and the quality of health service facilities are the most determining factors for a person to go to a health service in a hospital³. We understand, however, that quality is a separate construction from access. Value building has much to do with the outcomes of the health care process⁴,⁵. Moreover, ease of access is essential in using health service facilities, especially at the referral level⁶–⁸.

Based on the 2018 Indonesia Basic Health Survey, the society seen that 37.1% of the public said access to
hospitals was easy to reach, 36.9% said it was difficult to get, and 26% said it was challenging to achieve. The difference between the people who said it was easy and difficult was only 0.2%. Hence, society assumed that a hospital’s affordability based on people’s knowledge is still a balance between comfort and difficulty. However, the large proportion of people who say it is complicated to access hospital services (26%) needs to be paid attention to by the government and hospitals.

Currently, the government is trying to provide health service insurance through National Health Insurance (NHI). With the NHI’s existence, we hoped that the community would get adequate access to proper health services. The cooperation system adopted by NHI requires all people to become members of this national insurance system. The government implements NHI as responsibility and protection for access to services and primary health needs.

However, gaps in access to health services still occur. The dominance of government policies in health development is one of the causes for the poor’s low access to health service facilities. Communities experience administrative complexity, unreachable costs, spatial disparities, discrimination, and other problems. Based on the background description, this study aims to conduct an ecological analysis related to the factors that affect hospital accessibility in Indonesia.

**Materials and Methods**

**Study Design**

The study design carries out using an ecological analysis approach. The environmental analysis uses an approach that focuses on comparisons between groups, not individuals. In this study, the research was the aggregate data at the provincial level. The purpose of the ecological analysis in this study was to make ecological conclusions about the effects on groups (provinces).

**Data Source**

The study conducted using secondary data from the 2018 Indonesia Basic Health Survey report and the 2018 Data and Information of Indonesia Health Profile. Both stories were official reports of the Ministry of Health of the Republic of Indonesia. The unit of analysis in this study was the province. All provinces in Indonesia analyzed (34 regions).

<table>
<thead>
<tr>
<th>Source</th>
<th>Variables</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 2018 Indonesia Basic Health Survey</td>
<td>Percentage of households easily accessible to the hospital</td>
<td></td>
</tr>
<tr>
<td>The 2018 Data and Information of Indonesia Health Profile</td>
<td>Total population</td>
<td>Estimated at 2018</td>
</tr>
<tr>
<td></td>
<td>Population density</td>
<td>Estimated at 2018</td>
</tr>
<tr>
<td></td>
<td>Poverty depth index</td>
<td>Recorded in September 2018</td>
</tr>
<tr>
<td></td>
<td>Poverty severity index</td>
<td>Recorded in September 2018</td>
</tr>
<tr>
<td></td>
<td>Percentage of the population completing primary education</td>
<td>Graduated from Junior High School</td>
</tr>
</tbody>
</table>
**Data Analysis**

The dependent variable in this study is the percentage of households easily accessible to the hospital. The ease of accessing the hospitals is assessed based on household knowledge of the type of transportation, travel time, and transportation costs. There were five independent variables analyzed in this study. The five variables were total population, population density, poverty depth index, poverty severity, and population percentage completing primary education.

The Poverty Depth Index is an indicator to measure the average gap based on the costs incurred by each low population compared to the poverty line. A higher index value indicates the average expenditure of the downward moving away from the poverty line. The Poverty Severity Index is an indicator that shows the distribution of spending among the poor. The greater the poverty severity index value, the greater the expenditure inequality among the poor. The percentage of the population completing primary education is the proportion of people who have met or have a junior high school diploma.

Data were analyzed by univariate and bivariate. The research carries out bivariate analysis using a scatter plot. The study uses a fit-line to determine the relationship between the percentage of households easily accessible to the hospital with independent variables. The entire analysis process utilizes SPSS 21 software.

**Ethical Approval**

The analysis in this study was employed secondary data from published official government reports. For this reason, the study not required ethical clearance in the implementation of this study.

**Results and Discussion**

Table 2 shows the descriptive statistics of variables of the factors related to hospitals’ accessibility in Indonesia. Table 2 provides a very high variation between provinces. The lowest percentage of households easily accessible to the hospital was 19.30% (Papua Province), while the highest prevalence was 70.60% (Yogyakarta Province). This analysis’s descriptive analysis follows previous studies’ results, which inform the backwardness of health development in the eastern compared to other regions in Indonesia.

**Table 2. Statistics descriptive of variables of the factors related to the accessibility of hospitals in Indonesia, 2018**

<table>
<thead>
<tr>
<th>Statistics Descriptive</th>
<th>Percentage of households easily accessible to the hospital</th>
<th>Total population</th>
<th>Population density</th>
<th>Poverty depth index</th>
<th>Poverty severity index</th>
<th>Percentage of the population completing primary education</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Mean</td>
<td>35.682</td>
<td>7794568.029</td>
<td>734.7144</td>
<td>1.8829</td>
<td>0.5071</td>
<td>76.747</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>11.455</td>
<td>11103978.632</td>
<td>2685.605</td>
<td>1.415</td>
<td>0.494</td>
<td>6.173</td>
</tr>
<tr>
<td>Range</td>
<td>51.30%</td>
<td>47967454</td>
<td>15754.85</td>
<td>6.00</td>
<td>2.27</td>
<td>29.29%</td>
</tr>
<tr>
<td>Minimum</td>
<td>19.30%</td>
<td>716407</td>
<td>9.41</td>
<td>0.50</td>
<td>0.11</td>
<td>57.09%</td>
</tr>
<tr>
<td>Maximum</td>
<td>70.60%</td>
<td>48683861</td>
<td>15764.26</td>
<td>6.50</td>
<td>2.38</td>
<td>86.38%</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile.
Figure 1. Scatter plot of the total population and the percentage of households easily accessible to the hospital in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile

Figure 1 is a scatter plot between the total population and the percentage of households easily accessible to the hospital in Indonesia. The relationship between the two variables shows a positive trend. The situation indicates that the higher the total population in a province, the higher the percentage of households easily accessible to the hospital in that province.

Figure 2 is a scatter plot between population density and the percentage of households easily accessible to Indonesia’s hospital. The relationship between the two variables shows a positive trend. The result means that the higher the population density in a province, the higher the percentage of households easily accessible to the hospital in that province.
Figure 2. Scatter plot of the population density and the percentage of households easily accessible to the hospital in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile

Figure 3. Scatter Plot of the poverty depth index and the percentage of households easily accessible to the hospital in Indonesia, 2018

Source: The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile
Previous studies show similar information. The trend indicates that hospitals build in areas that are more numerous and more densely populated. This situation means that populations living in disadvantaged, peripheral, and island regions have low access to hospitals\textsuperscript{7,17}.

Figure 3 is a scatter plot between the poverty depth index and the percentage of households easily accessible to the hospital in Indonesia. The tendency of these two variables shows a negative relationship. The situation informs that the higher the poverty depth index in a province, the lower the percentage of households easily accessible to the hospital in that province.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{scatter_plot.png}
\caption{Scatter Plot of the poverty severity index and the percentage of households easily accessible to the hospital in Indonesia, 2018}
\end{figure}

\textbf{Source:} The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile

Figure 4 is a scatter plot between the poverty severity index and the percentage of households easily accessible to the hospital in Indonesia. Based on the scatter plot, the two variables show a negative tendency. The scatter plot shows that the higher the poverty severity index in a province, the lower the percentage of households easily accessible to the hospital in that province.

The poverty index, both in-depth and severity, shows a negative relationship with the percentage of households easily accessible to the hospital in Indonesia. Poverty is closely related to the community’s ability to pay service fees and transportation costs to get to hospitals\textsuperscript{18}. The ability to pay for this community includes paying for health insurance contributions\textsuperscript{19–21}. 

\textbf{Figure 4.} Scatter Plot of the poverty severity index and the percentage of households easily accessible to the hospital in Indonesia, 2018

\textbf{Source:} The 2018 Indonesia Basic Health Survey and The 2018 Data and Information of Indonesia Health Profile
Figure 5 is a scatter plot between the percentage of the population completing primary education and the rate of households easily accessible to the hospital in Indonesia. The relationship between the two variables shows a positive trend. It can interpret that the higher the portion of the population completing primary education in a province, the higher the percentage of households easily accessible to the hospital in that province.

The positive relationship between education and easy access to hospitals shows that the more educated, the more he can understand his needs, the better he can understand the health services available. Several previous studies have also provided similar results. The studies found education as a positive determinant of performance in the health sector. On the other hand, poor education informed as a barrier to achieving better health performance.

**Conclusion**

The research result concludes that the five independent variables analyzed ecologically were related to the percentage of households easily accessible to the hospital in Indonesia. The five variables were total population, population density, poverty depth index, poverty severity index, and population percentage completing primary education.
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Source of Funding: Self-funding

Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, the study not required ethical clearance in the implementation.

Conflicting Interests: Nil

References


Association of Calpain-10 gene (rs2975760 and rs3792267) Polymorphism with Type 2 Diabetes Mellitus in the Iraqi Population

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Abstract

Background: Type II Diabetes Mellitus (T2DM) can be considered as the main diabetes’ type, which is present in all populations worldwide and all regions. Calpain-10 is a part of a vast intracellular protease family. CAPN10 gene polymorphisms have been related to complex types of T2DM.

Objective: The major goal of the presented work is evaluating the relation regarding CAPN10 gene polymorphisms (SNP44 rs2975760 and SNP43 rs3792267) with T2DM in the Iraqi population as well as changes in serum lipid concentration and insulin concentration.

Materials and Methods: Two groups of persons were recruited, 300 patients with type2 diabetes mellitus, and 300 healthy control individuals. Fasting serum glucose and serum lipid concentrations have been evaluated via standard enzymatic approaches, while the concentrations of serum insulin were evaluated via ELISA assay. Genotyping of rs2975760 and rs3792267 SNPs is conducted via PCR-RFLP.

Results: Those of the SNP-44 showed that patients of heterozygous genotype (TC) decreased significantly with respect to the control group. Patients with the homozygous genotype (CC) elevated insignificantly relative to the control group. The minor allele C frequency in patients (12%) is decreased considerably in the patients’ group relative to the group of controls (15%). The genotype results of SNP-43 illustrated that patients of heterozygous (GA) genotypes decreased significantly with respect to the control group. Patients of the homozygous genotype (AA) appeared to be insignificantly higher than the controls. The minor allele A frequency in patients (11.5%) is decreased considerably in the patients’ group relative to the group of controls (27%). Serum lipid concentrations, insulin, and insulin resistance are distributed in groups of various genotypes of the 2 SNPs deferentially.

Conclusion: SNP-44 and SNP-43 in Iraqi individuals are protective against the development of T2DM. They were implicated in serum lipid changes, insulin and insulin resistance values.

Keywords: Polymorphism; ELISA; Insulin resistance; RFLP-PCR; CAPN10

Introduction

T2DM is the major common diabetes form, responsible for approximately 90% of cases in many developed countries and it affects between 10% and 20% of people with age more than 45 ¹, T2DM indicates a person with physiological resistance to insulin effect in the peripheral tissues. Above all, insulin generated via the body isn’t functional physiologically ². There is diabetes in every population in the world and every country, including rural areas of countries with low and middle income. It is considered a global epidemic.
DM’s prevalence has increased globally, with lifestyles changing and obesity growing.  

Two metabolic disorders have contributed to T2DM: reduced peripheral tissue response to insulin (insulin resistance) as well as incomplete insulin secretion due to β-cell dysfunction. The causes of T2DM are environmental factors with or maybe medical consequences of genetic factors. It is known that more than 36 genes are attributed to the occurrence of DM. They could be involved in about 10 percent of the disease’s likelihood of occurrence. Some of these genes in β-cell activity are complicated and might involve insulin genetic defect mutation, hepatocyte nuclear transcription factor-1 alpha, glucokinase enzyme, hepatocyte nuclear transcription factor-4 alpha mutation, and insulin promoter factor 5.

Calpains can be specified as strongly preserved non lysosomal, calcium dependent cysteine protease superfamily, thus as a minimum of fourteen calpain family members were predicted, while their biology and chemistry were thoroughly examined. In vitro data in terms of the inhibition regarding calpain in adipocytes and skeletal muscle cells which lead to decreased glycogen synthesis and decreased insulin-stimulated glucose uptake, indicating that calpains have a role in glucose transport. In addition, CAPN10 can be considered as the first gene with regard to the T2DM sensitivity being identified via genome scan, along with polymorphisms related to altered CAPN10 expression. Extreme CAPN10 mRNA expression occurs in human heart, succeeded by kidney, brain, pancreas and liver, located on the chromosome 2q37.3, also includes fifteen exons spanning 31 kb that encode an intracellular protease of 672 amino acids. A lot of case control, as well as interaction researches, indicated that the expression of T2DM and insulin resistance are associated with polymorphisms in CAPN10.

In the production of T2DM, genetic variants such as SNP44 rs2975760 and SNP43 rs3792267, majorly found in intron 3 of CAPN 10 gene, is involved. Allelic frequency differences between cases and controls were shown by SNP44 and SNP43, however, a G>A transition in SNP-43 was correlated with evidence of linkage in the Mexican-American type 2 DM region. G allele frequency is increased relative to controls has been observed in patients. In Mexican Americans, a strong association was identified between the SNP-44 T>C genotype CAPN10 gene and T2DM, also in British/Irish people.

Due to a lack of research focusing on this issue, Calpain 10 gene polymorphism, however, is still unclear in Iraqi society. In the current research, the relationship between rs2975760 and rs3792267 SNPs with type 2 diabetes mellitus was explored for gaining insights into genetic history related to the disease in our culture.

Materials and Methods

Subjects

Case control study is used on 600 participants, they have been divided into 2 groups, healthy control group (300) along with group of patients experiencing T2DM (300). The period of the study was from August 2019 till April 2020. The study is conducted in the Postgraduate Laboratory Department of Biochemistry/University of Kufa/Faculty of Medicine, Iraq. The patient group comprised of 300 patients with, T2DM. They were selected from the Diabetes Center in Teaching Hospital (AL-Sadder) in Al Najaf Al-Ashraf, province. They have been observed and recognized by specialist physicians for the measures of inclusion. Patients with heart failure, cardiomyopathy or congenital, heart disease, autoimmune disease, and cancer are excluded.

The control group contained 300 volunteers. They were selected from relatives, friends, and medical staff. Any participant who had a disease for example cardiovascular disease, hypertension, heart disease, the renal disease had been unconsidered from the current study.

Biochemical parameters

Five milliliters of the blood sample were taken from each participant by peripheral vein puncture after overnight fasting. We separated the blood into 2 parts. Part one confined 3ml of blood was placed in a plain tube and left for about15min at 37°C for coagulation then centrifuged for10-15min at 2000 xg. The sera obtained was separated into 3 parts and then stored under -20°C for estimation of fasting serum glucose (FSG),
insulin, and lipid profiles (Low-density lipoprotein cholesterol (LDL-C), total cholesterol TC, very-low-density lipoprotein cholesterol (VLDL-C), high-density lipoprotein cholesterol (HDL-C) and triglycerides (TG)). Determination of fasting serum glucose is done by the enzymatic method. The enzyme-linked immune sorbent assay (ELISA) is used for the estimation of serum insulin. For the purpose of calculating insulin resistance, a homeostatic model assessment (HOMA) approach was utilized by means of the next formula:

\[ \text{HOMA} = \frac{\text{glucose} \times \text{insulin}}{22.5} \]

The concentrations of HDL-C, total cholesterol, and triglyceride TG have been evaluated via standard enzymatic methods. The concentrations of VLDL-C and LDL-C are determined indirectly through Friedewald approach.

Genotyping of polymorphism

Two milliliters of blood that mixed with EDTA in a tube was used for DNA extraction, using a kit of ReliaPrepTM Blood gDNA. In addition, CAPN10 amplification for SNP-44 T/C rs2975760 was carried as described by Evans et al. Forward primer was 5'-GCAGGGCCCTCAGCTTGCCC-3' and reverse primer was 5'-GCATGGCCCCCTCTCTGATTC-3'. The amplicon size was 166bp. It has been electrophoresed on agarose of 3% and visualized directly with diamond dye under a UV light. The product was digested with BstUI restriction enzyme, electrophoresed on agarose of 3% agarose, and visualized directly with diamond dye under a UV light. Wild type genotype (TT) exhibited one band (166pb), homozygous variant (CC) as two bands (145,21bp), and heterozygous genotypes (TC) three bands (166,145and 21bp) (Fig 1).

The amplification of calpain-10 gene for SNP-43 G/A rs3792267 was done as described by Carlsson et al. Forward primer was 5' -GCTGGCTGGTGACATCAGTG- 3'. The reverse primer was 5'-ACCAAGTCAGGCTTA GCCTACCTTCTCATA- 3'. The amplicon size was 245bp. It is electrophoresed on agarose of 3% and visualized directly with diamond dye under a UV light. Furthermore, the wild genotype (GG) was manifested as one band (245pb), homozygous variant (AA) as two bands (223,31bp) and the heterozygous genotypes (GA) three bands (245,223and 31bp) (Fig 2).

Statistical Analysis

To determine the variations in means between the healthy and patient groups, the mean ±SD and student t-test are utilized. Student t-test and ANOVA were applied for comparing the mean levels of continuously characteristic through genotype using (SPSS.v.25.0software) SPSS Inc. Chicago, IL. Categorical data (alleles and genotypes) have been evaluated by chi-square test. In terms of all statistical analyses, the significance level has been less than 0.05.

Results

Allele frequencies and genotype of the two SNPs.

The results of SNP-44 T/C(rs2975760) of type 2 diabetes mellitus and control persons with numerous inheritance models were demonstrated in table 1. The codominant model showed that patients of heterozygous genotype (TC) decreased significantly (OR=0.62, CI95%= 0.42-0.92, P=0.02) with respect to the control group. Patients with the homozygous genotype (CC) elevated insignificantly (OR=1.51, CI 95%=0.53-4.31, P=0.43) relative to the control group. The dominant model indicated that patients of TC+CC genotypes declined significantly (OR=0.68, CI 95%=0.47-1.00, P=0.046) with respect to the controls. The additive model showed an insignificant (OR=0.73, CI95%=0.51-1.05, P=0.09) decrease ofT2DM patients than the control group and the recessive model explored an insignificant (OR=1.52, CI95%= 0.53-4.31, P= 0.44) increase than the control group. The minor allele C frequency in patients (12%) was found to be insignificantly (OR=0.77, CI 95% =0.55 – 1.07, P=0.12) reduced in the group of patients relative to the group of controls (15%).

The genotype results of SNP-43 G/A(rs3792267) in T2DM and control persons with various inheritance patterns were mentioned in table 2. Under the codominant model, patients of heterozygous (GA) genotypes seemed to be significantly (OR=0.19, CI95%= 0.13-0.28, P<0.0001) decreased with respect to the control
group. Patients of the homozygous genotype (AA) appeared to be insignificantly (OR=0.81, CI 95%=0.33-1.96, P=0.63) higher than the controls. The dominant model showed that patients of GA+AA genotypes were significantly (OR=0.23, CI95%= 0.16-0.33, P < 0.0001) decreased with respect to the group of controls. Also, the additive model indicated a considerable decrease significantly (OR=0.25, CI95%=0.18-0.36, P<0.0001) regarding patients experiencing T2DM compared to the group of controls. The recessive model pointed out an insignificant (OR=1.35, CI= 0.56-3.25, P=0.51) increase of T2DM patients relative to the control group. The minor allele A frequency in patients (11.5%) was evident to be significantly (OR=0.35, CI 95%=0.25-0.47, P<0.0001) declined in the group of patients relative to the group of controls (27%).

Table 1: Genotype and allele frequency results of SNP -44 T/C (rs2975760) of CAPN10 gene in T2DM and control subjects

<table>
<thead>
<tr>
<th>SNP-44 T/C</th>
<th>T2DM (N=300)</th>
<th>Control (N=300)</th>
<th>OR (95%CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Co-dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>237</td>
<td>79%</td>
<td>216</td>
<td>72%</td>
</tr>
<tr>
<td>TC</td>
<td>54</td>
<td>18%</td>
<td>78</td>
<td>26%</td>
</tr>
<tr>
<td>CC</td>
<td>9</td>
<td>3%</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TC+CC</td>
<td>63</td>
<td>21%</td>
<td>84</td>
<td>28%</td>
</tr>
<tr>
<td>Recessive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT+TC</td>
<td>291</td>
<td>97%</td>
<td>294</td>
<td>98%</td>
</tr>
<tr>
<td>CC</td>
<td>9</td>
<td>3%</td>
<td>6</td>
<td>2%</td>
</tr>
<tr>
<td>Additive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2CC+TC</td>
<td>72</td>
<td>24%</td>
<td>90</td>
<td>30%</td>
</tr>
<tr>
<td>MAF</td>
<td>72</td>
<td>12%</td>
<td>90</td>
<td>15%</td>
</tr>
<tr>
<td>SNP-43 G/A</td>
<td>T2DM (N=300)</td>
<td>Control (N=300)</td>
<td>OR (95%CI)</td>
<td>P-value</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------</td>
<td>----------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Co-dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GG</td>
<td>243</td>
<td>81%</td>
<td>147</td>
<td>49%</td>
</tr>
<tr>
<td>GA</td>
<td>45</td>
<td>15%</td>
<td>144</td>
<td>48%</td>
</tr>
<tr>
<td>AA</td>
<td>12</td>
<td>4%</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>Dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GA+AA</td>
<td>57</td>
<td>19%</td>
<td>153</td>
<td>51%</td>
</tr>
<tr>
<td>Recessive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GG+GA</td>
<td>288</td>
<td>96%</td>
<td>291</td>
<td>97%</td>
</tr>
<tr>
<td>AA</td>
<td>12</td>
<td>4%</td>
<td>9</td>
<td>3%</td>
</tr>
<tr>
<td>Additive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2AA+GA</td>
<td>69</td>
<td>23%</td>
<td>162</td>
<td>54%</td>
</tr>
<tr>
<td>MAF%</td>
<td>69</td>
<td>11.5%</td>
<td>162</td>
<td>27%</td>
</tr>
</tbody>
</table>

Results of phenotypic parameter analysis in relevance to the genotypes

For the SNP-44 genotype, the co-dominant model revealed a significant association for insulin (P=0.0043), VLDL-C (p=0.05), HOMA-IR (P=0.0087), while other factors did not show significant modifications (Table 3). For the dominant pattern TG, VLDL-C, glucose, insulin, and HOMA-IR show a significant increase in TC+CC model in comparison with TT model (p=0.043, 0.0076,0.036, 0.0034,0.0013 respectively) while LDL-C shows a significant decrease in TC+CC model in comparison with TT model but TC and HDL-C shows an insignificant association.
For the SNP-43 genotype, the co-dominant model revealed a significant association for LDL-C (P=0.0018), TG (P=0.00001), insulin (P=0.009), FBG (P=0.02), and HOMA-IR (P=0.0003) but other factors did not show significant modifications (Table 4). Under the dominant pattern, glucose, insulin, and HOMA-IR show significant increments (p=0.008, 0.0028, 0.0002 respectively) in the GA+AA model in comparison to the GG model while other factors did not show significant modifications.

Table 3: Results of phenotypic parameters of diabetic patients analyzed in relevance to the SNP-44 T/C (rs2975760) of calpain10 gene under the co-dominant model

<table>
<thead>
<tr>
<th>Parameters</th>
<th>TT (N=237) Mean ± SD</th>
<th>TC (N=54) Mean ± SD</th>
<th>CC (N=9) Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG(mg/dl)</td>
<td>250.9±37.37</td>
<td>258.3±39.29</td>
<td>271.5±50.22</td>
<td>0.1464</td>
</tr>
<tr>
<td>TC (mg/dl)</td>
<td>253.9±32.33</td>
<td>251.5±34.93</td>
<td>231.7±35.07</td>
<td>0.1333</td>
</tr>
<tr>
<td>VLDL-C (mg/dl)</td>
<td>49.35±11.58</td>
<td>53.27±10.31</td>
<td>53.39±13.04</td>
<td>0.05</td>
</tr>
<tr>
<td>LDL-C (mg/dl)</td>
<td>153.3±34.23</td>
<td>146.8±35.40</td>
<td>128.5±37.84</td>
<td>0.0618</td>
</tr>
<tr>
<td>HDL-C (mg/dl)</td>
<td>48.79±7.394</td>
<td>49.54±6.098</td>
<td>48.86±5.690</td>
<td>0.785</td>
</tr>
<tr>
<td>FSG (mg/dl)</td>
<td>239.0±33.12</td>
<td>248.9±32.44</td>
<td>238.8±40.57</td>
<td>0.1409</td>
</tr>
<tr>
<td>Insulin (µU/ml)</td>
<td>27.67±3.545</td>
<td>28.70±3.794</td>
<td>31.13±1.714</td>
<td>0.0043</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>16.35±3.208</td>
<td>17.62±3.146</td>
<td>18.35±3.155</td>
<td>0.0087</td>
</tr>
</tbody>
</table>

Table 4: Results of phenotypic parameters of diabetic patients analyzed in relevance to the SNP-43G/A (rs3792267) of calpain10 gene under the co-dominant model

<table>
<thead>
<tr>
<th>Parameters</th>
<th>GG (N=243) Mean ± SD</th>
<th>GA (N=45) Mean ± SD</th>
<th>AA (N=12) Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG(mg/dl)</td>
<td>251 ± 38.1</td>
<td>261 ± 27.1</td>
<td>196 ± 89.3</td>
<td>0.00001</td>
</tr>
<tr>
<td>TC (mg/dl)</td>
<td>253 ± 32.7</td>
<td>250 ± 38.8</td>
<td>244 ± 30.4</td>
<td>0.5907</td>
</tr>
<tr>
<td>VLDL-C (mg/dl)</td>
<td>49.6 ± 11.6</td>
<td>51.1 ± 10.8</td>
<td>55.3 ± 6.51</td>
<td>0.1858</td>
</tr>
<tr>
<td>LDL-C (mg/dl)</td>
<td>152 ± 34.7</td>
<td>147 ± 37.8</td>
<td>187 ± 26.6</td>
<td>0.0018</td>
</tr>
<tr>
<td>HDL-C (mg/dl)</td>
<td>48.8 ± 7.34</td>
<td>47.5 ± 6.38</td>
<td>46.3 ± 6.24</td>
<td>0.29885</td>
</tr>
<tr>
<td>FSG (mg/dl)</td>
<td>239 ± 33.2</td>
<td>254 ± 32.2</td>
<td>239 ± 26.6</td>
<td>0.02092</td>
</tr>
<tr>
<td>Insulin (µU/ml)</td>
<td>27.7± 3.54</td>
<td>29.5 ± 3.36</td>
<td>28.0 ± 1.96</td>
<td>0.0092</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>16.4 ± 3.21</td>
<td>18.5 ± 3.08</td>
<td>16.5 ± 2.35</td>
<td>0.0003</td>
</tr>
</tbody>
</table>
Figure 1: The RFLP product of rs297760 SNP of calpain 10 gene polymorphism after digestion by \textit{BstUI} enzyme. It was electrophoresed on 3\% agarose gel for 120min and 75V and immediately visualized under UV light. Lanes 3, 4, 5, 13, 16 and 17: (TT) genotype 166bp. Lanes 2, 6, 7, 8, 9, 10, 11, 12 and 15: (TC) genotype 166, 145 and 21bp. Lane 14: (CC) genotype 145 and 21bp. M: DNA ladder 50bp.

Figure 2: The RFLP product of rs3792267G/A SNP of calpain 10 gene polymorphism after digestion by \textit{Ndel} enzyme. It was electrophoresed on 2\% agarose gel (120min and 75V) then visualized under UV light. Lane 4: (GG) genotype 254bp. Lanes 2 and 3: (GA) genotype 254, 223 and 31bp. Lanes 1, 5, 6 and 8: (AA) genotype 223 and 31bp. M: DNA ladder 50bp.

**Discussion**

Today, DM is a major risk factor for many medical conditions, mainly the causes and effects of T2DM in humans have been studied to minimize their impression on the health care system, as it needs huge, financial, efforts and impacts the community’s vitality.

The Calpain10 gene has been reported to be a significant T2DM factor, so we have investigated the CAPN10 impact on T2DM risks and lipid profile, insulin as well as insulin resistance levels.

We have evaluated these two polymorphisms for association with T2DM in this work, on the basis
of former researches exploring the relations between combinations regarding the two SNPs (SNP44 and SNP43) and diabetes, using a case-control system. These polymorphisms either affect either T2DM individually or in combination or on triglyceride or cholesterol or other lipid profile levels.

In this study, patients with TC heterozygous of the co-dominant model and the dominant model with TC+CC genotype in SNP-44 are both diminished significantly with respect to the control group. This indicates that SNP-44 may be linked to a protective effect from T2DM incidences or development of the disease in the study group.

Regarding SNP-43, patients with GA heterozygous and dominant model GA+AA genotype and minor allele frequency (A) are all showed significant decreases with respect to the control group. Basically, such observations may indicate that SNP-43 has also a protective effect from T2DM occurrence.

The impact of the studied SNPs with T2DM might be due to a combined effect of both gene irregulars with other factors that exacerbate the manifestation of the disease. It may be related to population confirmation and ethnicity.

The results of this work are in accordance with the results of Tsai et al.\textsuperscript{22} on Samoans, Evans et al.\textsuperscript{23} on British, Horikawa et al.\textsuperscript{24} on Japanese; as well as the results of Wu et al.\textsuperscript{25} in their researches on Chinese in which they indicated no considerable relations between T2DM as well as the allele frequencies related to SNP43, del/ins19, and SNP63 when individually tested. Our study is well-disposed with Song et al.\textsuperscript{26} and Weedon et al. 2003 where they showed that the SNP-44 T allele was protective against diabetes mellitus. The results of this work are in accordance with the results of Jensen et al.\textsuperscript{27}, in which they indicated no consistent evidence regarding the relation of T2DM and CAPN10 SNP44.

On the other hand, the results of this work are different from the ones indicated via, in which the frequency related to G-allele (allele-1) in SNP43 indicated a statistically considerable increment in patient group of Mexican-Americans. For the SNP-44 T/C of CAPN10 gene, fasting blood insulin level and insulin resistance were higher in patients with CC genotype of the recessive model, compared to those of the TT genotype. Triglycerides and VLDL-c have increased levels in TC+CC genotype and the level of LDL-c is high in TT genotype compared to the ones of TC+CC genotype. Results of the SNP-43 G/A pointed out that fasting blood glucose, IR and insulin levels have been high in those related to GA genotype, compared to those of the AA and GA genotype. These results are matching the results indicated via previous research indicating that GG genotype being implicated in T2DM development via increasing IR. The current results are not in accordance with the results of Daimon et al.\textsuperscript{28} in which they specified that the genotype combinations related to SNP43 G/G and SNP44 T/T had considerably elevated TC level (p=0.02). It is worthy to highlight several restrictions in the present study. Primary, many diabetic patients were taking oral hypoglycemic drugs and anti hypertensive drugs, such drugs might have affected IR and insulin secretory function. A small number of subjects participated in this work. Wide-scale research must be carried out for confirming the relationship between the polymorphism of CAPN10 and T2DM in Iraqi patients and showing a major approach to explain the impact of genetic polymorphisms on diabetes as well as metabolic imbalances.

Conclusions

SNP44 rs2975760 and SNP43 rs3792267 in Iraqi individuals are protective against the development of T2DM. The protective influences varied from one SNP relative to the others. No risk effect for the two SNPs under the studied inheritance models. Both SNPs are implicated in changing lipid metabolism in diabetic patients. Each SNP may be implicated in changing lipid metabolism in a certain style that differed from the other one with varying degrees. There is a high importance in confirming the results of this presented work via including further samples as well as identifying the precise analysis of CAPN10 gene polymorphism in regard to the metabolic complications in T2DM in future studies.

Conflict of Interests: There are no conflict of interests.
Source of Funding: The source of this research costs from self.

Ethical Clearance: Approval from the Ethical Committee (in the faculty of medicine /Kufa university) was taken for the protocol of the study.

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Aortic Valve Stenosis: A Review of the Literature

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Abstract

Aortic valve stenosis is considered one of the common and serious valve disease. This short review intends to explore the Aortic Stenosis (AS) regarding chief symptoms, diagnostic tests, current treatment, and patient’s education. The searching was carried out in electronic data bases: Google scholar and PubMed. The chief symptoms of AS may consist of dyspnea and further symptoms of, angina, heart failure and syncope. The past studies have revealed that medical treatment does not considerably influence disease development in AS. Aortic valve replacement (AVR) is the first current treatment for symptomatic, hemodynamically severe AS. Nurses and physicians have a vital function in educating patients.

Keywords: Aortic Valve Stenosis, Aortic Stenosis (AS), Valve Disease.

Introduction

Aortic valve stenosis or aortic stenosis (AS) is considered one of the common and serious valve disease. The heart uses the aortic valve to pump blood to whole body. With time, calcium accumulation may narrow the valve opening and limit blood flow to the heart (1). According to statistics, approximately 20 % of older American has AS. It is common in persons above age 65 years, and if untreated, it may result in heart failure and even death (1). It is more probable to affect males than females as about 80% of adults with symptomatic AS are male (2). When the beginning of symptoms, patients with severe AS have a survival rate as low as 50% at 2 years and 20 % at 5 years with no replacement of aortic valve (2).

The AS is a slow, progressive illness that start with aortic sclerosis and develop to severe calcific AS. Other less common causes of acquired AS are atherosclerosis, rheumatoid end-stage renal disease, amyloidosis and arthritis. Some features of calcific AS be similar to that of coronary artery diseases (CADs). Both diseases are common in males, older persons, and patients with hypercholesterolemia. The main risk factors related to an increased aortic valve disease are like to that related to atherosclerosis (male gender, increasing age, smoking, hypertension, diabetes mellitus, elevated lipoprotein A, elevated LDL cholesterol, increased creatinine level and serum calcium (3).

This review aimed to explore the AS regarding chronic symptoms, diagnostic tests, current treatment, and patient’s education.

Method

Search Methods: The electronic searching was conducted in a different database: Google Scholar and PubMed. Key search terms used: Aortic valve stenosis, aortic stenosis (AS), and Valve Disease.

The studies that focused on the topic of Aortic valve stenosis, were published in English between 2000 and 2020 were included in the review. While, studies
published before 2000 were excluded.

**Search outcome:** Exploring of literature yield about 30 studies for review, after reading the studies about 22 study were excluded and 8 studies met the inclusion criteria.

**Discussion**

The chief symptoms of AS may consist of dyspnea and further symptoms of, angina, heart failure and syncope. Starting of symptom identifies clinically important stenosis and the necessity for serious intervention. However, some patients with severe aortic stenosis, particularly elder patients cannot develop typical symptoms primarily and as a substitute only experience a decline in exercise tolerance. Others may possibly have a more serious presentation, sometimes with symptoms triggered by coexisting medical conditions or treatments (4).

Regarding the diagnostic tests of AS, the Echocardiography is specified to patients with a single second heart sound, a history of a bicuspid aortic valve, loud unexplained systolic murmur, or symptoms that may be caused by AS (5). While, the suggested primary test for patients with assumed AS is Transthoracic echocardiography, this test allows reliable identification of the number of valve leaflets and assessment of valve motion, leaflet calcification and left ventricle (LV) function (6). Serial Doppler echocardiography should be achieved in asymptomatic patients; each three to five years in those with mild AS, each one to two years in those with moderate AS and each six to 12 months in those with severe AS (6).

The clinical decision in patients with AS is depend on: the presence or lack of symptoms, severity of aortic valve obstruction and LV response to pressure overload (6). Typical symptoms of AS support by echocardiographic results along with severe stenosis need rapid cardiology consultation (7). The past studies have revealed that medical treatment does not considerably influence disease development in AS (8,9). However, Aortic valve replacement (AVR) is the first current treatment for symptomatic, hemodynamically severe AS; it leads to major progress in survival, typically along with symptom improvement (10).

Nurses and physicians have a vital function in educating patients. Patients with mild AS must be educated not be restricted from physical activity. Asymptomatic patients with moderate to severe AS must avoid strong physical activities, while other forms of physical activities are acceptable (11). Since the coexisting of Coronary Artery Disease (CAD) is common among patients with AS, the ACC/AHA guidelines recommend assessment and alteration of cardiac risk factors in these patients (11) and this consist of cessation of smoking, start of aspirin prophylaxis in adult patients with a 10-year risk of cardiovascular disease 6 percent or greater, and participation in regular physical exercise (12). Finally, the most importantly, patients should be educated about symptoms and the importance of quickly reporting them to their physician.

**Conclusion**

The AS is considered one of the common valve diseases. The chief symptoms of AS may consist of dyspnea and further symptoms of, angina, heart failure and syncope. The suggested primary test for patients with assumed AS is Transthoracic echocardiography. The AVR is the first current treatment for symptomatic, hemodynamically severe AS. Patients should be educated about symptoms and the importance of quickly reporting them to their physician.

**Conflict of Interest:** No conflict of interest.

**Ethical Clearance:** Taken from Princess Salma Faculty of Nursing, AL al-Bayt University ethical committee.

**Source of Funding:** Self.

**References**


Diagnostic Value of thyroid Cytology: a Meta-analysis

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Abstract

Objective: Thyroid disorders are the most common endocrine disorders worldwide (4-7% of population). Excision of all thyroid lesions is impractical. For rapid diagnosis, Fine needle aspiration cytology (FNAC) is simple, safe, rapid diagnostic procedure. However, indeterminate cases were reported occasionally where the patient cannot be confidently assigned to a manageable category.

Aim: we conducted a systematic review and meta-analysis to evaluate the diagnostic accuracy of FNAC in thyroid lesions and the correlation between cytological and histopathological diagnosis.

Method: A literature search of published studies was conducted using Medline/PubMed, reasearchgate, Scielo (scientific electronic library online), and Google Scholar as international databases, and IVSL (Iraqi Virtual Science Library) and IASJ (Iraqi Academic Scientific Journals) as national databases.

Results: A total of 24 studies are analyzed. The median sample size of the studies included was 100 (range, (20-23)5). The sensitivity and specificity ranged from 0.38 to 0.98 (pooled sensitivity: 0.81; 95% confidence interval (CI), 0.78-0.83) and from 0.47 to 1.00 (pooled specificity: 0.93; 95% CI, 0.92-0.94), respectively. By SROC curve, the Q-value was 0.883 and the area under the curve (AUC) was 0.945, indicating a high level of overall accuracy.

Conclusion: The recognized accuracy of FNAC in detecting thyroid cancers is applicable only to papillary carcinoma and not to other malignancies. Moreover, FNAC should be considered as a screening rather than diagnostic tool for follicular lesions. Thus, FNAC helps to orientate patient management rather than to provide final definitive diagnosis.

Key words: thyroid, cytology, meta-analysis, FNA, fine needle aspiration

Introduction

Thyroid diseases are the most frequent endocrine disorders globally. In surgical practice, thyroid lesions are seen in 4-7% of population. (1) Moreover, a survey of random patients undergoing neck ultrasonography 20%–76% of adult women was found to have at least one thyroid nodule.(2,3)

The diagnostic challenge facing the clinician is to identify those lesions most at risk and to limit resection of benign conditions as much as is safely possible. Several diagnostic tests, such as radionuclide scanning, ultrasonography, and fine-needle aspiration (FNA) cytology have been used to highlight those patient requiring surgical intervention. FNAC has been used widely because it is safe, and readily doable in outpatient settings. Moreover, Fine-needle aspiration has also been shown to have similar or higher sensitivity and accuracy levels than frozen section examination.(4)

However, there is also evidence of limitations and pitfalls of FNA are those related to specimen adequacy, sampling techniques, the skill of the physician performing the aspiration, the experience of the pathologist interpreting the aspirate, and overlapping cytological features between benign and malignant follicular neoplasms.(5)

About one fifth of thyroid nodules with indeterminate cytology found to be malignant after surgery, therefore histopathological examination remains the standard modality of diagnosis. (6)
**Aim:** we conducted a systematic review and meta-analysis to evaluate the diagnostic accuracy of FNA in thyroid lesions and the correlation between cytological and histopathological diagnosis.

**Materials and Methods**

**Search strategy**

Our study was performed according to the meta-analyses guidelines of diagnostic tests accuracy studies. (7)

A literature search of published studies was conducted using Medline/PubMed, Researchgate, Scielo (scientific electronic library online), and Google Scholar as international databases, and IVSL (Iraqi Virtual Science Library) and IASJ (Iraqi Academic Scientific Journals) as national databases. The study conducted in May 2020.

The database search for eligible studies were made without any restriction (such as (publication date, language, or other restrictions). The search terms included “thyroid”, “cytology”, “FNA” and “fine needle aspiration”. Thereafter, the titles were checked and duplicates were removed, then the abstracts were screened for potentially relevant studies. Full-text articles were then obtained for all potentially relevant studies. Additional references were obtained by checking the reference lists of included studies.

**Inclusion and exclusion criteria**

Candidate studies included in this meta-analysis must conform the following inclusion criteria: (1) studies concerning the diagnostic value of FNAC in thyroid diseases; (2) studies with cytohistopathological correlation. (3) Studies must contain sufficient information regarding true positive, true negative, false positive, false negative or any data from which this information were extractable.

The exclusion criteria were as follows: (1) duplicate articles; (2) case reports, editorials, abstracts, commentaries, (3) lack of essential data and (4) studies without cytohistopathological correlation.

**Data extraction**

The full texts of all potentially relevant articles were evaluated by the author. Studies were included if they contained extractable data on correlation of cytological diagnosis with histopathological examination of lesions. Data from foreign-language articles (non-English) were extracted from English summary and/or tables. Data extracted from each study included: (1) name of first author; (2) year of publication; (3) number of patients; (4) absolute numbers in TP, FP, FN, and TN, or any data from which this information was derivable.

**Statistical Analysis**

All the analyses were conducted using the following softwares: Statsdirect version 3.2.10, Meta-Disc version 1.4, and Medcalc version 19.3

Statistical heterogeneity was assessed by Cochran’s Q statistic (with a significance level of $p \leq 0.1$) and I2 statistic with values of 25%, 50%, and 75% indicating low, moderate, and high degrees of heterogeneity, respectively.

We used random effects model to minimize risk of heterogeneity across studies as diagnostic test accuracy studies are expected to be heterogeneous, making a fixed-effect model inappropriate. Publication bias was assessed using a funnel plot and Eggers test. (7)

In addition, a summary receiver operating characteristic (SROC) curve was constructed to investigate the impact of thresholds by the Moses-Shapiro-Littenberg method. The AUC was calculated to show the diagnosis authenticity. The closer the AUC was to 1.0, the better the diagnosis authenticity was. (7)

**Results and Discussion**

**Literature search:** The process of electronic database search yields 886 potential relevant articles (studies dealing with fine needle aspiration cytology (FNA) for diagnosis of thyroid diseases. An additional 34 eligible studies were identified by scanning references lists of these articles (total records identified $n = 920$). Title and abstract screening carried out, duplicates and irrelevant studies (studies without cytohistopathological correlation, editorials, case reports) were excluded ($n = 858$). After reviewing the full-text, we further excluded 38 studies for lacking necessary data (extractable data in the form of true positives, false positives, false negatives, and true negatives). Twenty-four articles are included in
the present meta-analysis\(^{(8-31)}\)

Table (1) The characteristics of included studies

<table>
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<th>Study (First Author/reference number)</th>
<th>Country</th>
<th>Year</th>
<th>TP</th>
<th>FP</th>
<th>FN</th>
<th>TN</th>
<th>Total* (H/P correlated)</th>
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<td>3</td>
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<td>4</td>
<td>79</td>
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<td>13</td>
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<td>1</td>
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<td>86</td>
<td>0</td>
<td>31</td>
<td>71</td>
<td>188</td>
</tr>
</tbody>
</table>

* H/P correlated = Number of cases in which cytohistopathology correlation done.

TP = true positive, FP = false positive, FN = false negative, TN = true negative.
Characteristic of the included Studies:

The salient characteristics of included studies are outlined in Table 1. The selected studies were published from 1987 to 2019. A total of 24 studies are analyzed. Twenty-one of these studies were published in English, one in Arabic and one in Korean. Included studies were from different countries, including India (n=8); Iraq (n=2), Bangladesh (n=2), and one study from each of Egypt, Iran, Ireland, Korea, Kuwait, Nepal, Pakistan, Saudi Arabia, Syria, Turkey, UK, USA. All included studies compare cytological diagnoses with histopathological ones. Fine needle aspiration cytology (FNAC) was performed and interpreted before histopathology.

1- Role of thyroid FNA and aim of our study

Histopathology examination is the gold standard for thyroid cancer diagnosis. However, this diagnostic process is time-consuming, invasive, and it may expose patients to complications. The quest for simple, safe, diagnostic tool for the initial screening of patients with thyroid diseases deemed rational.

To our knowledge, our study is the first meta-analysis to pool the data regarding accuracy of FNA for the diagnosis of thyroid diseases and provide possible areas of improvement for future studies. Except for one meta-analysis carried out in India and include pediatric patients only. (32)

2- Diagnostic accuracy of thyroid FNAC

At the outset of literature retrieval, we found 24 studies reporting thyroid cases subjected to FNAC and published over a very large period (1987–2019) by Asian, European and American authors. The most significant finding was that the FNAC sensitivity in diagnosing thyroid lesions was noticeably high.

The overall sensitivity and specificity ranged from 0.38 to 0.98 (pooled sensitivity: 0.81; 95% confidence interval (CI), 0.78-0.83) and from 0.47 to 1.00 (pooled specificity: 0.93; 95% CI, 0.92-0.94), respectively. The diagnostic accuracy quantified by AUC was 0.945 (a diagnostic test is considered perfect if the AUC is 100%, excellent if greater than 90%, and good if greater than 80%). All these results demonstrated that FNAC had a considerable potentiality in differentiating thyroid cancers from benign tumors and non-neoplastic lesions. (33)

However, the accuracy of a benign thyroid FNA result is difficult to establish because most patients with a benign result do not have surgery. The false-negative rates reported in the literature reflects only those patients who have their aspirated nodules being surgical excision, and thus the figures may be an undervalue of reality figures. Approximately 18% of patients who have an FNA are actually treated surgically. (34)

3- false-negative

The rate of false-negative results varies from 0 to 22.8% (mean 5%). (9,26) In most series, false negatives are due to inadequate specimens or improper preparation of the smear and, to a lesser extent, to the pathologist’s inability to identify a malignant lesion or to the coexistence of two pathologies. Excluding these causes, the most common errors are due to the presence of a cystic neoplasm, followed by occult lesions and small tumor size. Adherence to strict criteria of specimen adequacy will greatly reduce the number of false negative diagnosis especially, if the benign nodules are followed by a repeated FNA over a period of time, and if ultrasound guidance is used. Large multinodular goiters may represent an important source of false negatives because in 10% of cases, a micropapillary carcinoma may be present. The probability of identifying this type of carcinoma by FNA without US guidance in this gland is practically zero because the aspiration punctures tend to be directed to palpable nodules. (35)

4- false-positive

On the other hand, false-positive diagnoses represent about 0 to 27% of the cases. This figure markedly decline if suspicious malignancies are ruled out, or even nullified in highly skilled hands. Almost false positive diagnoses are due to misinterpretation of hyperplastic nodules and Hürthle cell lesions as papillary or follicular carcinoma. (11-14)

The most common benign lesions giving false positive result are follicular adenoma (including the follicular adenoma with papillary hyperplasia) and hyalinizing trabecular tumor. (34)
5- Study Heterogeneity

We found significant heterogeneity among the 24 studies, so we used a random effect model.

6- Publication Bias:

Publication Bias was ruled out from being the potential cause of the heterogeneity in studies. Funnel plot was performed to assess publication bias among the included studies. No publication bias was detected in this meta-analysis, thus heterogeneity cannot be attributed to publication bias. To further confirm the absence of publication bias we did Eggers test (Egger: bias = 3.427 (95% CI = -5.57 to 12.43) P = 0.4381)

6- Summary receiver operator curve (SROC)

SROC provides an overall measure of test accuracy. The Q-value, which is the point of intersection of the SROC curve with a diagonal line passing from the left upper corner to the right lower corner of the ROC space and corresponds to the highest common value of sensitivity and specificity for the given test. This point does not indicate the only or even the best combination of sensitivity and specificity for a particular clinical setting, but represents an overall measure of the discriminatory power of a test.

SROC curve demonstrates that the overall area under the curve of 0.945 (standard error: 0.0160). The SROC curve, shows the tradeoff between sensitivity and specificity. Our data showed that the SROC curve is positioned near the desirable upper left corner of the SROC curve, and that the maximum joint sensitivity and specificity (ie, the Q-value) was 0.883; while the area under the curve (AUC) was 0.945, indicating a high level of overall accuracy.

7- Conclusion and Recommendations

Because of its low cost, relative safety, and rapid sign-out time, FNAC facilitate prompt and appropriate clinical decisions and therapy. However, the recognized accuracy of FNAC in detecting thyroid cancers must be applied only to papillary carcinoma and not to other types of malignancies. Moreover, FNAC should be considered as a screening rather than diagnostic tool for follicular lesions. Thus, the aim of FNAC is to orientate patient management rather than to provide final definitive diagnosis.

Ethical Clearance- Taken from the research ethics committee in Tikrit university/College of Medicine

Source of funding- Self

Conflict of Interest - nil

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Understanding Women’s Psychological Well-Being in Post-Natural Disaster Recovery

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Abstract
This study aims to understand psychological conditions of women during post-disaster recovery in Palu city Indonesia. The ethnic women in Palu city are known as the bulonggo (backbone), which describes their role, function, and position in the family. The focus of this study is to examine the psychological aspects of the wellbeing of Kailinese women, especially those who become victims of natural disasters and have lost their possessions. We conducted a survey on 200 women who live in two districts which experience severe earthquake and liquefaction. Through a psychological well-being scale adapted from Ryff and Keyes, the result was analyzed using factor analysis and interview methods. The findings indicate that among six dimensions of wellbeing proposed by Ryff and Keyes, personal growth and positive relationship are the most significant contributing factors to Kailinese women well-being during post-disaster recovery. The findings highlight the important of building personal growth and positive relationship among women community to develop their ability to recover from natural disaster distress. More importantly, as the personal growth and positive relationship contribute to Kailinese women’s well-being, their roles as family backbone (bulonggo) in economics and social is also strengthened.

Key Words: women’s psychological wellbeing, resilient, happiness, post-natural disaster

Introduction
Reverberating mental and behavioral health consequences occur when the physical forces of natural disaster collide with a vulnerable human population. Women are often found the most vulnerable ones in many cases of natural disaster consequences in term of physical, psychological, economic, and social, but the psychological impacts have been found as more expansive for women in term of scope, more extended in time, and frequently more debilitating in severity than the injurious physical impacts of natural disaster1. After a natural disaster, women psychological well-being is often lower than men due to the lost they experience2. However, women are considered to have better ability to recover from psychological stress in particular when women get better social support and the sense of purposes3,5. As such women better women psychological well-being increase their salient in facing social and economic challenges in supporting their family survival.

Previous Studies argue that factors enhancing women mental well-being and resilience after natural disaster are mostly related the natural environment, meaningful activities, social activities5, positive social interaction6, social integration7, family cohesion8, attention from friends9. Vernon, Dillon, & Steiner10 also report that the ability to actively respond to disasters with positive forces such as gratitude and optimism can also prevent women from higher levels of trauma. Women are considered to have the strength and resilience to face all difficulties and develop positive meanings in life. In adverse condition, such positive meaning of life can lead women to psychological wellbeing11,12.

In this study, psychological wellbeing is understood in a broader context. The meaning of psychological wellbeing has been described as the ability of individuals to accept themselves as they are, form warm relationships with others, be independent of social pressures, control the external environment, have meaning in life, and realize their potential in an ongoing
way\textsuperscript{27}. Thus, individuals who can accept themselves as they are despite being affected by a disaster can get back up and independently achieve psychological wellbeing. Well-being is also considered linked to experiences in family life, to work and other community activities\textsuperscript{13}, to religious involvement, spirituality and personal meaning for life\textsuperscript{14,15}, to a life rich in purpose and meaning, continued growth, and quality ties to others\textsuperscript{16}.

The psychological impacts of natural disasters are widespread, expand across a spectrum of severity, extend along a range of duration, and relate to the nature of the disaster event. The psychological consequences of disasters are spawned by, and directly proportional to, the degree of exposure to hazards, loss, and change, the “forces of harm” that characterize natural disasters.\textsuperscript{1}

Studies on disaster impact to women life\textsuperscript{5,17,18} found that physical illness, loss of a family member, and pessimistic expectations were associated with adverse psychological sequelae. During post disaster period, women often experience to feel disappointment and other negative emotions in their lives, but their ability to manage distress is very important to feel mentally strong, which has an impact on the emergence of their positive emotions\textsuperscript{1,19}. Psychological wellbeing is also related to the ability of individuals to function properly and effectively, accompanied by good feelings, so that they can generate positive emotions\textsuperscript{20}.

Similarly, when women develop emotional potential, they can positively change their level of psychological wellbeing which means women who manage their positive emotions have better psychological wellbeing\textsuperscript{21}. For example, maintaining a connection to others in the aftermath of disaster can be healing for individual woman and her community. In another word, avoiding isolation and increasing social support is an important factor in building women resilience.\textsuperscript{17}

Even though, many studies to understand women psychological wellbeing have been conducted, but research related to the women psychological wellbeing post natural disaster is scarce, in particular studies related to women who play role as families backbone during post disaster recovery\textsuperscript{5}.

This study, therefore, examines the psychological wellbeing of women in Kalinese tribe in Central Sulawesi Indonesia after the natural disasters on September 28, 2018. Kalinese is the largest tribe in Central Sulawesi, and most of the victims come from this tribe. This research will provide an understanding of the psychological wellbeing of Kalinese women as families backbone (bolongo) who are strongly influenced by the natural disaster.

This study uses psychological and cultural perspectives as a theoretical lens. In this paper, the author will answer the following questions: What are the dominant factors affecting the psychological wellbeing of Kalinese women in the aftermath of the disaster, and how significant the cultural and socio-cultural values of the tribe contribute to Kalines women’s psychological wellbeing?

This paper is structured as follows: after the introduction, a literature review will be presented. Then, in the third section, the methodology is discussed; subsequently, in the fourth section, the authors present the results, which are then followed by the discussion in the fifth section. Conclusions and limitations of the study will be presented in the sixth and final section.

**Material and Method**

The study involved 200 Kalinese women who were at refugee camps in Petobo and Balaroa districts. The Petobo and Balaroa districts are two districts that were swept away by liquefaction and killed more than four thousand people during a deadly earthquake on 28 September 2018. The process of selecting participants used purposive sampling, with subjects divided into 74 respondents in Balaroa and 126 women in the Petobo refugee camp. The age range of the subjects in this study was between 18 to 71 years old, where 56.4 percent of subjects were in the range of early adulthood, 39 percent in middle adulthood, and 4.5 percent elderly.

Other data collected was the education level of research subjects; the categorization of Kalinese women was as follows: 36 elementary school level, 60 junior high school level, 94 senior high school level, and ten bachelor’s degree level. The explanation was stated in the graph as follow:
Besides, data on Kalinese women who were working is 43 people, and who did not work is 157 people. An Explanation is illustrated through the following graph:

The stages of data analysis used in this study began with the validity and reliability tests as prerequisite tests. Next, the researchers used exploratory factor analysis (EFA). The basic consideration of using this technique is that the researcher wants to know the dominance of psychological wellbeing factors that have appeared in Kalinese women since the disaster.
Factor and Rotation Test

The core process of factor analysis to extract a set of variables that have been tested was carried out after Kaiser-Meyer-Olkin test (KMO) Measure of Sampling Adequacy (MSA). The results of the extraction are shown in the table 1 below:

Table 1: Results of Exploratory Factor Analysis Tests with Psychological Well-being Scale

<table>
<thead>
<tr>
<th>Variables</th>
<th>Initial Extraction</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence</td>
<td>1,000</td>
<td>.427</td>
</tr>
<tr>
<td>Environmental Control</td>
<td>1,000</td>
<td>.541</td>
</tr>
<tr>
<td>Personal Growth</td>
<td>1,000</td>
<td>.546</td>
</tr>
<tr>
<td>Purpose of life</td>
<td>1,000</td>
<td>.532</td>
</tr>
<tr>
<td>Self-acceptance</td>
<td>1,000</td>
<td>.535</td>
</tr>
<tr>
<td>Positive relationship with other people</td>
<td>1,000</td>
<td>.690</td>
</tr>
</tbody>
</table>

Note communalities

The table 2 shows that the autonomy variable is 0.427 which means 42.7 percent of the variance of the autonomy variable cannot be explained in the factors formed. The environmental control variable is 0.541, or as much as 54.1 percent of the variance of this variable can be explained in terms of the factors formed. Furthermore, the variable personal growth with a value of 0.546 or 54.6 percent of the variance of the variable personal growth can be explained in the factors formed. The rest of the life purpose variable of 0.532 or 53.2 percent of the variance of this variable can be explained in terms of the factors formed. The self-acceptance variable is represented in the form of 0.535 or 53.5 percent, which can be explained in the factors formed. Meanwhile, the positive relationship of variable is indicated by 0.690 or 69.0 percent. The results of total variance test are depicted in the table 2 below:

Table 2: Total Variant Test Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Initial Eigen values</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
<td>Cumulative %</td>
</tr>
<tr>
<td>1</td>
<td>2,067</td>
<td>34,444</td>
<td>34,444</td>
</tr>
<tr>
<td>2</td>
<td>1,204</td>
<td>20677</td>
<td>54,510</td>
</tr>
<tr>
<td>3</td>
<td>.786</td>
<td>13,099</td>
<td>67,609</td>
</tr>
<tr>
<td>4</td>
<td>.743</td>
<td>12,390</td>
<td>79,999</td>
</tr>
<tr>
<td>5</td>
<td>.710</td>
<td>11,827</td>
<td>91,826</td>
</tr>
<tr>
<td>6</td>
<td>.490</td>
<td>8,174</td>
<td>100,000</td>
</tr>
</tbody>
</table>
Data from the table 2 above show that six components represent variables, where the determination of values is based on the SPSS test $>1$. Then the variance that can be explained by factor 1 which is 2,064 divided by 6 components and multiplied by 100 percent, and the result obtained is 34,444, while factor 2 is 1,204 divided by 6 components and multiplied by 100 percent, and the result obtained is 20,067, so the total of the two factors is $34,444 + 20,067 = 67,609$ percent. Thus, the total value to be taken is $>1$, namely factors 1 and 2.

The next stage is to determine each variable that is included in any factor. The rotation test results is presented in the table 3 below:

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence</td>
<td>.581</td>
<td>299</td>
</tr>
<tr>
<td>Environmental Control</td>
<td>.612</td>
<td>.407</td>
</tr>
<tr>
<td>Personal growth</td>
<td>.738</td>
<td>.023</td>
</tr>
<tr>
<td>Purpose of Life</td>
<td>.061</td>
<td>.727</td>
</tr>
<tr>
<td>Self-Acceptance</td>
<td>.715</td>
<td>-.155</td>
</tr>
<tr>
<td>Positive Relationship with Others</td>
<td>.043</td>
<td>.830</td>
</tr>
</tbody>
</table>


The table 3 above explains the determination of the variables included, in which factors are determined through the largest correlation value, which means the personal growth, self-acceptance, environmental control, and independence more correlated with factor 1. Meanwhile, the variable positive relationships with others and life goals are correlated at a factor of 2. This is shown in the table 4 below:

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Personal growth</td>
</tr>
<tr>
<td></td>
<td>Self-acceptance</td>
</tr>
<tr>
<td></td>
<td>Environmental mastery</td>
</tr>
<tr>
<td></td>
<td>Independence</td>
</tr>
<tr>
<td>2</td>
<td>Positive relationship with other people</td>
</tr>
<tr>
<td></td>
<td>Purpose of life</td>
</tr>
</tbody>
</table>

The final stage to determine factors is to look at the values in the following component transformation matrix table:
Table 5. Component Change Test Results

<table>
<thead>
<tr>
<th>Factors</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.813</td>
<td>583</td>
</tr>
<tr>
<td>2</td>
<td>-.583</td>
<td>.813</td>
</tr>
</tbody>
</table>

Note Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

The table 5 shows that data in component 1, the correlation value is 0.813, this value being > 0.5, and in component 2, the value is 0.813, being > 0.5. It can be concluded that the two factors formed are feasible to summarize the six variables analyzed.

Discussion

The data obtained revealed that the six aspects; personal growth, self-acceptance, environmental control, and independence as well as positive relationships with others and life goals have influenced the formation of psychological well-being of Kalinese women. However, from the six variables, we found that variables personal growth and positive relationship with others play more significantly influence on the formation of the women psychological well-being.

The findings justify earlier studies\(^1,^2\) that personal growth and positive relationship have become dominant factors affecting the psychological well-being of women. We found that Kalinese women build their well-being, mostly through building a positive relationship with one another during the post-disaster recovery process. However, in this study, the personal growth plays a more significant contribution to the development of Kalinese women’s well-being. The finding high-lights that Kalinese women have strong personality in fighting life difficulties during post-disaster period.

More importantly, our study shows that Kalinese women characters are reinforced during the post period of disaster where they can determine their potential and develop their quality of life. A strong character base in growing their potential, in turn, makes Kalinese women resilient and still able to explore their potential despite natural disasters befalling them, destroying them and their environment.

Another manifestation of the aspects of Kalinese women’s personal growth is the ability to immediately rise from the natural disasters. This fact was obtained from the results of further interviews with the ind\(^1\), who dominated the trading process in traditional markets a week after the disaster. We identify the rise of entrepreneur motives, such as self-dependence and providing monetary support, to support family income as a medium to socially construct their gender roles\(^24\). As a result, the roles improve their resilient towards pressures from natural disaster effects. In this regards, Sagone and Caroli\(^25\) stated that resilient people not only easily rise from disaster, but also have psychological well-being.

The functioning aspect of personal growth in post-disaster Kalinese women is inseparable from their legacy philosophy that is believed to be hereditary in Kalinese culture. In an informal interview, we also found that the Kalinese tribe generally treats women as bulonggo, a philosophy that carries meaning as the backbone. Like the backbone, a true Kalinese woman is formed with a belief to keep growing stronger and develop to become strength for her family. This philosophy is in line with theories about aspects of personal growth in psychological well-being: personal growth associated with an individual’s ability to grow\(^26\). Feelings of being able to go through stages of development, be open to new experiences, realize their potential, and make improvements in life\(^27\).

Our findings confirm Ryan and Deci\(^28\) study, which states that one of the important aspects of improving well-being is being able to build positive relationships with others. In a study conducted by Keyes\(^27\) found that age and education also become an indicator for well-being improvement. However, our study found that education has no relationship with psychological well-being. Most of The Kalinese women with lower education levels, even some of them have no formal education, can achieve psychological well-being during post-disaster recovery.

The ability of Kalinese women to build positive relationships with others and have a positive life purpose was not determined by their level of education, but it was determined by social support from their family, relatives, and people around them. The support encourages the women to be confident and establish
positive relationships with others. Walen and Lachman\textsuperscript{29} said that positive social relationships built by individuals are strongly correlated with resilient psychological well-being.

**Conclusion**

As we found that the psychological well-being of Kailinese women during post natural disaster recovery was determined by personal growth, self-acceptance, environmental control, independence, positive relationships, and life goals. We recommend psychologists and government agents to support women psychological well-being building through creating the sense of personal growth, environmental control, independence, positive relationships, and life goals.

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**Funding:** Self

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**References**


Understanding Students’ Psychological Distress Complaints through Online Academic Advising Support

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Abstract

The purpose of the study is to investigate students’ psychological distress complaints through an online web-based academic advisor support. This study employed a qualitative method. Data were gathered through in-depth anonymous consultation and interview which were conducted through online facilities, such as email, WhatsApp, and telephone, to understand the students’ psychological distress complaints. The data, then, were analyzed using the grounded theory approach through open, axial, and theoretical coding. The results of this study showed that five main issues that caused psychological distress have been complained by students through the online advising service centre. Those issues included feeling distress towards campus unfair treatment, bureaucracy complexities, lack channel to express complaints, unfriendly academic advisors, and opposite-sex advisors issue. This study concludes that the online advising support center can be used to support students’ psychological relief because the system increases anonymity, reduce physical contact, and avoid opposite sex barriers during psychological consultation. This study promotes the use of online academic advising support to increase students’ intention to use an academic advising support in order to reduce stress and promote students’ mental health.

Keywords: psychological distress, online advising, academic advising, university students

Introduction

Recent interest in students’ psychological distress complaints and grievances related to campuses environments have caused more researchers to study academic advising roles in solving the issues. Prior studies highlight that the increase in the number of psychological distress complaints in higher education institutions mostly relates both to quality and standards in campus services and lack response to student demands as a ‘consumer’¹.

University students experience psychological distress at an early stage of study or during the whole process of the study. Unresolved psychological distress have resulted in increasing number of students to take study leave for a certain period². This phenomenon is worse when a campus does not have academic advising and help support center. Students might keep the stressful situation without a solution which may cause their education failure³.

Prior studies point out that higher education students who experience a high prevalence of complaints and grievances may result in higher levels of psychological distress⁴,⁵. Relationship between students mental health with academic success have been found in previous studies⁶,⁷.

In some cases, students’ psychological support merely rely on an academic advisor who takes care for specified number of students according a campus regulator appointment through a face to face academic advising service center³. However, prior studies⁸,⁹ found that very limited students use face to face academic advising support center. Even though some students may use the services, but most of them are not satisfied⁹,¹⁰. The reasons behind low usage of conventional face to face academic advising services include cultural issues, reluctant toward physical contact, and lack of anonymity¹¹.
Academic advising may become an essential element for learning success in Islamic universities environments, but it has received little attention from researchers. Since academic advising can contribute to improving the satisfaction and retention of students, research on this activity is especially needed in the current situation of the competition among Islamic universities in Indonesia and across the globe. Lack of studies of academic advising within Islamic education institutions may cause lack of academic literature and hinder the development of the institutions.

This study, therefore, explores a university students use of online academic advising services to express psychological distress related to campus life. It is expected to shed light on how a university students use online academic advising services to relief their psychological distress. Understanding the phenomenon through online advising service not only help the students solve their psychological problem, but also help universities to improve services. The result could also be used to assist universities in providing quality, accurate and consistent advising services to their students.

**Methodology**

This study used qualitative approach. Data were gathered from in-depth interview with 28 Muslim university students who used an online academic advising service. The online academic advising services were provided by three professional advisors who responded to students consultations through various online instruments such as online chat, e-mail, and telephone call.

In-depth semi-structured interviews were implemented with each of the students through online chat, email, and telephone. These interviews took approximately 30 minutes to 45 minutes. Students were free to choose the communication facilities provided on the website.

The interviews were analyzed using grounded theory approach as outlined by Strauss and Corbin. A list of descriptive codes was created based on the general themes and topics identified by the researchers during the interviews and transcription. Memoing, which involves creating short descriptive headings based on the patterns and quotations identified, was used to describe and analyze the patterns that were found. The organized descriptive statements were then interpreted by the researchers. From the interpretation, five main themes were emerged to explain the phenomena of this study.

**Results**

Since this study was conducted in an Islamic university context, advisors also assess the role of religion and level of religiosity among the student, they should seek to identify and integrate positive academic and campus environment problems coping strategies from Islam perspectives. Based on the analysis of the data, we found five main themes emerged from all online academic consultation sessions. Each theme is presented in the table below:

**Table 1. Themes emerged from online consultation**

<table>
<thead>
<tr>
<th>Themes</th>
<th>Quotes</th>
<th>Participant’ codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfair Feeling</td>
<td>My house shows distantness that is far from the economic perspective. My house is made of simple planks, while the house of my friend who gets the scholarship is made of permanent concrete that looks luxurious. I showed the picture of my friend’s house to the scholarship selection committee but they just ignore it. I was really upset with the process of scholarships awardees determination for poor students at the university.</td>
<td>ILM</td>
</tr>
<tr>
<td></td>
<td>I tried to talk to the vice dean of students affairs, and he said to me that the scholarship had been distributed fairly and the awarded students are based on government regulation in which students have good academic records and from low-income families. Impossible a student gets the scholarship without those requirements even though he/she has a family member within this faculty. However, when I gave him the name of a student from a wealthy family got the scholarship, he keeps quiet and walk away.</td>
<td>ANW</td>
</tr>
<tr>
<td>Bureaucracy Inertia</td>
<td>I have applied for the award twice and I have completed all the requirements, but when I put in the file to the office, they said bring it to another room. When I went to the room, the staff said the place you visited before was right, and I went back to the first room I visited. The staff, then, checked my files and he said my document is not completed. The next day when I completed the file, they said again that he forgot to let me know another document to be completed. Why didn’t they said from the beginning that the file is still lacking?</td>
<td>BDI</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>ZNA</td>
<td>I had been on leave for one semester due to financial problem. When I came back to campus, I was ordered to show my last study result record. However, instead of telling me how to obtain the record, the staff asked me to meet my academic advisor first. After a few days in difficulties to meet my supervisor, my problem was still not resolved. I was told to go back to the academic office center and asked for an academic record.</td>
<td></td>
</tr>
<tr>
<td>A Feeling of not welcome</td>
<td>I once met my academic advisor. When I met him like being angry, he was busy calling and then walking crisscross in the room without looking at me. I waited a long time, and then he said you could come tomorrow? He wanted to meet someone, it was very important, he said. In fact, I just want him to sign my document. He culd immediately sign it, but he rejected it. I felt like I was not appreciated. Now I am not interested to meet my academic advisor unless it is really very urgent.</td>
<td>ARM</td>
</tr>
<tr>
<td>MHD</td>
<td>I came to the office to obtain a recommendation letter to join a sports competition. A staff said’ why you are going to go to a taekwondo competition? You do not look like a fit man”. Instead of motivating me, she made me down. I expected she just gave the letter and I will go away”.</td>
<td></td>
</tr>
<tr>
<td>Opposite Sex Resistant</td>
<td>I met my advisor during lunch time because he said he has time during break time from 12 to 1 o’clock midday. I came to his room and situation was very quiet because other lectures were not there. I discussed my matter with him. I feel not comfortable because it was only him and me in the room. I think it was a sin being in a room with a man. He also looked at me differently.</td>
<td>LNY</td>
</tr>
<tr>
<td>RHM</td>
<td>I am not really worried about sin when I meet with my supervisor. I only feel embracing to discuss a personal problem with her. If the problem is about academic, I will discuss with her, but when a problem is a bit personal, I don’t dare to talk to her.</td>
<td></td>
</tr>
<tr>
<td>Overload Problem</td>
<td>Sir, I am stress out every day because there are so many problems that I face. I don’t know where to go. I want to talk to my parents, but they live far away in the village, I want to talk to my friends, but I feel ashamed, and I think they cannot solve my problem. I want to speak with academic advisors, but I never meet him. Luckily there is this online counseling, and I can release my thoughts a little.</td>
<td>AGS</td>
</tr>
<tr>
<td>Table 1. Themes emerged from online consultation</td>
<td>Cont...</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

The findings show that four themes have emerged from the data. The themes reflect the students’ psychological distress complaints relating to fairness in accessing campus services, rigid bureaucracy, unavailability of a channel to put complaints, and moral issue regarding sex opposite advisor.

The university treatment in providing services has become a major concern of students within the university. The services provision is considered as unfair in which particular students did not have a similar chance in accessing a service. Feelings of fairness or unjust experienced by students in the university have also been found in another university context. The cause of unfairness feeling is negative treatments from an organization, unfair offers, and sadness.

The impact of unfairness feeling is that the emergence of emotional attributes such as anger and frustration. Such feelings may affect the students’ relationship with friends, teaching staff, and campus bureaucracy. In a particular situation, a sense of being unfairly treated or experience discrimination may also cause withdrawal from the situation. In this study, the students may discontinue study or take study break as found by Lee & Rice and Brown.

The university bureaucracy in service provision exacerbated Students’ dissatisfaction towards unfair treatment. A university service quality has been found related to its functional service quality which includes service process and interpersonal interaction within the campus bureaucracy. In this study, rigid and unclear bureaucracy related to the university services process and difficulties in interacting with teaching and administrative staff resulted in high psychological stress among students as revealed during online academic advising sessions.

Meanwhile, a feeling of not being accepted (not welcome) is often associated with rejection by the approached party. This kind of feeling causes someone to feel lonely. Even if an academic advisor cannot serve a student at the requested time, the student may understand if the advisor respects the student and gives good reasons.

In this study context, the problem is not whether or not the service can be provided at the time required, but creating acceptance attitude by an academic advisor is essential. The attitude of accepting well by the academic advisor will increase bonds between students and their academic advisor more open in conveying their problems and also in conducting consultations that are more equitable. As a result, the students’ openness and better support from an academic advisor can boost their success.

The students, frustrations are also reflected in their recognition that they have been reluctant to see their appointed supervisor again. The feeling also causes them to consider their future studies. For example, some students say that various kinds of problems they face and do not know where to complain, causing them to be lazy to go to college. The finding consistent with previous studies which found that the number of personal problems faced by students can result in dropping out of college students.

Reluctant to see appointed academic supervisors was not only caused by unfriendly supervisors but also caused by opposite-sex issues. We found that Male and female Muslim students are very reluctant to meet their opposite-sex supervisors in face to face advising sessions. Opposite sex service resistance is commonly found within communities with strong value holders. Reluctant to interact with different sex status might be affected by experience sex segregation during childhood or early adulthood. Other studies also argue that students who have the personal belief from their previous life experience tend to bring and practice it in their future life. The findings are consistent with the phenomena of this study, which most Muslim students who graduated from Islamic boarding tend to resist to engage with their opposite-sex academic advisor when they enter a university.

Islamic teaching forbid Muslim women or men to have direct contact with non-mahram. Certain Muslim communities strongly hold the belief, in particular, those who graduate from Islamic boarding schools. As a result, when they enter the university education system, they bring those beliefs within campus life.
We found that some Muslim students who have education background from strong Islamic boarding school tend to believe that direct contact with non-mahram (opposite sex advisors) is forbidden as they were taught in Islamic boarding schools. It is no doubt that students who were appointed opposite sex academic supervisors experience feel lack comfortable to see them. Reluctant to express complaints to academic advisors in face to face mode escalate students distress because another channel is limited. The situation may reduce their opportunity to succeed in their studies. While pressure to succeed in university for students in developing countries are higher. An online academic advising service center can become a better solution to increase students’ participation in using academic advising service. Active use of academic advising service increases strong rapport between students and advisors, which facilitates an open discussion that is productive for identifying and solving problems.

**Conclusion**

This study found that Muslim students are more open to express their feeling and thought during online counseling consultation. Five main themes have emerged during the online consultation, which is distress of bureaucracy complexities, unfair academic treatment, lack channel to express grief, and unfriendly academic advisors. We suspect that the students’ openness in expressing sensitive issues through online counseling mode due to high confidentiality and anonymity. Their identities were confidential because all online facilities for consultation did not support self-disclosure except voices when it was conducted through telephone. This highlighted that online counseling is able to encourage students to seek academic support actively. Barriers, such as reluctant to see opposite sex counselor and supervisor’s time limitation, can be reduced by online academic advising systems.

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**References**


Nurses Knowledge Regarding Prevention Protocol of COVID-19 in Emergency Departments

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Abstract

Corona virus disease (COVID-19) pandemic, caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), and is considered a global challenge. This short review intends to investigate the knowledge of nurses regarding prevention protocol of COVID-19 in emergency departments. The searching was carried out in electronic data bases: Google scholar, PubMed and World Health Organization (WHO). Most of the reviewed studies stated a good level of knowledge, attitude and a practice among nurses regarding COVID-19. The community education is needed to improve the knowledge, practice and attitude of the people. Also, continuous training for all healthcare workers to help them to be more effective in controlling of the COVID-19 pandemic.

Keywords: Coronavirus, COVID-19, Prevention Protocol, Emergency Department.

Introduction

Novel 2019 coronavirus disease (COVID-19) is a respiratory infection breed by the virus SARS-Cov-2, which was recently detected after an outbreak began in Wuhan, China, in December 2019 (1).

The COVID-19 was stated a pandemic by the World Health Organization (WHO) on March 11, 2020, after the identification of more than 118,000 cases in 114 countries (2). The common clinical symptoms of patients with COVID-19 may include: fever, fatigue and dry cough, occasionally accompanied by nasal congestion, runny nose, malaise, tachypnea, shortness of breath and sore throat (3-5). The COVID-19 is mainly transmitted through direct person-to-person transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and it occurs through close-distance contact by respiratory droplets; virus released in the respiratory secretions when a person with infection coughs, sneezes, or talks can infect another person if it makes direct contact with the mucous membranes. Also, infection can occur if a person touches an infected surface and then touches his eyes, nose or mouth (4,6,7).

The COVID-19 is spreading in our community. Person to stay safe should take some precautions such as: physical distancing (maintain at least a 1-metre distance between yourself and others to reduce your risk of infection when they cough, sneeze or speak). Wearing a mask (clean your hands before you put your mask on, as well as before and after you take it off, make sure it covers both your nose, mouth and chin), and mask
should be changed every 6 hours or earlier if it becomes soiled, and N95 respirators may be used for suspected or confirmed positive patient (2). Also, keeping rooms well ventilated, avoiding crowds, washing your hands for at least 20 seconds with soap and water or hand sanitizer with at least 60% alcohol, and coughing into a bent elbow, terminal cleaning was done after the patient had vacated the room, it was thoroughly cleaned before next admission. Proper biomedical waste segregation was done as per the guidelines (8,9).

The COVID-19 is highly infectious disease, and there has not yet been any vaccine or effective treatment that has received approval. So, the best solution to avoid being exposed to the virus will be the simultaneous application of preventive methods (10).

The China CDC issued a guideline to promote awareness of the prevention and control of COVID-19 among the general population. The key messages of the guideline include how to select and wear face masks, adequate hand washing habits, preventive protocol in different locations (include at home, on public transportation, and in public space), disinfection methods and medical observation at home (4).

This short review intends to assessment the major literature that study the knowledge of nurses about prevention protocol of COVID-19 in emergency department.

Method

Search methods: The electronic searching was conducted in a different database: Google scholar, Pubmed, and WHO. Key search terms used: Coronavirus COVID-19, prevention Protocol.

The studies that focused on the topic of prevention protocol of COVID-19, were published in English between 2019 and 2020 were included in the review. While, studies published before 2019 were excluded.

Search outcome: Exploring of literature yield about 50 studies for review, after reading the studies about 25 study were excluded and 25 studies met the inclusion criteria.

Discussion

Regarding the clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Most affected patients were men had underlying diseases including diabetes, hypertension and cardiovascular disease. The common symptoms at the onset of illness were fever, cough, and myalgia or fatigue. Less common symptoms were sputum production, headache, hemoptysis and diarrhea (3,4).

The precautions in the preventing and controlling the outbreak of COVID-19 in non-isolated areas in a general hospital were reported and it was recommended that there is no hospital-acquired COVID-19 infection among hospital staff. Also, the rates for wearing masks, checking epidemiological history and disinfecting medical supplies were 100% in the hospital. The accuracy of wearing masks among patients and their families was 73.79% and the percentage of commitment to hygiene of their hands was 40.78% (4).

The prevention of infection with airborne pathogens and exposure to particulates matter and aerosols (environmental pollutants and allergens) can be facilitated through the use of disposable face masks. The effectiveness of such masks at excluding pathogens and pollutants depends on the intrinsic ability of masks to resist penetration of airborne pollutants (2,8,9).

The level of knowledge regarding the prevention protocol of COVID-19 was ranged between fair to good as reported in this study (11). Healthcare worker especially nurses shave good knowledge, good practice and a positive attitude concerning COVID-19 in emergency departments. And, they perceived that poor knowledge about transmission and limited infection control material were the main barriers to infection control (12).

The professional training that the nurses received, the level of nurse experience and education were found as factors that affecting the nurse’s knowledge and practice level regarding the prevention protocol of COVID-19 (13,14).

A recent study found gaps in specific aspects of knowledge and practice that should be focused on in any future awareness and educational campaigns. Also, the study showed that nurses were using less reliable sources of information; and this need to be addressed immediately as it ultimately affects. The health care system has to provide a comprehensive training program
to promote all prevention protocol of COVID-19\(^{(12,15)}\).

**Conclusion**

Most of the reviewed studies stated a good level of knowledge, attitude and a practice among nurses regarding COVID-19. The community education should have effect through a commitment to use all strategies that may improve the knowledge, practice, and of the people. Continuous training has to be provided for all healthcare workers to help them to be more effective in diagnosis and management to control such pandemic.

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Using Roger’s Diffusion of Innovation Theory to Implement the Healthy Schools National Accreditation

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Abstract

Background: In Jordan, The Healthy School National Accreditation has been introduced in 2008 as a national health-promoting school program where schools are invited to voluntarily join the accreditation. Unfortunately, financial challenges and lack of resources among many other factors led to very low enrollment rate. Method: Adopting a selected change theory can be beneficial in making the decision and successfully implementing the intended change. Rogers’s diffusion of innovations theory was adopted by a public school administration to join the accreditation. This theory provides an explanation on how and at what rate new innovations take place and spread out over time in any system. The school health committee went through the five stages proposed by the theory and successfully implemented the accreditation.

Conclusion: Adopting Rogers’s diffusion of innovations theory can be beneficial in implementing the school health-promoting programs.

Implication for School Health: School administrators, school health nurses and school health teachers are strongly advised to adopt this theory while they are considering joining the school health-promoting programs.

Keywords: Health-promoting school; Healthy School National Accreditation; Rogers’s diffusion of innovations theory.

Introduction

Health promotion of youth is globally considered a high priority. Since students spend a long time in schools, schools have the chance to play a vital role in promoting students’ health and well-being. Nowadays, Health-Promoting School (HPS) is a well-established and sound public health approach to addressing health outcomes within an educational environment. The concept of HPS was first introduced by the World Health Organization (WHO) in 1980s as an effective multifaceted approach to ensure promoting students health and academic achievement [1]. HPS is defined as “school that fosters health and learning with all the measures at its disposal, and strives to provide supportive environments for health and a range of key school health education and promotion programs and services.” [2]. Later, the WHO developed a holistic HPS framework to help schools in developing, implementing, and evaluating the HPS programs. This framework stresses three main points: health education, changing social and physical environment, and involving students’ families and/or communities [3].

The WHO strongly suggested schools to adopt, implement, and investigate the effectiveness of this framework against a wide range of health outcomes such as physical activity and nutrition. Thus, the concept has been widely adopted worldwide but mostly by high income countries. In a systematic review by Furley and Goldfeld [4] on the randomized clinical trials that adopt the WHO framework, 59 out of 67 studies were found to be conducted in high income countries. This highlighted...
the gap in adopting and implementing the HPS programs between high and low-middle income countries as these programs are costly and require a lot of resources.

In Jordan, a low-middle income country, the concept of the HPS was translated into the Healthy School National Accreditation (HSNA) by the Royal Health Awareness Society, in partnership with the Ministry of Health (MOH) and the Ministry of Education (MOE). It was launched in 2008, where schools have been voluntarily encouraged to apply for any level of the accreditation including the bronze, the silver, and the golden levels [5]. The program is carried through national health standards that participating schools usually trained and supervised to implement them successfully. Standards cover ten chapters including management and leadership, healthy school environment, safe school environment, clean school environment, health education, nutrition, physical activity, health services, social and psychological support, and staff and community participation [5].

Problem statement

Children and youth are considered the greatest natural source for their nations, and the future of any nation strongly depends on how well they care for their children and youth. Thus, students must receive a comprehensive physical, social, mental and psychological health care at schools. Moreover, preventing and controlling the major risk factors of non-communicable diseases such as tobacco use, physical inactivity, and unhealthy diet is the focus of the WHO’s work with children and adolescents [6]. Creating healthy, clean, and safe school environment in addition to teaching students the healthy lifestyle practices through HPS programs can tackle these risk factors at early age and ensure healthier generations.

Voluntarily implementing a comprehensive program in a developing country can be challenging. Making the decision whether to join the accreditation depends mainly on school principals’ and school health teachers’ (SHTs) willingness. Unfortunately, after 10 years of launching the HSNA, the enrollment rate of schools to the end of the academic year 2018-2019 was still around 3% (174 schools) [5]. This indicates the need to raise awareness and introduce new ways of thinking. Following a selected change theory may help the school administrations make an informed decisions and facilitate the implementation process.

Rogers’s diffusion of innovation theory

Rogers’s diffusion of innovation theory (RDIT) is selected by the SHC at this school to help make a decision and guide the implementation process. The theory explains the process of change and how a new innovation takes hold and spreads throughout a system. It focuses on the perceived innovation attributes that will increasingly drive adoption. The five attributes of an innovation are relative advantage, compatibility, complexity, trialability, and observability. Also, the theory provides five steps necessary to promote the adoption of a new idea: knowledge, persuasion, decision, implementation, and confirmation [7].

Knowledge is produced when an individual or organization is exposed to an existing innovation and acquires some understanding about its mechanisms and functions. To reach the persuasion stage, the individual or organization must form a view toward the innovation based on its perceived attributes. For decision to occur, the individual or organization must be involved in an activity that would ultimately require him or her to make a choice between using and dismissing the innovation. For Adoption to occur, the individual or organization must decide that the innovation is the best available option to meet the intended goals. In the implementation stage, the individual or organization actually implements the innovation. Finally, the confirmation stage occurs when people are presented with the innovation on the long term [7].

Applying RDIT to implement the HSNA

Description of the school

This school is a large secondary public school that receives students from seventh to twelfth grades. It was established in 1982 in Amman, and annually receives about 900 students. Fifty-one academic and administrative employees and two housekeepers are working in this school. All teachers are at least Bachelor degree holders in different educational specialties. The school lack a school health clinic and health workers. Instead, the school principal assigns one teacher to follow students’ health issues and he/she is called the SHT.
Assessment

One pre-requisite in RDIT is to assess the previous conditions, practices and problems. Accordingly, a comprehensive assessment was conducted based on the ten accreditation chapters. Regarding the clean, safe, and healthy environment, the school environment was suffering from many chronic problems. Among them were the lack of the main gate which allows strangers to enter school and may expose students to robbery; short school wall which facilitates students escape from school as well as permitting strangers to enter school. Moreover, the wall is usually moist with reek and molds. Classes are small and crowded, with some broken desks, no curtains to protect students from sunlight, in addition to some lightening problems. Also, there were no shaded yards to allow students to play safely during their break time. Insufficient drinking water, limited number of bathrooms with low level of sanitation were also among the main problems. Also, the sidewalk is destroyed and people used to park there. Finally, lack of a pedestrian path makes it difficult for students to cross the road.

Assessing health education revealed scarcity in the educational activities and they found to be fragmented and limited to individualized initiatives from the SHT. Moreover, health education is conducted in a form of lectures. The school canteen was unorganized, dirty, with no fridge and no sink. Moreover, canteen was depending on sales of unhealthy snacks. Assessing the physical activity revealed absence of sport room and equipment, with only one sport teacher who was assigned for the entire school. Also, school’s yards were broken and unequipped for the different sports. Finally, sport’s classes often used to be devoted for teaching other subjects.

Assessing school health services revealed no health room, nor school health nurse. Beside her regular academic load, the SHT follows all students’ health issues. Also, a nurse and a dentist from the local health care center make annual visits to conduct vision and dental screening and send reports to parents to follow up. Class teachers usually measure height and weight and compare results with the growth and developmental charts and send reports to parents to follow up. Regarding the social and psychological services, the school counsellor usually gives routine group counseling sessions to students and parents that covers topics such as learning disabilities, effective studying habits, and bullying. Assessing families and community participation revealed limited collaboration with parents and local community agencies.

I. Knowledge stage:

The school administration had been introduced to the HSNA program through the official letters received from the MOE at the beginning of the academic year to invite schools to voluntarily join the accreditation. Consequently, the school principal and the SHT gained information about definition, goals, philosophy, benefits, process of implementation and kinds of evaluation.

II. Persuasion stage:

After gathering all needed information, the school principal and the SHC members met to discuss and evaluate the five attributes of the accreditation. Regarding the relative advantages, they realized that the program will introduce great positive change to the physical and social environment, as it will make it healthier, cleaner, and safer. Similarly, assessing compatibility revealed that the program is consistent with the existing values, past experiences and needs of the students. Regarding complexity, they found it easy to understand as SHT and principal will attend training sessions and will be provided by the accreditation guide. When they assessed the trialability, they realized that they can try implementing the program for only one year on a limited basis by applying to the bronze level which requires meeting only 60% in every chapter of the accreditation. Finally, assessing observability indicated that the results of implementing this program might be visible as at least the school will be cleaner, healthier and safer. Consequently, they developed positive perception and attitude toward the accreditation.

III. Decision stage:

The main challenge was the lack of fund, in addition to the anticipated change resistance from teachers and students, and the bureaucratic structure of the school and the MOE. However, they proposed many alternatives to overcome these obstacles and made decision to join the accreditation.
IV. Implementation stage:

The accreditation institution provides the interested schools with accreditation guide which guides them in the implementation process. The accreditation guide is organized by the ten chapters and provides detailed description of the needed interventions under each chapter. Actions that have been undertaken under each chapter were as follows:

Chapter One (Leadership and management): the first step was establishing the school health committee (SHC), which consists of eight members: the principal, assistant, SHT, canteen manager, two student representatives and two community members. The SHT is responsible for communicating with the accreditation institution and has to regularly attend external meetings, and to document all accreditation interventions. All SHC members are responsible for initiating and monitoring all needed interventions.

Chapter Two (Safe school environment): the SHC members ensured the availability of windows’ metal protection to protect students from accidental falling down. Also, they made sure that all windows are provided with net to prevent insects’ entry to classes. They installed blinds and fixed non-working electricity. They repaired or replaced the broken desks and fixed the broken stairs and broken regions in the external yard, and installed the school main gate and extended and painted the school’s wall. They installed a shelter in the yard to provide a sun-protected space for playing. Also, they painted the pedestrians’ zoon, so that student can cross the road safely. Finally, they banned employees’ parking inside the school yards.

Chapter Three (Healthy school environment): No-smoking policy was activated and no-smoking signs were posted in school’s corridors and main lobby. They added three water tanks to ensure sufficient water for sanitation and installed new coolers to ensure availability of sufficient clean drinking water.

Chapter Four (Clean school environment): Students and classes’ teachers became accountable for their own classes’ sanitation. A new cleaning schedule for the front and back yards has been developed and implemented to activate the students’ role under the supervision of their teachers and to help the housekeepers organize their work and manage the emerged overload.

Chapter Five (Health education): a comprehensive educational program was developed with no less than two activities per month. The most needed topics were assessed to be nutrition and sanitation. Accordingly, different educational activities on these two topics were conducted. Among them are educational lecture about healthy food choices, hazards of unhealthy food, and the importance of eating healthy breakfast.

Chapter Six (Staff and community participation): the SHC built good relations with the local community agencies and institutions in order to invest these relations to the benefits of students and the community. Also, they communicated with the local health care center, municipal council, traffic police, and drug-enforcement administration. Moreover, families were invited to join the regular staff-parents’ meetings, and all recreational and sports events.

Chapter Seven (Health services): one of the store rooms was devoted to be a school health room, and it was fully equipped through a donation from a private local hospital. In collaboration with the local health care center, a routine physical exam was conducted at the beginning of the academic year for all students.

Chapter Eight (Social, mental and psychological support): the school counsellor was already available to deal with different social, mental and psychological problems. She conducts regular meetings with staff to discuss the most important topics based on her ongoing assessment of students’ needs. Also, she provides counseling as needed and collaborates with families and different institutions to ensure students’ wellness as needed. Furthermore, she usually conducts individualized interviews with students who have been referred from teachers and submit reports to the school principal to follow up with parents.

Chapter Nine (Nutrition): the school canteen reorganized, painted, and new sink was installed and a new refrigerator was bought. Unhealthy food and drinks were replaced by healthy food and drinks such as healthy sandwiches and milk. Also, all canteen personnel underwent an annual routine physical exam and mandated to wear the uniform.
Chapter Ten (Physical activity): sports’ classes were scheduled on the weekly schedule and seriously reactivated. Also, sport room has been established and equipped and some tools and equipment were gained as donations. Moreover, the front and back yards have been lined to become suitable for the different sports. Different sport teams were established and participated in the local sports competitions.

In this stage, the SHC was struggled mainly by the tight budget. To overcome this challenge, they adopted many strategies such as calling for budget release and increase from the MOE as schools applying to the accreditation have the priority for budget release. Also, the SHC received modest donations from teachers, students, and their families and received small fund from the local commercial institutions.

V. Confirmation stage:

Confirmation stage is the final stage, in which many tactics were applied to facilitate the long-term acceptance. Continuing education, psychological support, effective communication and close monitoring were key components in this stage. Continuous assessment of resistance and implementation of appropriate strategies to overcome were conducted. Also, students and staff were strongly encouraged to actively participate in designing and implementing different interventions according to their preferences. Moreover, ceremonies and rewards such as appreciation letters have been utilized to build loyalty and recognition which ultimately will enhance the confirmation of the accreditation. Finally, continuous monitoring and evaluation of resistance will be continued even after the change is fully adopted to ensure that staff and students will not lapse to old patterns of behaviors.

Evaluation

The evaluation of the accreditation was conducted in two levels: internal evaluation by an internal audit constitutes evaluators from the school health committee; and external evaluation by external audit sent from the accreditation agency which has the authority to provide the accreditation. The internal evaluation was conducted regularly every two months to check out the key performance indicators. External evaluation was conducted at the end of the academic year by the RAHS and the school was successfully accredited at the bronze level as it achieved at least 60% in every chapter of the accreditation standards. Also, one-year accreditation certificate and accreditation logo were granted.

Conclusion and Implications for the school health

Implementing a HPS program that is complex, multi-dimensional and multi-level in a developing country is a highly challenging experience. However, Adopting RDIT may help schools’ administrations make informed decision on the light of the perceived attributes of the programs. Also, understanding the five stages of the theory can facilitate consciously proceeding throughout the implementation levels and anticipating the future events. Incorporating RDIT was of great benefit in understanding the change process itself, making informed decisions and organizing the implementation process.

Conflicts of Interest: the authors declare no conflict

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Ethical Clearance: The study was approved by the Scientific Research Committee-the University of Jordan.

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Pre-Operative Depilatory Cream Hair Removal to Reduce Surgical Site Infection in Patients Undergoing Elective Surgery

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Abstract
Surgical site infection (SSI) is a significant cause of morbidity, mortality, and increased hospital stay time and costs after the operation. This paper aimed to review studies that explored the potential effectiveness of using depilatory cream to decrease the occurrence rate of surgical site infections as early preparation of cleaning area of the postoperative wound incision. An electronic search was carried out using PubMed and Google Scholar data bases. This review showed that there is a little amount of evidence on the effectiveness of using chemical hair removal with patients undergoing elective surgeries to decrease the risk of surgical site infections. Depilation before surgery has been used as a procedure to prevent hair from interacting with the recovering wound area. For preoperative surgical site hair removal, shaving, clipping, and chemical depilation are performed in hospitals. Chemical depilation requires adding a hair removal cream to the skin to remove the hair, and when this approach is used for hair removal, it is suggested that injuries and subsequent wound infection will be less. It is highly recommended that further studies need to be conducted to deeply investigate this area of interest.

Keywords: Surgical Site Infection, Skin Preparation, Depilation, Hair Removal.

Introduction
The regular elimination of body hair from the planned surgical wound site has been historically involved in the preparation of patients for surgery. Hair is thought to be associated with unhygienic conditions, and hair removal is supposed to mitigate the chances of Surgical Site Infections (SSIs) (¹). On the other hand, reports suggested that pre-operative depilation is harmful to patients, likely causing SSIs and therefore should not be conducted out (²). In United Kingdom (UK) approximately 10 percent of patient’s experience SSIs per year which can lead to delay in wound healing, prolonged hospitalization, excessive pain, and in severe cases, patient death (²).

One of the antiseptic steps implemented by surgeons to prevent surgical wound infection is preoperative depilation. The most popular hair removal techniques used are razor blade shaving, clipping, and the use of depilatory creams (³). In developing countries, they use the oldest hair removal technique; the razor blade shaving is the most generally practiced and this is frequently accompanied by varying degrees of skin injuries and eventual contamination of the surgical site. While, the newer methods of clipping or using depilatory cream have not been practiced by many of these countries. This

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is due to the low expense of the razor blade, simplicity of use, and the inability of health facilities to implement modern hair removal techniques (4).

The Centers for Disease Control and Prevention (CDC) emphasize that the major aspects in preventing surgical site infections, which include educating and training health care workers to use best practice to prevent SSIs (5,6). There is scarcity in the literature regarding the different types of hair removal in terms of their effects on SSIs. In Jordan, few studies have been conducted regarding prevention practices guidelines commitment among healthcare workers (7-11)

This review explored the potential effectiveness of using depilatory cream to decrease the occurrence rate of surgical site infections as early preparation of cleaning area of the postoperative wound incision, which is an important characteristic of the safe recovery process without infections.

Method

Search Methods: The electronic searching was conducted in PubMed and Google Scholar. Key search terms used: surgical site infection, skin preparation, chemical depilation, hair removal.

The studies that focused on the topic of the effect of type of preoperative depilation on SSI among adult patients requiring clean surgeries through a hair-bearing area, were published in English between 2015 and 2020 were included in the review. While, studies published before 2015 were excluded.

Search outcome: Exploring of literature yield about 30 studies for review, after reading the studies about 20 study were excluded and 10 studies met the inclusion criteria.

Discussion

An uneventful postoperative healing and early return to preoperative status is the target of any surgeon after a successful operation. The SSI is one of the most prevalent surgical complications and puts a major burden on patients and the health care system, even with the many antiseptic steps which have been taken by physicians to prevent SSI (4). The SSI is a significant cause of morbidity and prolonged postoperative hospitalization and is expensive for hospitals (12). To avoid SSI or to prevent hair from overlapping with the incision site, preoperative hair removal is being performed in most of the hospitals (2). For surgical site hair removal, three approaches have been used widely: shaving, clipping, and chemical depilation. Shaving requires removing the hair with a razor near to the skin’s surface. Clipping involves removing the hair to leave ~1 mm of hair usually with electric clippers. To dissolve the hair, chemical depilation includes applying a hair removal cream on the skin (12).

Having a shaven surgical site can facilitate surgery, dressing and decrease possible infection, as the hair is a source of bacteria, but the hair removal process can induce primary infection due to microscopic injuries in the skin (2). The skin can suffer microscopic cuts and abrasions during the procedure of shaving. Microorganisms are thought to be able to penetrate and colonize these wounds, thereby contaminating the site of the surgical incision and inducing SSIs. Additionally, abrasions can exude body fluids, which supplies micro-organisms with a growth media. Since chemical depilatory creams do not come into contact with the skin of the patient, the probability of cuts and abrasions is considered to be decreased (2).

The depilation before surgery has been investigated in many studies. A meta-analysis of randomized or quasi-randomized study was conducted to compare various depilation techniques. The present evidence indicated that there were fewer SSIs with clipping than with shaving when it was appropriate to remove hair. However, there were a scarcity of research papers that compared chemical hair removal with clipping (2). In a developing nation where razor shaving is very common, a study examined the relationship between two techniques of preoperative depilation and surgical site infection. The study found that preoperative depilation with razor shaving is predisposed to skin conditions, which in turn significantly affects the rate of postoperative wound infection. When hair removal treatment is used, these wounds and the resulting wound infection would be less (13).

In a randomized prospective study performed on 100 patients who have undergone surgery, the study compared two forms of preoperative skin preparation:
51 patients were shaven and 49 were treated with a hair removal agent. They noticed that a suitable form of pre-operative skin preparation tends to be depilation with a chemical agent. It is easier than shaving, it can be administered on areas that are not readily accessible by razors, and can also be done by the patients themselves. Also, by replacing preoperative blade shaving with the use of hair removal cream, a decrease in surgical site infection rates has been recorded (4).

Shaving and clipping can be conducted by hospital personnel, ward staff, or by patients themselves in hospital settings, anesthesia rooms, clinics, or in people’s houses. Chemical hair removal is typically done onwards or at the house, as more time is required (2,12). Studies have indicated that depilation in the operating room should not take place as loose hair could pollute the sterile surgical area (2), and the professional workers should perform depilation to avoid abrasion wounds.

In Jordan, only few relevant data were found in the literature (14-19). A study was performed in five hospitals in Jordan found that only 29.8 percent of surgeons remove patient hair in the surgery room, with 57.1 percent preferring clipping as a method of removing patient hair before operation. According to the study further training was required to avoid SSIs. (20). The level of awareness of Jordanian nurses about evidence-based recommendations for SSI prevention was evaluated in another Jordanian study. The results indicated that thirty-six percent of the nurses reported that preoperative hair removal should occur just before the surgery, and 49 percent of the nurses reported that electrical clippers are preferred to cut the hair of the patient at or near the incision site. (21).

Throughout the world, various depilation strategies are encouraged. The CDC, for instance, strongly advises that hair should not be removed pre-operatively unless the hair interferes with the procedure at or near the wound area (22). While, the Norwegian Centre for Health Technology Evaluation reported that it is not highly encouraged to avoid before surgery hair removal. The Norwegian Centre found that there is no clear evidence either in support of preoperative hair removal or against it. The British Hospital Infection Society Working Group indicated that it is appropriate to shave only the area to be incised and that shaving should always be avoided if possible (2,12,23).

**Conclusion**

There is a scarcity evidence on the effectiveness of using chemical hair removal with patients undergoing elective surgeries as method to decrease the risk of surgical site infections. When comparing chemical depilation with shaving and clipping, there is a consensus that shaving is associated with the highest incidence rate of infection. It is highly recommended that further studies need to be conducted to deeply investigate this area of interest.

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Medico-legal Institute: A Need of State

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Abstract

Medico-legal Institute have been in existence for centuries in several countries of the world. The importance of setting up of Medico-legal Institute in every state of countries, closely associated with medical colleges, for the systematic teaching of forensic medicine, training of specialists, for the investigation of Medico-legal problems, etc., has been stressed by all the leading medical jurists of the world. The Health Survey and Development Committee (The Bhore Committee) Government of India, 1946, in their report had recommended the starting of Central Medico-legal Institute. Later, Government of India, Ministry of Health and Family Welfare constituted a central Medico-legal Advisory Committee in year 1958, which gave its report in 1964 and recommended every state for establishment of such Medico-legal Institute. The recommendation has been followed very lightly by establishing the Medico-legal Institute in few states only. Nowaday due to advancement of technologies and public awareness, Medico-legal issues are increasing day by day. It is the demand of the time to take a solid step to solve these cases in legal and scientific ways. Initiatives of establishment of medico-legal institute in every state can be one of the firm milestones for the settlements of the maximum Medico-legal cases. As Government of India is in the process to establish All India Institute of Medical sciences (AIIMS), in every state in which lands, buildings and manpower has already been planned, so up-gradation of Department of Forensic Medicine and Toxicology of every AIIMS to the level of Medico-legal Institute will be an appropriate decision for reduction of monetary investment.

Keywords: Medico-legal, Medical colleges, Advisory Committee, State, AIIMS, Monetary

Introduction

This century demands, yet obliges, for a rapid and efficient responsive organization. Indeed, imposes for a knowledgeable worker who is highly qualified, innovative and can work autonomously plus in teamwork. Though, globalization is well recognized as a market phenomenon, it is not so far to find a specific service offered by the medico-legal institute. “To deal with global competition, employees have to be able to keep up with knowledge and new ideas to stay in the race” (¹)

Medico-legal Institute have been in existence for centuries in several countries of the world. The First Medico-legal institute was started in Austria in 1804. There are medico-legal institutes in Italy, France, Austria, Romania, Egypt, Japan and other countries. In European Countries like Denmark, Rumania etc., State Medical Officers, even as early as 1914, had to undergo a course of one year in Forensic Medicine in a Medico-legal Institute and obtain a diploma before they were entertained into service. Whereas in India, only one medico-legal institute could be established that too in 1977 by the Government of Madhya Pradesh in Bhopal. According to Prof. Minovici (1928) “in this way the creation of a select body will be attained to which justice will have to address itself exclusively for the opinions in legal medicine”. So the importance of setting up of

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The Medico-legal Institute in every state of countries, closely associated with medical colleges, for the systematic teaching of forensic medicine, training of specialists, for the investigation of Medico-legal problems, etc., has been stressed by all the leading medical jurists of the world.

The Health Survey and Development Committee (The Bhore Committee), Government of India, 1946, in their report had recommended the starting of Central Medico-legal Institute. Later, the Government of India Health Ministry constituted a central Medico legal advisory committee in year 1958. Main function of the committee was to advise the central and state government on matters pertaining to medico legal procedure and practices throughout India and to promote the development of new and modern techniques in the field. The committee gives its report in 1964. Not much concrete work, was, however, done in this direction and subsequently the standing committee on forensic medicine was constituted in the Ministry of Home Affairs to pick up the threads left by the advisory committee report. The committee also observed most regretfully that the medico-legal practices throughout the length and breadth of the country has been found to be in most deplorable condition for the following reasons:

1. Shortage of trend personnel in the profession
2. Absence of even ordinary facilities i.e. transportation cold storage, mortuary, instruments etc. for the practice of the profession.
3. Absence of any incentive for the practitioner to take interest in the so-called dirty work. However provision incentive has been made but only in few states.
4. Want of literature, standard and research on the subject with an Indian bias, which is very important as in many cases.

Consequently suspects may not get fair and it is possible that criminals may escape or innocent convicted.

The Committee feels that the Department of Forensic Medicine should have access or be given a share in part of the work of the Casualty Department of a teaching Hospital and the Professor of Forensic Medicine be designated as Consultant in Clinical Forensic Medicine.

Although Medico-legal practice is purely a medical subject and practiced only by graduates of Medicine, so, the Committee also recommended that the medico-legal practitioners should remain under Ministry of Health rather than under Ministry of Home & Law as if that the incumbents should in no sense be dependent upon departments which are concerned with the process of trial or the investigation of crime.

**Present Position of Medico-legal Service in India**

The present position in regard to the investigation of medico-legal problems is very unsatisfactory. Every medical practitioner in charge of a remote dispensary whatever his qualification or experience, is asked to undertake medico-legal post-mortem in complicated cases of crime and he is liable to be held in question thereafter, the presumption being that every medical man is competent to undertake these responsibilities, but unfortunately neither the profession nor the judiciary nor the State have stopped to consider the absurdity of such a presumption.

The improper performance of an autopsy, and failure to understand the normal from pathological findings and their misinterpretation have frequently resulted in miscarriage of justice. Further, scrutiny of medico-legal certificates at random in several States has revealed very poor quality of medico-legal work resulting mostly from ignorance and occasionally from indifference.

In India the participation of medical officer in the investigation of crime is often restricted only to the performance of a post-mortem examination. Inspection of the body at the scene of crime is most essential to a proper medico-legal autopsy. It is regretted that the present system is defective in this respect as it is not practicable for the medical officer to visit the scene of crime due to lack of funds, security, manpower, vehicles & other logistics and has to depend on the police requisition or inquest report.
It is noticed that many specimens for toxicological analysis are being sent by medical officers without any scientific indication or necessity for such an examination; this is largely due to their lack of knowledge of pathology. Similarly the investigating police officers also are observed to collect far too many specimens of bloodstains, etc., in some cases which do not warrant such a procedure.

**Background**

According to data on conviction rate for 2014, collated by National Crime Records Bureau (NCRB) and presented by the government in Parliament, the percentage of cases in which the accused received punishment stood at over 45%. In 2013, the same figure was 40.2% while in 2012 it stood at 38.5%.

In 2014, Kerala was the best performing state with over 77% convictions while Bihar was the worst with just 10%.

The trend is significant as since independence conviction rate in cognisable crime (offences which fall under Indian Penal Code) have been consistently falling. The oldest record in this respect is that of 1953, the year when NCRB began collating crime data. In that year, the percentage rate of conviction to total cases tried was almost 64%. In the next decade it improved to 65%. However, 70s onwards it has been consistently declining, dropping to less than 40% in 2012.

Even Uttar Pradesh, with its infamous lawlessness, does better than the national average clocking 53.2%. Bihar is the worst with 10% conviction rate followed by West Bengal where the figure is 11%. Maharashtra, which not too long ago had one of the worst conviction rates hovering at 6-7% has shown marked improvement clocking a rate of 19.3% in 2014. In 2013, the figure for Maharashtra was 13% while in 2012 it was just 9%.

Over the years, the national capital has fast emerged as the crime capital of the country. And while an overburdened Delhi Police claims it is doing its best to reduce crime, the conviction rate tells a different story.

Rates of conviction in Delhi have been steadily falling over the last 12 years. While in 2005, 31.2 per cent of cases registered resulted in convictions, it fell drastically in 2016 to a paltry 4.9 per cent, according to information from the Ministry of Home Affairs (MHA).

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<th>National Crime Records Bureau (NCRB)</th>
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<td><strong>Year</strong></td>
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According to NCRB top reasons for low conviction rate are

1. Hostile witness
2. Long duration of trial
3. Faulty investigation

In 2016, one in four rape cases in India ended in conviction – lowest since 2012–according to national crime data.

India’s conviction rate for rape, at 25.5%, remains low compared to all cognisable crimes – those that do not require a magistrate’s permission to investigate – under the Indian Penal Code (46.9% in 2015).

Nagaland (72.7%) and Mizoram (70.6%) had the best conviction rates in 2015 – the year for which latest data were available – while Jammu and Kashmir (7%) and Gujarat (10.1%) had the worst.

As many as 278,886 rape cases have been reported in India over the last 10 years under Section 376 of the Indian Penal Code.(6)

### Cause of low conviction rate in India

1. No witness protection program –

India doesn’t have a state sponsored witness protection program. Witnesses often turn hostile because of this.

2. Police not well trained and equipped-

The Police officials in India are poorly equipped. A lot of Police work is still done manually. Police official aren’t trained to use computers and lack the necessary knowledge of both science and sadly even law.

3. Lack of training Institute-

India has lack of medico-legal institute in which the police officials and other scientific persons can be trained for collection and preservation of evidences of different crimes. Forensic laboratories

India doesn’t have well equipped laboratories and training centers in all the states. DNA and other forensic data has to be sent to forensic laboratories and that involves a lot of protocols as well as time. Also, lack of state medico-legal institute leads to large consumption of time for the chain of custody of the evidences.

4. Witnesses turning hostile

Sadly, this seems to be a major reason of low conviction rate in rape cases in India. A lot of times, the victims know the Accused. They either turn hostile owing to threats or settle outside the court.

### Functions & Duties of Medico-legal Institute

The following functions should be carried out by the Medico-legal institute in collaboration with Medical College:

i. To cater to the needs of undergraduate and postgraduate education in forensic medicine and to provide appropriate courses of instruction to other law-enforcing agencies

ii. Be responsible for conduct of all medico legal Necropsies of the city and the autopsies from the various district of the State and to give an opinion in expert opinion cases from whole state in medico legal cases.
iii. Undertake medico legal examination of skeletal remains

iv. Be responsible for all forensic serological investigations of the state

v. To provide consultative service to medical officers and guide those engaged in clinical forensic medicine practice;

vi. To work in close collaboration with the departments of police and Justice (law) whom it should provide consultative and advisory services on all relevant technical problems concerning investigation of crime. It should also advise the Government on all Medico legal matters;

vii. To conduct research

viii. To establish the advanced toxicology lab and hospital ward, OPD, procedure room etc to provide high level of patient care for poisoning cases.

Laboratories in the institute

- Anthropology
- Entomology
- Histopathology
- Photography
- Mortuary services
- Toxicology and Chemical analysis
- forensic psychiatry
- forensic odontology
- Forensic Radiology
- Forensic Serology
- Poison information center

Power and duties that can be conducted employees of Medico-legal institute in collaboration with Medical College.

1. The main function of Institute is to conduct all autopsies of the city and also the autopsies referred from various district of state

2. To give expert opinion in the medico-legal cases referred from whole state.

3. In addition during routine investigation relating viscera Analysis, Diatom, Vaginal smear, entomology are also conducted.

4. Quality FSL work given to the Institute.

5. In complicated cases the technique of investigative and reconstructive forensic medicine can also be used.

6. Crime Scene visit.

7. Medical and medico-legal management of poisoning cases.

Useful Scheme for a common man

The most important hypothesis of the Institute lies on the fact that “Dead never speaks lie while living persons may speak lie” However the deceased person has low voice, but he need a full satisfaction and faith that he is to be listen sincerely and seriously. In this world there is always a scientific reason behind every phenomenon rather it is being considered as a wonder.

1. The important functions of Medico-legal Institute should be very specific and continue to be for the common man utility. The Institute should render scientific opinion in the police cases, which are being referred from the entire state particularly where there is difference of opinion in suspicious death events or common public/aggrieved party is not satisfied with the police investigation and doctor’s opinion. Accordingly when these cases have been referred to the Institute usually the body is not available, only one the basis of documents viz. postmortem report, Panchnamra, Morg Information, F.I.R., clothings and Photographs of Scene of Crime etc. The Institute should draw scientific appraisal coordinating the facts mentioned in the above documents among each other and his supporting evidence. Thus a justified opinion is being given in each case.

2. In Medical negligence cases, if the cases are referred to medico-legal institute situated in Medical College, the condition and situation can be better understand by the doctors, and better opinion and judgment can be given for the doctors and the patient.
3. In Forensic Toxicology, the institute can give immediate result of poison which will help in diagnosis and treatment of patient of suspected poisoning case. It will further help the judiciary in medico-legal autopsy by diagnosing the suspected death due to overdose of drugs or poisoning in very less time, which is time consumable due to maintaining chain of custody.

4. The institute can serve the public by visiting and collecting the evidence from the scene of crime in more scientific way.

5. The Institute can serve the society by organizing regularly the training courses for Doctors, Police and Judicial personnel on the important Medico-legal issues.

6. This will also help the department follow up the regulations like maintaining the medico-legal records of all cases for at least 30 years.

Discussion

The one important single factor in the stalemate in the medico-legal practice in our country is the lack of Medico-legal Institutes or full-time Departments of Forensic Medicine in Medical Colleges imparting post-graduate training in Forensic Medicine. This has resulted in the paucity of regularly qualified experts. The work has been carried on by “untrained or ill-trained” State Medical Officers. It should be emphasized that forensic medicine is as much a specialty as any specialised branch in medicine or surgery and medico-legal work cannot be lightly thrown on the shoulders of any every medical man. The fact that all medical jurists in the United Kingdom are experienced forensic pathologists might be followed in India with advantage.

Across the state, medical colleges have forensic medicine departments, but do not have a dedicated center for medico-legal cases. Medico-legal institute in Medical College will provide a better platform for the medico-legal work beneficial for both the dead and alive patients. The establishment and successful functioning of the Medico-legal Institute can be fulfilled in better ways when it is established in Medical Colleges, as it will provide construction space, qualified man-power, working environment and case availability.

Although inefficiency in medico-legal practice is in no way directly responsible for the increase in crime figures yet a well organised and efficient medico-legal service is indispensable for the proper investigation and trial of all crime cases which would have a deterrent effect on the criminals and make them realise that science does not permit crime to pay.

In spite of recommendation of various committees to establish Medico-Legal Institute in every state, it could only be established only in one state. However ray of hope is Government of India has planned to establish AIIMS in every state for which financial provision is being done for more than ten thousand millions rupees for each AIIMS. If Government can provide ten thousand million then it can also provide eleven thousand million to upgrade the Forensic Medicine & Toxicology department to the level of Medico-legal Institute.

Conclusion

Now days due to advancement of technologies and public awareness, Medico-legal issues are increasing days by day, it is the demand of the time to take a solid step to solve these cases in legal and scientific ways. Initiatives of establishment of medico-legal institute in every state can be one of the firm milestones for the settlements of the maximum Medico-legal cases. The recommendation by different committee constituted by Government of India has been followed very lightly by establishing the Medico-legal Institute in few states only. As Government of India is in the process to establish All India Institute of Medical sciences (AIIMS), in every state in which lands, buildings and manpower has already been planned, so up-gradation of Department of Forensic Medicine and Toxicology of every AIIMS to the level of Medico-legal Institute will be an appropriate decision for reduction of monetary investment.

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References


The Juridical Analysis of Setting of Clinical Pharmacy Services in Hospitals

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Abstract

This research is based on statutory regulation relating to clinical pharmacy services in hospitals after the issuance of Minister of Health Regulation Number 3 of 2020 concerning Hospital Classification and Licensing (PMK 3 of 2020) which reaps various interpretations, especially clinical pharmacy services in hospitals. The methodology in this study used a normative juridical type and used four approaches, namely the statute approach, historical approach, comparative approach, and conceptual approach. Then a document study was carried out through tracing the sources of legal materials such as the Constitution, the Health Law, the Hospital Law, the Health Manpower Law and the statutory regulations relating to the rules for classifying pharmaceutical services in hospitals as well as studying reading sources related to the object of research.

This research showed that there is actually a contradiction in norms between the Hospital Law, the Health Law, the Health Manpower Law and the Minister of Health Regulation Number 72 of 2016 concerning the Standard of Pharmaceutical Services in Hospitals which is the implementer of the Hospital Law and PMK 3 of 2020 concerning Hospital Classification and Licensing, where the lower statutory regulations may not conflict with the statutory regulations under it or known as the lex superior derogate legi inferiori principle.

Keywords: Juridical Analysis, Pharmaceutical Services, Clinical Pharmacy, Conflict of Norms

Introduction

Health Service Facility is a tool and/or place that is used to carry out health service efforts, whether promotive, preventive, curative or rehabilitative carried out by the government, local governments, and/or the community.¹ Health services will not be separated from pharmaceutical services, including Clinical Pharmacy services.

Clinical Pharmacy is an extension of the role of the pharmacist profession that is not only oriented to drugs but also to patients and aims to improve the quality of drug therapy. Clinical pharmacy activities are centered on patients, cooperating and collaborating among professions with doctors, nurses in the health service team.²

Ironically, since the issuance of PMK 3 of 2020 concerning Hospital Classification and Licensing which is in Article 7 paragraph (2); “Health services provided by the Hospital at least consist of medical services and medical support, nursing and midwifery services, then non-medical services”. Article 10 states that non-medical services consist of pharmaceutical services, laundry/cleaner services, food/nutrition processing, maintenance of facilities and infrastructure and medical devices, information and communication, corpse handling, and other non-medical services.

The assumption that pharmacy personnel is non-medical is because there is no direct interaction service with patients that raises pros and cons. This is because as a pharmacist there is a service called clinical pharmacy
service that is a direct service provided by pharmacists to patients in order to minimize the risk of drug side effect, for patient safety purposes so that the patient’s quality of life is guaranteed. However, the real role of pharmacists is marginalized by the hospital system where pharmacy services are localized in the logistics, dispensing, and administration sections. The many interpretations that have emerged since the enactment of PMK 3 of 2020 concerning the classification of pharmaceutical services will cause problems for pharmacist colleagues as those who carry out the role of pharmaceutical services in handling patients. So that there is no legal certainty in pharmaceutical services in hospitals so that it can lead to different interpretations from various parties and can influence the standard of pharmaceutical services in hospitals.

**Discussion**

**The Setting of Clinical Pharmacy Services in Hospitals based on principles of ius constitutum and ius constiduentum**

The word Pharmacy comes from the word *Pharmacon* which is Greek for poison or medicine. And the word Medicine/med·i·cine/ which means medicine science, drug, and medical science. Pharmacy is a health profession that includes activities in the fields of discovery, development, production, processing, compounding, drug information and drug distribution.

The legal basis for administering clinical pharmacy services in hospitals is the Decree of the Minister of Health Number 436.Menkes/SK/VI/1993 concerning Hospital Service Standard and Medical Service Standard that pharmaceutical services are an inseparable part of the hospital health service system.

The stipulation of Law Number 7 of 1963 concerning Pharmacy aims to establish basic provisions in the pharmacy sector in the context of implementing the Law Number 9 of 1960 concerning Health Principles. Then the Pharmacy Law was repealed and replaced with Law Number 23 of 1992 concerning Health. Although the Pharmacy Law is repealed, the legal norms related to pharmacy have not all been replaced because until now the Pharmaceutical Bill is also unclear. Because, basically all laws contain legal principles which the rule of law is higher than the norms of the law. And the pharmacy work regulation is regulated in Government Regulation Number 51 of 2009 concerning Pharmaceutical Work as the material for implementing the Law on Health.

There has been a shift in the orientation of pharmaceutical services from managing drugs as a commodity to pharmaceutical care services. Pharmaceutical Care was known in 1990, and was only voiced in Indonesia in 2000. In practice, the responsibility for drug therapy is manifested in achieving positive results for patients.

In the Law on Psychotropics, the Law on Narcotics and Minister of Health Regulation Number 3 of 2015 concerning Circulation, Storage and Reporting of Narcotics, Psychotropics and Pharmacy Precursors, it is explained that the delivery of drugs of this class can only be submitted in the form of finished drugs and delivered, supervised directly by the pharmacist at the hospital pharmacy according to a doctor’s prescription.

In Law Number 36 of 2009 concerning Health which applies now has a philosophy that Law Number 23 of 1992 is deemed incompatible with developments, demands and legal needs in community so it needs to be repealed and replaced. The new Health Law consists of 22 chapters with 205 articles and there are three times as many settings as the previous one. One of the articles that discusses pharmaceutical, states that pharmaceutical personnel must meet the provisions of the code of ethics, professional standards, rights of health service users, service standards and standard operating procedures.

In line with the development of the work of the pharmacist profession in hospital pharmacy installations, it is now regulated in the Minister of Health Regulation Number 72 of 2016 concerning the Standard of Pharmaceutical Services in Hospitals (PMK 72 of 2016) with the aim of ensuring legal certainty for pharmaceutical personnel, protecting patients and community from irrational use of drugs in the context of patient safety. Pharmacists must be able to fulfill the patient’s rights to avoid unwanted things, including lawsuits.

It can be seen from the history of setting regarding clinical pharmacy services in Indonesia, it was still very weak, therefore there is a need for clear and updated regulations in accordance with the present and the future.
Reporting from the *European Associate of Hospital Pharmacists* (EAHP) which was founded on March 6th, 1972 until now. Several countries have included the role of pharmacist services as medical services in hospitals. The hospital pharmacist is considered a reliable and unbiased partner for all matters relating to drugs and drug use. In the UK the regulation of hospital pharmacy practice is principally governed by three types of regulations:

1. The Drug Law, which regulates the production, distribution, import, export, sale and supply of medicinal products;

2. Drug Abuse Law, which controls the availability of drugs which is responsible for drug abuse and can be controlled;

3. Pharmaceutical Law, pharmacists must be registered at the Royal Pharmaceutical Society of Great Britain or the Pharmaceutical Society of Northern Ireland and follow a code of professional practice.

Legal science is indispensable to support pharmacy in Indonesia from a side of the law or high regulation compared to only Government Regulation. Advance in Pharmacy Science is increasingly needed and considered to be very important for better future of community health.

**Hospitals as Clinical Pharmacy Service Administrator Based on Hospital Law**

Law Number 44 of 2009 concerning Hospital was issued to complement the Health Law. According to the Law on Narcotics and Government Regulation 51 Pharmaceutical Work defines a hospital as a form of integrated health service that involves many professions including pharmacists. This legal basis places the legal status of pharmacy in various health service settings. According *International Pharmaceutical Federation* (FIP), every pharmacist’s action has a liability that is accounted for scientifically and legally.

Regulation of the Minister of Health is the implementer of Hospital Law concerning clinical pharmacy services.

The ministerial regulation in Law Number 12 of 2011 concerning the Formation of Statutory Regulation is not regulated in the provisions of Article Paragraph (1). However, the existence of this type of regulation is regulated in Article 8 paragraph (1) of Law Number 12 of 2011, which confirms:

“Types of Statutory Regulation other than those referred to in Article 7 paragraph (1) include regulations stipulated by the People’s Consultative Assembly, House of Representatives, Regional Representative Board, Supreme Court, Constitutional Court, Supreme Audit Board, Judicial Commission, Bank Indonesia, Ministers, agencies, institutions, or commissions the same level as established by law or by the government at the behest of the law, the Provincial Regional House of Representatives, Governor, Mayor/Regent/City/Regency Regional House of Representatives, Village Head or equivalent.”

Although the provisions above do not explicitly state the types of statutory regulations in the form of “Ministerial Regulations”, but a phrase “... regulations stipulated by ... the minister ...” above, reflects the existence of a Ministerial Regulation as a type of statutory regulations. From this provision, it can be explained that ministerial regulation is born because of certain affairs in governmentnamely matters that have become the affairs of the ministry itself and affairs that have been determined by statutory regulation. However, not all ministries have the authority to form ministerial regulations, only the ministers who lead an institution have the right to issue ministerial regulations.

The incompatibility of implementer of the Hospital Law occurred in PMK 3 of 2020 in the Article that it is stated that pharmaceutical services are categorized as non-medical services because there is no direct interaction between pharmacists and patients. Furthermore, how is the binding strength of the Minister of Health Regulation, then in Article 8 Paragraph (2) of Law Number 12 of 2011 affirms: “Statutory Regulation as referred to in paragraph (1) is recognized for its existence and has binding legal force as long as it is ordered by a higher level of Statutory Regulation or established based on authority.”

From the provisions above, there are two conditions for the regulations referred to in Article 8 paragraph (1) of Law Number 12/2011 has a binding force as statutory regulations, namely the first to be ordered by a higher statutory regulation; or established based on authority.
Analysis of Norms in Regulation of the Minister of Health Number 3 of Year with Reference to Law Number 44 of 2009 concerning Hospitals.

In practice, it is often found that legal regulations lag behind concrete events, in the sense that there is no concrete event, so the existing regulations are often inadequate. Yohanes Sogar Simamora argues that legal principles are needed as a basis for the formation of legal rules and at the same time as a basis for solving legal problems that arise when the available legal rules are inadequate.7

Referring to Satjipto Rahardjo’s view that law is not what is written or said in the text, law is not only a rule but also behavior, law as text will be silent and only through human mediation it becomes alive, the text is just a zombie (living corpse) which is frightening, damaging, and disturbing the comfort of life and human life if it cannot be implemented and if it conflicts with the legal behavior of community. The law is seen not only as what is written, but also by the spirit and soul in it. The system of Indonesian legal norms forms a pyramid building, the prevailing legal norms are in a system that is tiered, multilayered, at the same time in groups. In the sense that legal norms are applicable, sourced and based on higher legal norms, and higher legal norms are applicable, sourced and based on higher legal norms. The building of this legal pyramid is to determine the degree of norms for each arrangement of higher legal norms and lower norms. The consequence of building a legal pyramid is that if there are conflicting legal/regulatory norms (conflicting norms), then those that are declared applicable are those with a higher degree. In this context, the lex superior derogate legi inferiori principle of law (a law with a higher degree overrides the law of a lower degree) applies. In addition, the consequence of building the legal pyramid is the harmonization among the various layers of law (for example at the level of Laws), in the sense that among legal norms in layers/level cannot conflict with each other.8

In this analysis, there is a Lex superior derogate legi inferiori principle, according to Hans Kelsen9, this principle is in accordance with the statutory regulations ladder theory or Stufenbau der Rechtsordnung which states that the binding power of a rule or norm lies in higher regulations or norms. Therefore the lower rules must not conflict with the higher regulations on which to base their binding power. If a lower rule conflicts with a higher rule, then the lower rule is overridden by a higher regulation. The application of the Lex Superior derogate legi inferiori principle in the preparation of a regulation is carried out so that in the future when the regulations have been agreed and applied there will be no disharmony in the laws.

a. Disharmony of laws caused by establishment is carried out by different institutions and often in different periods of time;

b. Officials authorized to establish statutory regulation change either because they are limited by the term of office, shift of duty or replacement;

c. Weak coordination in the process of establishing statutory regulation that involve various agencies and legal disciplines;

d. Public access to participate in the process of establishing statutory regulation is still limited;

e. There is no definite method and standard that binds all institutions authorized to make statutory regulation.

Disharmony of statutory regulations is a condition that needs to be avoided in the legal system because it can result in different interpretations in its implementation, the emergence of legal uncertainty and statutory regulation is not implemented effectively and efficiently as well as legal dysfunction, meaning that the law cannot function to provide behavioral guidelines to the community, social control, dispute resolution and as a means of social change in an orderly and regularly manner.10

The principle of Lex Superior derogate legi inferiori refers to the existing legislation hierarchy, in accordance with Law Number 12 of 2011 concerning the Establishment of Statutory Regulation that the legal hierarchy system in Indonesia is:

a. The 1945 Constitution of the Republic of Indonesia;

b. Decree of the People’s Consultative Assembly;
So by looking at the hierarchical order, PMK 3 of 2020 should have its power under the Hospital Law while in this context the contents should not violate the contents or conflict with the contents of the Hospital Laws. A legal product is a system of norms made according to the higher and highest norms, namely the basic norms (Grundorm).

**Conclusion**

Based on the description that has been stated, it can be concluded that the setting of clinical pharmacy services was clear even though it was only a Minister of Health Regulation, only at the level of implementation in the field was lacking so that not many understand and thought that pharmacy in hospitals only focused on managerial. According to the analysis carried out, there was a conflict of norms (antinomy normen) due to the incompatibility of the regulations of the minister of health as the implementer of laws or regulations that were above then also between concrete practices and inconsistent regulations, resulting in many wrong interpretations.

**Limitation and Study Forward**

This study aims to analyze the setting of clinical pharmacy services according to the Hospital Law that is very different from PMK 3 of 2020. And this research needs to be continued because of conflicting norms in higher regulations. Meanwhile, PMK 3 of 2020 should be repealed and adhere to the previous regulations or legitimate for clinical pharmacy regulations which are higher than only PMK 72 of 2016, so that there will be no interpretation without direction and principles.
Who Experience Out-of-Pocket Expenditures for Modern Contraceptive Use in Indonesian Universal Health Coverage System?

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Abstract

Integration of family planning programs into the universal health coverage system is expected to improve access to reproductive health services. All people should have access to sufficient and qualified family planning services they need without financial hardship. This study aimed to examine out-of-pocket expenditures of contraceptive services and the associated factors among fertile age couples that influence their access to modern contraceptive services. It was quantitative research with a cross-sectional design. Data obtained from the Health and Demographic Surveillance System 2016 of Sleman Regency, Indonesia, were analyzed using multiple logistic regression to determine factors associated with out-of-pocket expenditures for contraceptive services. This study revealed that more than 70% of people should pay for contraceptive services even though they had registered as health insurance members. Public non-subsidized and private health insurance members were more likely to experience OOP expenditures than public-subsidized participants (AOR=3.12; 95%CI=2.25-4.30 and AOR=3.47; 95%CI=1.60-7.52, respectively). Short-term contraception users were more likely to experience out-of-pocket expenditures than long-term users (AOR=6.38; 95%CI=4.79-8.50). Nearly three-quarters of health insurance participants experience out-of-pocket expenditures for contraceptive services. Out-of-pocket expenditures of contraceptive services significantly associate with the type of health insurance owned and the types of contraceptive methods used.

Keywords: Family planning, out-of-pocket, universal health coverage

Introduction

One of the critical equity issues in health systems is financial barriers¹,². Out-of-pocket payments represent approximately half or more of the total health expenditure in some countries like the Philippines, Pakistan, Laos, Bangladesh, and Vietnam³. In Indonesia, health spending as the extent of gross domestic product (GDP) remains under average among the low-to-middle-income countries⁴. The government of Indonesia presented the National Health Insurance (NHI) in 2014 for reacting to the high of OOP expenditure and its effect on access to health services by the poor⁵. However, the allocation of NHI to preventive and promotive services is relatively low. This challenge might encourage the high levels of OOP expenditure⁶, including family planning (FP) services.

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Responding to these conditions, Indonesia ratifies the integration of the FP program into the NHI. The FP program integration into the NHI scheme is expected to provide benefits for improving the access and quality of FP and reproductive health services. Nevertheless, there are still people who receive FP services in the private sector by paying for contraceptives. At the beginning of NHI implementation, the average OOP of health insurance participants is IDR 238,260. Based on data from the 2014 Indonesia Family Life Survey (IFLS), more than 5% of the Indonesian population experienced health expenditure of more than 40%, which according to WHO standards, is categorized as catastrophic expenditure.

Based on PMA2020, private facilities are the most predominant modern method source. The wealthiest segment paid the most out-of-pocket for FP services. Based on the 2017 IDHS data, more than thirty percent of women participating in FP received services from government sources; 21% have to pay for contraceptive services. It seems that there are problems in access to sufficient and qualified contraceptive services, even though WHO declared that UHC should protect all people from financial hardship. For these reasons, this study examines out-of-pocket expenditures of contraceptive services and the associated factors among fertile age couples using the Sleman Health and Demographic Surveillance System (HDSS) 2016.

Materials and Methods

Study Design and Sample Selection: This study was quantitative research with a cross-sectional approach. Researchers conducted secondary data analysis to obtain information about access to FP services, especially out-of-pocket expenditure issues for health insurance participants in Sleman Regency using Sleman Health and Demographic Surveillance System (Sleman HDSS) 2016. Sleman HDSS is a population-based survey that collects population transition, health status, and social transition periodically.

Sleman HDSS used a longitudinal design panel, which population was residents who live in Sleman Regency for six consecutive months. It involves a total of 5,147 selected households from 216 clusters in rural and urban districts. This study used Sleman HDSS Cycle 2 that was conducted in 2016. This study sample was 1,237 observations that met the inclusion criteria, i.e., aged 15 - 49 years, married or living with a partner, and health insurance members provided by the private sector and government. The Sleman HDSS obtained ethical permission from the Medical and Health Research Ethics Committee of Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, with the number KE/FK/0434/EC.

Outcome Variable: OOP expenditure of the FP service was the dependent variable in this study. In Sleman HDSS, OOP expenditures of FP services were assessed using how to pay the FP services. The response was classified into using health insurance facilities, paying with own money, distributing for free, and do not know. If the respondent answered with “pay with money” even though he/she was a health insurance member, we determined them as out-of-pocket expenditures.

Explanatory Variables: The essential sociodemographic characteristics of respondents that were considered included sex (male and female), age category (15-34 and 35-49), age of first marriage (under 21 and 21+), education attainment (primary/never attended, secondary-1, secondary-2, and university), parity (0-1 child, two children, and 3+ children), and working status (housewife, formal sectors, and informal sectors). According to the Indonesian population control and FP program, age category was classified into younger and older age, education attainment was determined by formal years education, age of first marriage was defined according to the Indonesian maturation age of marriage program, and working status distinguished according to Indonesian Central Statistics Bureau. The main essential variables that were involved were the modern contraception method used that was dichotomized into LARC and short-acting method users, and the type of health insurance owned was classified into public-subsidized, public-non-subsidized, and private insurance according to the Indonesian UHC system.

Data Analysis: The data obtained were analyzed using descriptive analysis to identify each research variable frequency distribution. It continued with cross-tabulation to identify the difference of OOP among several characteristics. We conducted a multiple logistic regression to obtain the best model of factors related to
OOP expenditure of FP services. The significance level was obtained from the magnitude of the p-value at the 5% significance level and the odds ratio using a 95% confidence interval. All analysis procedures were carried out using STATA version 14.2.

Results and Discussions

There were 5,147 selected households involved in this study, but only 1,237 observations met the inclusion criteria and were included in the final sample. Most of the respondents were primarily women and were categorized as old adults and already married. Respondents had various education levels; however, half of them completed secondary school. Most respondents had fewer than two children. The working status distribution showed that homemakers constituted the highest proportion of respondents.

While only 38.7% of respondents used the LARC and sterilization method, more than sixty percent of respondents reported using short-acting methods. The data depicts that most of the respondents were public insurance members in terms of health insurance membership. It was only about 4.4% of respondents were private insurance participants. More than sixty percent of the respondents were public-subsidized beneficiaries. Even though all respondents were health insurance participants, both public and private, it is striking that more than 70% should pay for their contraceptive services. Most people experience OOP expenditure of FP services even though contraception was one of the benefit packages covered by health insurance in the Indonesian health insurance scheme (See Table 1).

Table 1. Percentage Distribution of Respondents by Contraception Types, Health Insurance, and Payment for Contraceptive Services (n=1,237)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Method Used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LARC-Sterilization</td>
<td>479</td>
<td>38.7</td>
</tr>
<tr>
<td>Short-acting Methods</td>
<td>758</td>
<td>61.3</td>
</tr>
<tr>
<td>Type of Health Insurance Owned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public-Subsidized</td>
<td>763</td>
<td>61.7</td>
</tr>
<tr>
<td>Public-Non-Subsidized</td>
<td>419</td>
<td>33.9</td>
</tr>
<tr>
<td>Private Insurance</td>
<td>55</td>
<td>4.4</td>
</tr>
<tr>
<td>Payment Category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free</td>
<td>329</td>
<td>26.6</td>
</tr>
<tr>
<td>OOP Payment</td>
<td>908</td>
<td>73.4</td>
</tr>
</tbody>
</table>
There were significant differences in the out-of-pocket payment of contraceptives expenditures among different sex, age of first marriage, education attainment, parity, contraception methods, and type of insurance. Men tended to experience OOP higher than women. A similar pattern was observed for the age of first marriage, but with a minor difference. People who already got married under 21 years old were less likely to experience OOP. The data depicts that people with a higher education level tended to get OOP than lower educated ones. People who had more than two children were less likely to undergo OOP. It was unsurprisingly that short-acting method users tend to experience OOP than LARC users. This research also revealed that the public-subsidized insurance member was less likely to suffer from contraceptive services OOP.

Health insurance ownership status was one of the main factors that need to be considered in the OOP of FP services. OOP occurrence in FP acceptors who were participants of health insurance was a form of inefficiency in the health financing system. Besides, the modern method mix among married also hypothetically related to the OOP of FP services. Therefore, a multivariable analysis was conducted by considering other variables to get the adjusted odds ratio (OR) and the best model.

Model 1 shows the OR of OOP of FP services based on sociodemographic characteristics. Only parity was significantly associated with the OOP of FP services. The respondent who had three or more children was less likely to undergo OOP for FP services than with 0-1 child (AOR = 0.47; 95% CI = 0.31-0.72). Nevertheless, in the full model, this predictor was no longer statistically significant. A similar pattern was observed for working status. In model 1, there was no significant association between working status with OOP occurrence. However, in the full model, the formal sector was less likely to experience OOP than the housewife (AOR = 0.59; 95% CI = 0.37-0.94) (See Table 2).

Table 2. Structural Model and Odds Ratio of Factors Related to Out-of-Pocket Expenditures for Contraception Services in Sleman Regency, 2016

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Model 1 AOR [95% CI]</th>
<th>Model 2 AOR [95% CI]</th>
<th>Full Model AOR [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>0.51* [0.28 - 0.96]</td>
<td>1.01 [0.52 - 1.98]</td>
<td></td>
</tr>
<tr>
<td>Age Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-34</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>35-49</td>
<td>1.20 [0.87 - 1.65]</td>
<td>1.18 [0.84 - 1.67]</td>
<td></td>
</tr>
<tr>
<td>Age of First Marriage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 21</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>21+</td>
<td>0.97 [0.71 - 1.31]</td>
<td>0.99 [0.71 - 1.38]</td>
<td></td>
</tr>
<tr>
<td>Education Attainment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/Never Attended</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Secondary-1</td>
<td>1.10 [0.72 - 1.69]</td>
<td>1.15 [0.72 - 1.85]</td>
<td></td>
</tr>
<tr>
<td>Secondary-2</td>
<td>1.46 [0.98 - 2.17]</td>
<td>1.38 [0.89 - 2.16]</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>1.66 [0.98 - 2.80]</td>
<td>1.75 [0.95 - 3.21]</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 Child</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2 Children</td>
<td>0.76 [0.52 - 1.10]</td>
<td>0.85 [0.57 - 1.27]</td>
<td></td>
</tr>
<tr>
<td>3+ Children</td>
<td>0.47** [0.31 - 0.72]</td>
<td>0.66 [0.41 - 1.05]</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Structural Model and Odds Ratio of Factors Related to Out-of-Pocket Expenditures for Contraception Services in Sleman Regency, 2016

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Full Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AOR [95% CI]</td>
<td>AOR [95% CI]</td>
<td>AOR [95% CI]</td>
</tr>
<tr>
<td>Working Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal Sectors</td>
<td>0.93 [0.62 - 1.39]</td>
<td></td>
<td>0.59* [0.37 - 0.94]</td>
</tr>
<tr>
<td>Informal Sectors</td>
<td>0.95 [0.71 - 1.28]</td>
<td></td>
<td>0.90 [0.65 - 1.25]</td>
</tr>
<tr>
<td>Classification of Modern Methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LARC-Sterilization</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Insurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public-Subsidized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public-Non-Subsidized</td>
<td>3.12** [2.25 - 4.30]</td>
<td>3.10** [2.12 - 4.53]</td>
<td></td>
</tr>
<tr>
<td>Private Insurance</td>
<td>3.47** [1.60 - 7.52]</td>
<td>3.42** [1.51 - 7.71]</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1237</td>
<td>1237</td>
<td>1237</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.029</td>
<td>0.150</td>
<td>0.158</td>
</tr>
<tr>
<td>AIC</td>
<td>1413.5</td>
<td>1225.3</td>
<td>1234.4</td>
</tr>
<tr>
<td>BIC</td>
<td>1469.9</td>
<td>1245.8</td>
<td>1306.1</td>
</tr>
</tbody>
</table>

AOR: Adjusted Odds Ratio; AIC: Akaike’s Information Criterion; BIC: Bayesian Information Criterion

Exponentiated coefficients; 95% confidence intervals in brackets; * p<0.05, ** p<0.01

The best model resulting from the multivariable analysis was the second model with the lower Akaike information criterion (AIC) and the Bayesian information criterion (BIC). Both in model 2 and the full model, types of modern method and health insurance owned were statistically associated with OOP of FP services. The short-acting methods users were more likely to experience OOP than LARC users (AOR = 6.38; 95%CI = 4.79-8.50). The public-non-subsidized insurance member and private insurance were more likely to suffer from OOP of contraceptive services than public-subsidized members (AOR = 3.12; 95% CI = 2.25-4.30 and AOR = 3.47; 95% CI = 1.60-7.52, respectively)(See Table 2).

The contract system between the Indonesian health insurance implementing agency (BPJS Kesehatan) and all public health centers using a non-capitation scheme should reduce OOP\textsuperscript{15,16}, but the results of this study show different things. Findings in this study display a considerable percentage of respondents reporting that they paid for contraceptive services in the UHC scheme. The prior study stated that nearly two-thirds of Indonesia expenditure on the FP program comes from user expenses.PMA2020 data also showed that more than half of government FP providers charged FP services in various levels of services\textsuperscript{17}. It seems a sign that the Indonesia FP program strategy to provide free contraceptives through the NHIs scheme is still erroneous.

There was a lack of comprehensive data to estimate OOP expenditure on reproductive health, including FP services. While FP services were intended to be free within the public health system, a study by\textsuperscript{18} indicated that only one-half of modern method users reported obtaining their free methods. A study in Burkina Faso also mentioned that reproductive health, including FP through the public health center, is paid\textsuperscript{19}. PMA2020 examined that more than 70% of women paid for FP services, even though 60% of women receive their...
service from a public facility, where FP is supposed to be free. It suggested that OOP expenditure of FP services is ubiquitous\(^ {20}\). This situation should be a challenge to advocate for the local government to increase the fund allocation for FP and scale-up insurance coverage based on the community level\(^ {17,19}\).

It is interesting to note that OOP on FP services resulting from this study is significantly associated with health insurance ownership (public-subsidized compared to public non-subsidized and private insurances) and contraception types (LARC compared to short-acting methods). This finding has a similarity and contrast with the prior research about OOP determinants in several countries\(^ {18,19,21–23}\). In the Indonesian UHC system, socioeconomic characteristics were determined by health insurance ownerships, wherein public-subsidized refers to lower-income groups, and non-subsidized and private insurance refer to wealthier segments. Even though some countries reported no significant differences by wealth quintile in the odds of obtaining free contraception\(^ {18}\), the results of this study indicate that non-subsidized and private insurance were significantly associated with the out-of-pocket payment for contraceptive services.

The finding was consistent with studies conducted by Finer, Sonfield, & Jones, which stated that out-of-pocket costs among privately insured women occurred for at least some methods of contraception—including oral contraceptives, the most popular reversible method in the United States\(^ {23}\). This study also supports evidence from previous observations that the OOP of health expenditure, in general, has a significant association with socioeconomic status in Bangladesh. The OOP on health services is higher among the wealthiest people\(^ {21}\). A similar pattern was also reported in India; the OOP was positively associated with the wealthiest quintile, suggesting that the burden was higher among those who could pay more\(^ {22}\). This result indicates that NHI insurance coverage may be more critical for FP use among the poor than the rich as early as mentioned by Teplitskaya, Ross, and Arin\(^ {6}\).

A desirable explanation for this might be that it was a higher use of short-acting methods in Indonesia among poor and rich segment\(^ {6}\), as significantly proven by this study results. It was typical that using short-acting methods, particularly in LMICs, includes ease of access, privacy, freedom to discontinue use without involving a health provider, and lower cost\(^ {24}\). In Indonesia, the average short-acting method OOP is approximately 1.47 USD\(^ {6}\). These results corroborate the findings of previous work in several countries. In Kenya, users of implants and IUDs were more likely to report receiving their method for free than injectable users, who reported an average OOP payment of approximately 0.91 USD\(^ {18}\).

Previous studies in several LMICs have proven that the OOP of modern contraceptives mostly happened in private health services compared to government service\(^ {22}\). Indonesian Ministry of Health indicates that there are an estimated 163,541 midwives in Indonesia who lead private clinics. These practitioners are not adequately incentivized to practice in rural areas, preferring to practice in urban areas for nonfinancial and financial reasons\(^ {25}\). These issues are particularly tricky, given that many people continue to access FP services through private sector midwives and pay out-of-pocket for the services.

It could also be because of the broad range of FP methods included within the NHI benefits package, but both providers and clients strive to understand what is covered. Because of these confinements, FP is apportioned at the point of delivery, and out-of-pocket expenditure persists. Besides, not all FP methods are created equal. For example, the positioning of short-acting methods as “user-controlled commodities” will reduce the need for clients to interact with a health provider. Out-of-pocket payments are likely to continue to overwhelm this category of methods\(^ {19}\).

Nonetheless, the findings do not explain how much users expense the OOP, including the actual cost associated with commodity, consultation, and transport to access FP services. We could also not examine the share of OOP expenditures for FP services from total household income to analyze FP services individual/household burden. In the future study, it might be possible to use a different approach and datasets to answer the mentioned limitations.

**Conclusions**

Health insurance should improve the uptake of affordable FP services by reducing costs at the service point for users. Nevertheless, more than half of FP
acceptors in the Sleman Regency should pay to get their FP services. Even though the poor segment is less likely to experience OOP expenditures than the wealthiest, OOP in FP services should be reduced to a minimum in all socioeconomic classes and health insurance membership segments. A more considerable effort is also needed to ensure that all modern methods are provided free in the UHC system.

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**Conflict of Interest:** The author declared that all authors had approved the manuscript, and there were no conflicts of interest associated with the material presented in this paper.

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Model of Nursing Group Intervention based on Interpersonal Human Caring (IHC) Toward Psychological Needs of the Adolescent in the Orphanage

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Abstract

Introduction. Live at the Orphanage with various facility limitations requires teenagers to develop according to the situation. The facts that exist in the Orphanage, orientation of meeting the youth group’s needs are physical needs. Purpose. The study aimed to develop an interpersonal human caring (IHC)-based group nursing intervention model on adolescents’ psychological needs in the Orphanage. The contribution of this research is to increase the psychological needs of adolescents so that adolescents are confident in carrying out activities even at the orphanage. Method. The method used is observational analytic. The sample is some teenagers who live in orphanages in Surabaya City and Sidoarjo Regency, taken by random cluster sampling, totaling 260 people. Research variables include predisposing factors and values of care, supporting aspects and environmental caring, driving factors, interpersonal behavior of adolescents’ human caring, and psychological needs. Phase 2 research with the quasi-experimental method for model testing. The samples were some of the teenagers who lived in one of the orphanages in Surabaya and Sidoarjo, amounting to 32 people taken by simple random sampling. The instrument uses a questionnaire. Data analysis used descriptive analysis and model testing with Partial Least Square (PLS) software. Results and Discuss. The first stage of the study found that all indicators of the variables can explain the construct variables (T>1.96). Path diagram analysis of all exogenous variables influences psychological needs. The second phase of paired t-test testing found differences in psychological needs before and after the trial model. Model of Nursing Group Intervention based on interpersonal human caring (IHC) can be used to support physical needs for teenagers in the Orphanage (p<0.05). Every In the Orphanage needs added a Psychology as a consultant. Conclusion. The new scientific findings from this study were the formation of IHC-based group intervention models. This model can fulfill psychological needs in adolescents at the Orphanage. The conclusion that predisposing factors and values of care, supporting elements and caring environment, and driving factors are essential factors that can influence human affectionate interpersonal behavior. Implication. This behavior can improve the fulfillment of the psychological needs of adolescents in the Orphanage.

Keywords: model, intervention, care, adolescence, psychological needs.

Introduction

Life in an orphanage with limited facilities requires children to develop by the existing situation. Children in a physical, psychological, and social development phase need conducive environmental conditions and possible means. In the orphanage, the orientation of meeting the needs of the children of the orphanage, including the youth group, is physical needs. This can be seen in the donors’ donations on average in the form of money and nine staples (groceries). This condition does not yet support the psychological needs of the residents of the
The development of the adolescent group’s personality has a special meaning because the teenager is not a child but also not an adult, so it needs special attention, especially on their psychological needs. Fulfilling psychological needs is just as important as meeting physiological needs. Physiological needs that are not fulfilled, such as eating, drinking result in people getting sick. Likewise, when psychological needs are not met, it will result in feelings of dissatisfaction, frustration, and inhibition of growth and development of positive attitudes towards the community and itself, so that they feel insignificant in their lives.

Adolescents who live in orphanages are the target for nurses’ performance in implementing nursing care at the group level. In this case, nurses have the responsibility to meet adolescents’ needs, including their psychological needs. Komara, in 2016 explained that self-confidence is positively related to adolescent learning achievement. The better the self-confidence, the better learning achievement. Research by Komang et al. (2014) explains a relationship between academic self-concept and achievement motivation. Social support is related to adjustment to adolescents in the orphanage. There was a relationship between self-concept and the meaning of life for adolescents in the orphanage. Previous research results were not found on the psychological needs of adolescents in orphanages or other topics related to adolescents in the orphanage. Novelty, this study will develop a model of nursing care for youth groups in an orphanage to fulfill psychological needs by integrating behavior theory (Lawrence Green), Caring’s theory (Jean Watson), and psychogenic needs theory (Murray). Research from Suryo in 2010 explains that the orphanage managers’ behavior is influenced by knowledge, experience, competence, costs, and facilities. Ministry of Social Affairs Republic of Indonesia (2011) explained that the results of research that was carried out in six provinces in Indonesia showed that the management of the orphanage did not have adequate knowledge about the situation of children who should be cared for in an orphanage, and care that should ideally be accepted by children. Childcare Social Institutions function more as an institution that provides access to education for children rather than as a last alternative institution for childcare that cannot be cared for by their parents or family.

The second theory that is integrated is the caring theory. Caring is defined as a deliberate act that brings a sense of security both physically and emotionally and a sincere attachment to another person or group of people. Caring can also be interpreted as a nurse’s care for clients in providing nursing care by providing support to clients, communicating well, and taking nursing actions as needed. Caring needs to be done at the orphanage by the manager for all orphanage residents so that the function of the orphanage as a substitute for parental care can be realized to meet the needs of adolescents in the orphanage. The caring theory will be integrated with interaction theory by implementing interpersonal communication. This communication will result in transactions between two or more people so that a transaction will occur. Caring’s theory is integrated with King’s theory of interaction because in providing nursing action, communication is needed so that the goal of fulfilling psychological needs can be achieved.

The results showed 6 (six) indicators of psychological well-being, namely autonomy, environmental control, personal growth, positive relationships with others, life goals, and self-acceptance. Murray explained that psychogenic needs consist of humility, affiliation, aggression, autonomy, improving the situation, self-defense, respect, domination, self-assertion, avoiding danger, avoiding humiliation, nurturing attitude, order, play, rejection, compassion, sexual needs, and understanding needs. Psychological needs in this study refer to Murray’s psychogenic needs, but they are also tailored to adolescents’ needs, especially those who live in orphanages.

The nursing care model that was built will encourage the fulfillment of their psychological needs in adolescents. This condition will impact personality maturity, a positive attitude towards the environment, and a spirit of independence. Adolescents who have met their psychological needs will become qualified young people for the Indonesian nation’s development. This study aims to develop a group nursing intervention model based on interpersonal human caring (IHC) on the psychological needs of adolescents in the orphanage.
**Method**

The first phase of research used an observational analytic method to describe the influence between variables, mainly the variable that affects the fulfillment of psychological needs in orphanage adolescents. The first phase’s design was cross-sectional, with the orphanage adolescents among Surabaya City (29 Orphanage) and Sidoarjo Regency (11 Orphanage) as a population. It counts around 620 adolescents by determining the sample size (rule of thumb) of 260 adolescents. The sampling methods used probability sampling. The sample selection is not based on the researcher’s wishes, so that every member of the population has the same opportunity to be selected as a sample. This first stage of research used random cluster sampling. The samples were determined by randomly selecting orphanages in each of the North, West, East, South, and Central Surabaya areas and the Sidoarjo region, so that 14 (fourteen) orphanages were assigned, 9 (nine) orphanages in the city of Surabaya and 5 (Five) Orphanages in Sidoarjo Regency.

The method of processing the data that has been obtained is by doing: 1) editing, namely checking the completeness, consistency, and suitability of the data that has been obtained; 2) coding to classify answers based on certain codes; 3) data entry, a list of questions that have been completed with the coding of answers, then processed by a computer so that it is ready for analysis; 4) cleaning, data cleaning if there is an error during data entry.

Data analysis was done descriptively and inferential. Descriptive data analysis was used to identify the factors that influence caring behavior in the orphanage. This descriptive analysis is carried out by creating a frequency distribution table and calculating the frequency or number and percentage of the measured aspects. The inferential analysis is used to test the empirical model and hypotheses proposed in this study.

This study’s data collection tool was a questionnaire developed from research variables using a Likert scale. Each sub variable consists of five statements with the choice of answers strongly agree (SS), agree (S), disagree (TS), and strongly disagree (STS). The results of the research questionnaire validity test showed that all the question items were valid. The results of the questionnaire reliability test showed that all questionnaires were reliable with a value > 0.7.

The analysis technique used is a structural equation model (Structural Equation Modeling-SEM) based on variance or component-based SEM, known as Smart Partial Least Square version 2.0 (Smart PLS, 2.0). Explanatory research used as the second phase in quasi-experimental design aimed to explain the group nursing care model to fulfill adolescents’ psychological needs in an orphanage. This phase is used to assess the psychological fulfillment before model simulation (pretest) then evaluate it after simulation (post-test). This design was used without a control group with paired t-test as statistical analysis.

The second stage uses explanatory research that aims to describe the model of group nursing care to meet adolescents’ psychological needs in the orphanage. The second stage of research was Quasy experimental. The second stage is to simulate the nursing care model in the group. Simulations are carried out after the modules are structured, and the caregivers/managers of the orphanage have been given training on simulated models. The samples in the second phase of research were adolescents who lived in orphanages where the caregivers had attended training, namely the Khadijah 2 Orphanage Surabaya and the Al-Muttahidin Orphanage in Sidoarjo. Sampling using probability sampling techniques. The number of samples is 32 people.

The simulation results are used to assess the psychological needs of adolescents in the orphanage. The orphanage selected for the simulation has assessed the fulfillment of psychological needs first (pretest), and after that, a re-evaluation (post-test) was carried out. The designs used were pretest and post-test designs without a control group. Ethical clearance this study from the Research Ethics Commission of Politeknik Kesehatan Kemenkes Surabaya No. 183/5 / KEPK / VI / 2018.

**Results and Discussion**

**Results of the first phase**

The description of the characteristics of adolescents living in the orphanage is as follows.
Table 1. Table of Distribution of Characteristics of Adolescents in Orphanages in Interpersonal Human Caring-based Group Nursing Intervention Modeling of Adolescents’ Psychological Needs in Orphanages.

<table>
<thead>
<tr>
<th>No</th>
<th>Characteristic</th>
<th>Account</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 10-14 year</td>
<td>101</td>
<td>38,8</td>
</tr>
<tr>
<td></td>
<td>b. 15-17 year</td>
<td>100</td>
<td>38,5</td>
</tr>
<tr>
<td></td>
<td>c. &gt; 17 year</td>
<td>59</td>
<td>22,7</td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Male</td>
<td>119</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>b. Female</td>
<td>141</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. SD</td>
<td>18</td>
<td>6,9</td>
</tr>
<tr>
<td></td>
<td>b. SMP</td>
<td>106</td>
<td>40,8</td>
</tr>
<tr>
<td></td>
<td>c. SMU</td>
<td>105</td>
<td>40,4</td>
</tr>
<tr>
<td></td>
<td>d. PT</td>
<td>31</td>
<td>11,9</td>
</tr>
<tr>
<td>4</td>
<td>Length of stay at the orphanage &lt; 1 Tahun</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. 1 - 5 year</td>
<td>7</td>
<td>2,7</td>
</tr>
<tr>
<td></td>
<td>b. 6 - 10 year</td>
<td>163</td>
<td>62,7</td>
</tr>
<tr>
<td></td>
<td>c. 11-16 year</td>
<td>74</td>
<td>28,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td>6,1</td>
</tr>
<tr>
<td>5</td>
<td>Etnic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Jawa</td>
<td>228</td>
<td>87,7</td>
</tr>
<tr>
<td></td>
<td>b. Madura</td>
<td>22</td>
<td>8,5</td>
</tr>
<tr>
<td></td>
<td>c. others</td>
<td>10</td>
<td>3,8</td>
</tr>
</tbody>
</table>

Based on table 1, the adolescent age group in this research between early and middle adolescents has almost the same percentage. Most of the total adolescents are female (54%). Adolescents who attend junior and senior high schools have almost the same percentage. Most of the length of stay in the orphanage is between 1-5 years (62.7%). Most of the adolescents are Javanese (87.7%).

Dimension of Predisposing Factors and Value of Care (X1) and Human Caring Interpersonal Factors (X4)

The predisposing factors and the value of care are constructed by 3 (three) indicators, namely the attitude of the orphanage manager (X1.1), the motivation of the orphanage (X1.2), and the commitment of the orphanage manager X1.3). The results can be seen in the table below:

Table 2. Distribution of Frequency Predispositions and Values of Care (X1) and Human Caring Interpersonal Human Caring-based Group Nursing Intervention Modeling of Adolescents’ Psychological Needs in Orphanages.
Table 2 explains that the management commitment indicator has the largest percentage of the under category (3.8%) among the other indicators. The indicator of health education has the highest percentage (37.7%) in the low category.

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>Enough</td>
</tr>
<tr>
<td>1.</td>
<td>The attitude of the orphanage administrator</td>
<td>139</td>
<td>53.5</td>
</tr>
<tr>
<td>2.</td>
<td>Motivation of the orphanage administrators</td>
<td>85</td>
<td>32.7</td>
</tr>
<tr>
<td>3.</td>
<td>Commitment of the orphanage management</td>
<td>151</td>
<td>58.1</td>
</tr>
</tbody>
</table>

Human Caring Interpersonal Factors (X4)

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Interpersonal communication</td>
<td>260</td>
</tr>
<tr>
<td>5.</td>
<td>Group health education</td>
<td>260</td>
</tr>
<tr>
<td>6.</td>
<td>The act of parenting</td>
<td>260</td>
</tr>
<tr>
<td>7.</td>
<td>Actions for improve taste confidence</td>
<td>260</td>
</tr>
</tbody>
</table>

Supporting Factors and Caring Environment (X2), and driving factor (X3)

Supporting factors and caring environment (X2) is constructed by four indicators, namely learning facilities (X2.1), socialization facilities (X2.2), counseling facilities (X2.3), and opportunities to develop achievement (X2.4). Human Caring Interpersonal Factors (X4) is constructed by three indicators, namely interpersonal communication (X4.1), group health education (X4.2), parenting actions (X4.3), and actions to increase self-confidence (X4.4). The results can be seen in the table below:
Table 3. Frequency Distribution of Supporting Factors and Caring Environment, and driving factor (X3) in Interpersonal Human Caring-based Group Nursing Intervention Modeling of Adolescents’ Psychological Needs in Orphanages.

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>Less</td>
</tr>
<tr>
<td></td>
<td>Supporting Factors and Caring Environment (X2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Learning facilities</td>
<td>140</td>
<td>53,8</td>
</tr>
<tr>
<td>2.</td>
<td>Socialization facilities</td>
<td>184</td>
<td>70,8</td>
</tr>
<tr>
<td>3.</td>
<td>Counseling facilities</td>
<td>100</td>
<td>38,5</td>
</tr>
<tr>
<td>4.</td>
<td>Opportunity to develop achievements</td>
<td>73</td>
<td>28,1</td>
</tr>
<tr>
<td></td>
<td>Driving factor (X3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Orphanage management system</td>
<td>236</td>
<td>90,8</td>
</tr>
<tr>
<td>6.</td>
<td>Family support</td>
<td>183</td>
<td>70,4</td>
</tr>
<tr>
<td>7.</td>
<td>Community support</td>
<td>147</td>
<td>56,5</td>
</tr>
</tbody>
</table>

Table 3 explains that the indicator of the opportunity to develop achievement has the smallest percentage (28.1%) in the good category. The driving factor (X3) is constructed by three indicators, namely the orphanage management system (X3.1), family support (X3.2), and community support (X3.3). The community support indicator has the greatest percentage in the lower category (43.5%).

Fulfillment factor for adolescent psychological needs is constructed by Need of achievement (Y.1.1), Need of Affiliation (Y.1.2), Need of Autonomy (Y.1.3), Need of Counteraction (Improve the situation) (Y.1.4), Need of Defendants (Y.1.5), Need of Deference (Y.1.6), Need of Order (Y.1.7), Need of Understanding (Understanding) (Y.1.8). The research results can be seen in the table below:

Fulfilling the Psychological Needs of Youth in an Orphanage (Y)


<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>Enough</td>
</tr>
<tr>
<td>1.</td>
<td>Need of achievement</td>
<td>59</td>
<td>22,7</td>
</tr>
<tr>
<td>2.</td>
<td>Need of Affiliation</td>
<td>66</td>
<td>25,4</td>
</tr>
<tr>
<td>3.</td>
<td>Need of Autonomy</td>
<td>117</td>
<td>45</td>
</tr>
<tr>
<td>4.</td>
<td>Need of Counteraction</td>
<td>131</td>
<td>50,4</td>
</tr>
<tr>
<td>5.</td>
<td>Need of Defendance</td>
<td>68</td>
<td>26,2</td>
</tr>
<tr>
<td>6.</td>
<td>Need of Deference</td>
<td>115</td>
<td>44,2</td>
</tr>
<tr>
<td>7.</td>
<td>Need of Order</td>
<td>156</td>
<td>60</td>
</tr>
<tr>
<td>8.</td>
<td>Need of Understanding</td>
<td>111</td>
<td>42,7</td>
</tr>
</tbody>
</table>
Evaluation of measurement model (outer model)

![T-Statistical Path Diagram](image)

**Figure 1. T-Statistical Path Diagram**

Based on figure 1 above, it can be seen that some variables have a loading factor value of less than 0.7. Still, because the T-statistic value is more than 1.96, the construct variables in the latent that are reflected do not have to be eliminated on the existing variables.

Evaluation of Structural Model (Inner Model)

![Structural Equation Path Diagram](image)

**Figure 2. Structural Equation Path Diagram SEM Partial Least Square Against Indicators on Each Latent Variable in Interpersonal Human Caring-based Group Nursing Intervention Modeling of Adolescent Psychological Needs in Orphanages.**
The results of the significance test of exogenous variables on endogenous variables are described in table 5.

### Table 5. of Significance Analysis on Structural Model (Inner Model)

| Path                                      | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) | P Values | Result   |
|-------------------------------------------|---------------------|-----------------|-----------------------------|-----------------|----------|----------|
| X1 Predisposing factors and values of care -> X4 IHC Behavior | 0.157               | 0.165           | 0.048                       | 3.259           | 0.001    | Significant |
| X2 Supporting factors and caring environment -> X4 interpersonal human caring behaviors | 0.362               | 0.363           | 0.063                       | 5.719           | 0.000    | Significant |
| X3 Driving factors -> X4 IHC behaviors    | 0.135               | 0.140           | 0.059                       | 2.299           | 0.022    | Significant |
| X4 Interpersonal human caring (IHC)behavior -> Y adolescent psychological needs | 0.712               | 0.719           | 0.023                       | 30.472          | 0.000    | Significant |

Structural Equation Modeling test results with Partial Least Square based on the value of $R^2$ note that the model of construct had a value with the model criteria according to Chin, 1998. The moderate strength model on the latent construct in each construct was a latent construct strong enough to describe the structural model concept.

#### The goodness of Fit (GoF)

Based on the GoF value of 0.473, which that value was high and powerful, it might be noticed that the prediction model in this research is powerful in explaining the variables, or the significance of the variable effect is great/strong.\(^5\)

### Results of the second phase

The second stage of the study results were the trials of the Interpersonal Human Caring model on psychological fulfillment in adolescents in the orphanage.

### Table 6. Psychological Needs Frequency Distribution between before and after of Model of Nursing Group Intervention Simulation based on Interpersonal Human Caring to Adolescent Psychological Needs in the Orphanage

<table>
<thead>
<tr>
<th>No.</th>
<th>Indikator</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>1. Pre test</td>
<td>Need of achievement</td>
<td>8 (25%)</td>
</tr>
<tr>
<td></td>
<td>Need of Affiliation</td>
<td>15 (46,9%)</td>
</tr>
<tr>
<td></td>
<td>Need of Autonomy</td>
<td>15 (46,9%)</td>
</tr>
<tr>
<td></td>
<td>Need of Counteraction</td>
<td>21 (65,6%)</td>
</tr>
<tr>
<td></td>
<td>Need of Defendance</td>
<td>5 (15,6%)</td>
</tr>
<tr>
<td></td>
<td>Need of Deference</td>
<td>18 (56,2%)</td>
</tr>
<tr>
<td></td>
<td>Need of Order</td>
<td>23 (71,9%)</td>
</tr>
<tr>
<td></td>
<td>Need of Understanding</td>
<td>8 (25%)</td>
</tr>
</tbody>
</table>
Table 6. Psychological Needs Frequency Distribution between before and after of Model of Nursing Group Intervention Simulation based on Interpersonal Human Caring to Adolescent Psychological Needs in the Orphanage

<table>
<thead>
<tr>
<th>Need of achievement</th>
<th>13 (40.6%)</th>
<th>16 (50%)</th>
<th>3 (9.4%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need of Affiliation</td>
<td>21 (65.6%)</td>
<td>11 (34.4%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Autonomy</td>
<td>25 (78.1%)</td>
<td>7 (21.9%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Counteraction</td>
<td>27 (84.4%)</td>
<td>5 (15.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Defendance</td>
<td>18 (56.2%)</td>
<td>14 (43.8%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Deference</td>
<td>28 (87.5%)</td>
<td>4 (1.25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Order</td>
<td>27 (84.4%)</td>
<td>5 (15.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Need of Understanding</td>
<td>32 (100%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

**Statistical analysis result of the second phase**

This research has shown that a minority of the Orphanage Caregivers were low if viewed by the orphans from attitude, motivation, and commitment. The discussion with the caregiver somewhere causes anger or resentment.

Similar results stated by Ferris, K. in 1981 explained a relationship between commitment and individual performance. Based on the affective commitment dimension, the Orphanage Caregivers who love the profession resulted in the responsibility to do their work properly. The commitment may affect the organization’s performance. Commitment is the crucial construct to retain trusted employees, knowledge, and the organization’s performance. The Orphanage Caregiver who comprehended the orphanage’s vision might intend to do their job as well as possible to nurture and care for the orphans.

The result of statistical revealed p = 0.008, which means there is a difference between adolescents’ psychological needs before and after Model of Nursing Group Intervention Simulation based on interpersonal human caring (IHC).

**Discussion**

The interpersonal human caring-based group’s application, the nursing intervention model, affects adolescents’ psychological needs in the orphanage. The psychological needs of adolescents in this study refer to Murray’s theory, which is adapted to the psychological development of adolescents, consisting of the need for achievement, need of affiliation, need of autonomy, need of Counteraction (Improving the situation), need of defense, need of Deference (attitude of respect), need of order, and need of understanding. This psychological need is by the results of research by Van Dierendonck et al. in 2008, which explains that 6 (six) psychological well-being, namely autonomy, environmental control, personal growth, positive relationships with others, life goals, and self-acceptance11.

The results of the research on the need for achievement were obtained from 260 adolescents as respondents, 120 people (46.2%) of whom had sufficient psychological needs, 55 people (22.7%) were good, and 81 people (31.2%) were in the poor category. Based on the questionnaire data analysis, most of the adolescents had not been included in the competition according to their talents; most of them answered “sometimes” they were allowed to get special guidance and facilities to hone their talents. This fact is consistent with Komang Dyah L. and Putu N.’s research in 2014, explaining a relationship between academic self-concept and achievement motivation. Youth in the orphanage are required to be able to adapt to facing a much competitive life. The success that is carved by adolescents or the failure that occurs when adolescents try to achieve can be a predictor of success as an adult.

The research results on the psychological needs of affiliation found that most (60.8%) were sufficient, 25.4% were good, and 13.8% were less. This need for collaboration is the need to socialize with friends and the
environment. The results of the analysis of adolescent answers to the questionnaire found that caregivers/administrators were still not optimal in facilitating adolescents to be involved in community organizations and providing facilities to access social media. Teens generally want to socialize with peers either directly or through social media. The results of this study reinforce the statement of Greca’s research results. The social development of adolescents needs to be understood by parents and caregivers/administrators of the orphanage and those who serve as adolescent educators because the social development of adolescents has an important effect on adolescents’ personality development and learning achievement.

The research results on the autonomy needs of adolescents found that 48.5% were sufficient, 45% were good, and 6.5% were in the poor category. The need for autonomy is a need for adolescents to be free to choose what actions to take. Van Dierendonck et al. in 2008 stated that autonomy is an indicator of psychological well-being in adolescents. Bartholemew et al. in 2011 explained that autonomy support affects need satisfaction. Personal autonomy is a predictor of psychological satisfaction for adolescents. Autonomy (autonomy), is the need for a person to freely integrate actions carried out with oneself without being bound or controlled by others. Steinberg in Ali M & Asrori in 2018 distinguishes the characteristics of independence into three forms, namely: a) Emotional autonomy, which is an aspect of independence that states changes in the closeness of emotional relationships between individuals, such as emotional relationships between individuals, such as emotional relationships of students. With teachers or their parents. b) Behavioral autonomy, which is the ability to make decisions without depending on others and do them responsibly. c) Value autonomy, namely the ability to interpret a set of principles about right and wrong, about what is important and what is not. Factors such as rewards (rewards) or threats can reduce the need for an individual to be fully autonomous in his actions. Conditions such as being free to make choices or knowing the individual’s feelings can increase satisfaction with the need for autonomy.

The need for Counteraction (Improving the situation) in this study is defined as the need for adolescents to improve failure, suppress feelings of fear, and maintain self-esteem.

The questionnaire data analysis results of the orphanage administrators/caregivers have reconciled teenagers when fighting with other teenagers. Administrators/caregivers have also made it a habit to deliberate with adolescents before making decisions to increase youth self-esteem. Healthy youth self-esteem must be maintained in their immediate environment, such as an orphanage. Positive relationships with their friends will reinforce their sense of value to others.

The research results on self-defense need were mostly (65%) in the moderate category, 26.2% in the good category, and 8.8% in the poor category. Defendants’ need (Self-defense) in this study is to defend themselves against attacks, criticism, and reproach. The results of data analysis from the list of questions given to adolescents found that caregivers sometimes provided the opportunity to reason/argue when adolescents were found guilty. The needs of adolescents in self-defense will be fulfilled when adolescents are given freedom of speech, freedom to take action as long as they do not harm others, freedom to explore the environment, justice, honesty, and fairness.

The research results on the psychological need for respect were 48.5% in the sufficient category, 44.2% in the good category, and 7.3% in the poor category. The need for Deference (respect attitude) in this study is to respect and happily submit to the influence of others who are known. The questionnaire data analysis results showed that adolescents had given greetings, did not speak louder, and were reluctant to care for the orphanage caregivers/administrators. Respect in acting, speaking, and how to treat other people’s belongings is a form of respect for others. The research results on the discipline component’s psychological needs found that most (60%) were in a good category. The need of Order (Order) in this study is defined as adolescents’ need to organize things, maintain cleanliness and order. The results of data analysis through adolescents’ answers on the questionnaire given that most teenagers have arranged their belongings, rarely borrow belongings from friends without permission. However, teenagers
are still not used to carrying out activities with a plan. Factors that influence discipline/discipline come from the school environment and the environment. The school environment consists of the type of authoritarian teacher or school leadership who always dictates his will without paying attention to adolescents, making aggressive adolescents want to rebel against the restraints and inhuman treatment they receive so that orderly behavior does not appear.

The research results on psychological needs on the understanding component showed that most of the data (52.3%) were insufficient categories. The analysis results on the answers of adolescents on the questionnaire already understood the condition of the orphanage. However, there were still many adolescents who were considered less mature by their caregivers. The need for Understanding (Understanding) in this study is to ask or answer general questions related to the situation of the orphanage. This understanding is an advanced condition of adolescent knowledge about various things that exist in the orphanage. This understanding is needed so that adolescents have high self-acceptance of the existence of the orphanage. Self-acceptance will support the fulfillment of psychological needs, which impact the formation of a strong personality to live life and achieve goals.

The application of this group, the nursing intervention model, is proven to meet adolescents’ psychological needs in the orphanage. Quantitatively, the H0 statistical test results are rejected, meaning that there are differences in psychological needs before and after the HIC-based group nursing intervention model is applied. Interviews with adolescents reinforced these test results at the orphanage, already feeling confident, willing to participate in community organization activities close to the orphanage, participating in mosque youth activities. Model simulation is carried out with assistance to the orphanage caregivers. The simulation is carried out for 2 (two weeks). Activities carried out by examining what teenagers feel while in the orphanage, their hopes, and aspirations, learning to identify the weaknesses and strengths that exist in each teenager, their talents, and the orphanage’s proposed activities according to their talents. Teens are also provided with actions that can increase their self-confidence and reinforce positive behavior. Researchers also coordinate with the chairman of the Orphanage Communication Forum so that teenagers participate in the activities of the Youth Organization, Youth Mosque or other organizations. Van Dierendonck et al. (2008) explained that environmental control by controlling activities with the environment is one of the psychological indicators for adolescents in the orphanage.

The Model of Nursing Group Intervention application has been proven to fulfill adolescents’ psychological needs in the Orphanage. Quantitative, statistical resulted in H0 rejected, which means there is a difference between the psychological need before and after Model of Nursing Group Intervention Simulation based on HIC. An interview session strengthened this result with adolescents in the Orphanage. The adolescent expressed a feeling of confidence and willingness to attend community organization activities near the Orphanage, such as mosque youth activities. This simulation was applied for two weeks, accompanied by assistance from caregivers. It’s implemented by assessing what adolescents felt, hope, and ambition learned about identifying their strengths and weaknesses and their talent, which were continued by suggesting adolescents’ activity program based on their talent during a stay in the Orphanage. Various actions and strategies also provide them to enhance the self-confidence and positive behavior strengthening. The researchers have coordinated with the Chief of Communication Forum. Thus, the adolescent participates in various Youth Organization, Mosque Youth, or other organizations. The ability to deal with the environmental situation by controlling activity is an adolescent psychological indicator in the Orphanage.

The limitation of this research to fulfill the Orphans’ psychological needs is the process of Focus Group Discussion (FGD) that unable to perform but might change by the expert discussion. The person adjusts the member according to the plan of FGD. The result of the discussion revealed the appropriate content of research hopes and goals.

This Model of Nursing Group Intervention is recommended, especially for the community nurse who works in the Primary Health Care Services with a working area covering the Orphanage. It’s also recommended to the Head of the Government Social Services of Surabaya City and Sidoarjo Regency as a substance to arrange the
development program for adolescents in the Orphanage. This research proposes that the University with the Psychological Faculty resulted in an intensive counselor contribution for the Orphanage.

**Conclusions**

According to the results, the conclusion of this research was:

Model of Nursing Group Intervention based on Interpersonal Human Caring composed by model component composer consists of predisposing factors and caring values, supporting factors and caring environment, driving factors, and interpersonal human caring behavior. Predisposing factors and caring values are crucial factors to enhance interpersonal human caring behavior. The indicators of predisposing and caring values are attitude, motivation, and commitment of the Orphanage Administrator.

Supporting factors and a caring environment might strengthen the interpersonal human caring behavior. The supporting factors and caring environment are learning, social, counseling, and chance to develop accomplishment. Driving factors might increase interpersonal human caring behavior. The indicators of driving factors are a legal aspect of the Orphanage, family, and community support. Interpersonal human caring behavior is essential for the psychological needs of adolescent orphans. The indicators of interpersonal human caring are interpersonal communication, health education, caring intervention, and action to enhance self-confidence.

Model of Nursing Group intervention based on interpersonal human caring (IHC) can fulfill the adolescent orphans’ psychological needs. This model might enhance attitude, motivation, administrator commitment, driving factors and environmental caring, and interpersonal human caring (IHC) behavior.

**Appreciations**

Gratitude and appreciation for cooperation and support in finishing this research delivered to the orphans who have been willing to become respondents in this research. The Orphanage Administrators and the Head of Orphanage Federation all-around Surabaya City and Sidoarjo Regency. The Government Social Services of Surabaya City and Sidoarjo Regency. Polytechnic of Health, Health Ministry Of Surabaya as funding resource, mainly through the Central Research and Community

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**References**

Factors Related to Dental and Oral Utilization in Indonesia: An Ecological Study

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Abstract

Oral and dental health is an integral part of general health which requires attention. This study was conducted to analyze the ecological factors associated with the proportion of dental and oral utilization in Indonesia. The ecological analysis was conducted using secondary data from the Ministry of Health of the Republic of Indonesia report in 2018. All provinces were taken as samples. Apart from the proportion of dental and oral utilization, 5 other variables analyzed as independent variables were a percentage of 9-year gross enrollment rate, percentage of poor people, the proportion of damaged/cavity/sore teeth, proportion of missing teeth due to extraction/date itself, and ratio of PHC per district. The results show that 4 variables tend to have a positive relationship with the proportion of dental and oral utilization. The four variables were the percentage of 9-year gross enrollment rate, the proportion of damaged/cavity/sore teeth, proportion of missing teeth due to extraction/date itself, and the ratio of PHC per district. On the other side, 1 variable was found to tend to have a negative relationship with the proportion of dental and oral utilization, namely the percentage of poor people. It could be concluded that the five independent variables analyzed tend to have a relationship with the proportion of dental and oral utilization in Indonesia.

Keywords: dental health, oral health, ecological study, dental health services.

Background

According to The Global Burden of Disease Study 2016, dental and oral health problems, especially dental caries, are a disease that affects nearly half of the world’s population (3.58 billion people). Gum disease (periodontal) is the 11th most common disease in the world. Meanwhile, in the Asia Pacific, oral cancer is the 3rd most common type of cancer¹.

Indonesia is a country with a sizeable population. Based on population data for 2018, the total population of Indonesia is 265,377,461 people. Health problems in a country with such a large population, of course, require attention and good health service management². Oral and dental health which is an integral part of public health certainly needs attention. Based on the 2018 Indonesia Basic Health Survey report, 57.6% of Indonesia’s population experiences dental and oral health problems, and of that number, only 10.2% receive treatment or treatment from dental medical personnel³. The most common dental health problem is dental caries, around 45.3%. Meanwhile, the population whose teeth were lost due to being pulled out/self-dated was 19.0%³.

The adequacy standard for dentists in Public Health Centers (PHC) based on the Minister of Health Regulation Number 75 of 2014 is a minimum of one person per PHC. In 2018, nationally there were 42.46% PHCs from a total of 9,825 PHCs with sufficient dentists. Approximately 13.18% of PHC had the number of dentists exceeding the standard, and 44.36% of PHC had a shortage of dentists⁴.

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The government has a Caries-Free Indonesia program in 2030. The Ministry of Health establishes a Dental and Oral Health Committee through the Minister of Health Decree Number 189 of 2019 concerning the Committee for Dental and Oral Health. This committee has the duties of assisting the Ministry of Health in formulating strategic plans and action plans, conducting advocacy with other stakeholders, conducting monitoring and evaluation, and providing recommendations for solving problems related to the implementation of dental and oral health efforts. It takes serious efforts to realize these ideals. For this reason, it is necessary to have an adequate understanding of what factors are related to the utilization of dental and oral health services in Indonesia.

Based on the background description, this study was conducted to analyze the ecological factors associated with the proportion of dental and oral utilization in Indonesia.

**Materials and Methods**

The study was designed using an ecological analysis approach. Ecological studies focus on comparisons between groups, not individuals. The data analyzed is aggregate data at a certain group or level, which in this study is the provincial level. Variables in ecological analysis can be in the form of aggregate measurement, environmental measurement, or global measurement.

This research using report data taken from the 2018 Indonesia Basic Health Survey and the 2018 Indonesia Health Profile which is an official report released by the Indonesian Ministry of Health. Both reports can be downloaded on the page http://www.depkes.go.id. The unit of analysis in this study is the province. A total of 34 provinces in Indonesia were used in the analysis of this study.

The dependent variable in this study was the proportion of dental and oral utilization. Meanwhile, the independent variables analyzed were the percentage of 9-year gross enrollment rate, percentage of poor people, the proportion of damaged/cavity/sore teeth, proportion of missing teeth due to extraction/date itself, and ratio of PHC.

The percentage of dental and oral utilization is the percentage of residents who receive treatment from dental medical personnel. The percentage of the 9-year gross enrollment rate is the percentage of the enrollment rate which is one indicator to measure the school participation rate of the population according to school-age groups or certain levels of education. This study using a 9-year education level. The percentage of poor people is the percentage of the population with a per capita monthly expenditure level less than or below the poverty line.

The proportion of damaged/cavity/sore teeth is the percentage of residents with permanently damaged cavities in the hard surface area of the teeth that develop from small holes to cavities that damage the teeth. The proportion of missing teeth due to extraction/date itself is the percentage of residents with the loss of teeth from the oral cavity intentionally or unintentionally. The PHC ratio is the PHC ratio per district.

Data were analyzed bivariate by using cross-tabulation to see the trend. The entire analysis process utilizes SPSS 21 software.

**Results and Discussion**

Table 1 shows the descriptive statistics of the 6 variables analyzed in this study. The highest proportion of the population utilizing dental and oral health services is the Provinces of Jakarta and Yogyakarta (16.4%), while the lowest is East Nusa Tenggara (5.1%). Other variables that have a fairly high variation in values are the 9-year gross enrollment rate and the variable proportion of damaged/cavity/sore teeth.
Table 1. Descriptive statistic all variables

<table>
<thead>
<tr>
<th>The proportion of dental and oral utilization</th>
<th>Percentage of 9-year gross enrollment Rate</th>
<th>Percentage of poor people</th>
<th>Proportion of damaged/ cavity/ sore teeth</th>
<th>The proportion of missing teeth due to extraction /date itself</th>
<th>The ratio of PHC per district</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Mean</td>
<td>9.9324</td>
<td>90.9932</td>
<td>10.6535</td>
<td>47.1265</td>
<td>19.5882</td>
</tr>
<tr>
<td>Median</td>
<td>9.3500</td>
<td>91.4050</td>
<td>8.9050</td>
<td>46.4000</td>
<td>19.6000</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>3.27171</td>
<td>4.92008</td>
<td>5.67818</td>
<td>5.73259</td>
<td>2.59402</td>
</tr>
<tr>
<td>Range</td>
<td>11.30</td>
<td>22.78</td>
<td>23.88</td>
<td>23.90</td>
<td>11.60</td>
</tr>
<tr>
<td>Minimum</td>
<td>5.10</td>
<td>80.17</td>
<td>3.55</td>
<td>36.50</td>
<td>13.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>16.40</td>
<td>102.95</td>
<td>27.43</td>
<td>60.40</td>
<td>24.60</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Table 2. Cross-tabulation of the proportion of dental and oral utilization and percentage of 9-year gross enrollment rate in Indonesia, in 2018

<table>
<thead>
<tr>
<th>Percentage of 9-year gross enrollment rate</th>
<th>The proportion of dental and oral utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (5.10-8.16)</td>
</tr>
<tr>
<td></td>
<td>Middle (8.17-10.70)</td>
</tr>
<tr>
<td></td>
<td>High (10.71-16.40)</td>
</tr>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (80.17-88.49)</td>
<td>4</td>
</tr>
<tr>
<td>Middle (88.50-93.19)</td>
<td>4</td>
</tr>
<tr>
<td>High (93.20-102.95)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Table 2 shows the results of the cross-tabulation proportion of dental and oral utilization and the percentage of the 9-year gross enrollment rate. It can be seen that based on the proportion of dental and oral utilization in the high category, the percentage of 9-year gross enrollment rate for the low category has a lower percentage (27.3%) than the percentage of 9-year gross enrollment rate for the high category (45.5%). This information shows a trend towards a positive relationship between the proportion of dental and oral utilization with
The percentage of the 9-year gross enrollment rate. The higher the percentage of the 9-year gross enrollment rate, the higher the proportion of dental and oral utilization.

The results of the analysis shown in Table 2 are in line with several previous studies that have informed a positive relationship between education and service utilization\(^8,9\). Better education levels are often found to be a positive determinant of program performance in the health sector\(^10,11\). Meanwhile, poor education is often identified as a barrier to achieving better health performance\(^12,13\).

Table 3. Cross-tabulation of the proportion of dental and oral utilization and percentage of poor people in Indonesia, in 2018

<table>
<thead>
<tr>
<th>Percentage of poor people</th>
<th>The proportion of dental and oral utilization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (5.10-8.16)</td>
<td>Middle (5.10-8.16)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Low (3.55-7.21)</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>Middle (7.22-12.14)</td>
<td>2</td>
<td>18.2</td>
</tr>
<tr>
<td>High (12.15-27.43)</td>
<td>7</td>
<td>63.6</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Table 3 shows the results of the cross-tabulation, proportion of dental and oral utilization, and percentage of poor people. It can be seen that based on the proportion of dental and oral utilization in the high category, the percentage of poor people in the low category has a higher percentage (63.6%) than the percentage of poor people in the high category (9.1%). This information shows a trend towards a negative relationship between the proportion of dental and oral utilization with the percentage of poor people. The higher the percentage of poor people, the lower the proportion of dental and oral utilization. In contrast to education, poverty is reported to tend to have a negative relationship with performance in the health sector\(^14\). The poorer, the harder it is to achieve a good performance in the health sector\(^15,16\).

Table 4. Cross-tabulation of the proportion of dental and oral utilization and proportion of damaged/cavity/sore teeth in Indonesia, in 2018

<table>
<thead>
<tr>
<th>The proportion of damaged/cavity/sore teeth</th>
<th>The proportion of dental and oral utilization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (5.10-8.16)</td>
<td>Middle (5.10-8.16)</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Low (36.50-43.90)</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>Middle (43.91-48.16)</td>
<td>4</td>
<td>36.4</td>
</tr>
<tr>
<td>High (48.17-60.40)</td>
<td>3</td>
<td>27.3</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4 shows the results of the cross-tabulation, the proportion of dental and oral utilization, and the proportion of damaged/cavity/sore teeth. It can be seen that based on the proportion of dental and oral utilization in the high category, the proportion of damaged/cavity/sore teeth in the low category had a lower percentage (18.2%) than the proportion of damaged/cavity/sore teeth in the high category (27.3%). This information shows a trend towards a positive relationship between the proportion of dental and oral utilization with the proportion of damaged/cavity/sore teeth.

Table 5. Cross-tabulation of the proportion of dental and oral utilization and proportion of damaged/cavity/sore teeth in Indonesia, in 2018

<table>
<thead>
<tr>
<th>The proportion of missing teeth due to extraction/date itself</th>
<th>The proportion of dental and oral utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (5.10-8.16)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (13.00-18.13)</td>
<td>5</td>
</tr>
<tr>
<td>Middle (18.14-19.93)</td>
<td>2</td>
</tr>
<tr>
<td>High (19.94-24.60)</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile

Table 5 shows the results of the cross-tabulation, the proportion of dental and oral utilization, and the proportion of missing teeth due to extraction/date itself. It can be seen that based on the proportion of dental and oral utilization in the high category, the proportion of missing teeth due to extraction/date itself in the low category has a lower percentage (18.2%) than the proportion of missing teeth due to extraction/date itself in the high category (27.3%). This information shows a trend towards a positive relationship between the proportion of dental and oral utilization with the proportion of missing teeth due to extraction/date itself. The higher the proportion of missing teeth due to extraction/date itself, the higher the proportion of dental and oral utilization.

The information presented in Table 4 and Table 5 shows a positive relationship between need and demand. This situation confirms the positive relationship between need and demand. The higher the perceived need, the higher the demand.

Table 6. Cross-tabulation of the proportion of dental and oral utilization and the ratio of PHC per district in Indonesia, in 2018

<table>
<thead>
<tr>
<th>The ratio of PHC per district</th>
<th>The proportion of dental and oral utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (5.10-8.16)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (0.73-1.30)</td>
<td>4</td>
</tr>
<tr>
<td>Middle (1.31-1.45)</td>
<td>5</td>
</tr>
<tr>
<td>High (1.46-7.30)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
</tr>
</tbody>
</table>

Source: The 2018 Indonesia Basic Health Survey and The 2018 Indonesia Health Profile
Table 6 shows the results of the cross-tabulation, the proportion of dental and oral utilization, and the ratio of PHC per district. It can be seen that based on the proportion of dental and oral utilization in the high category, the ratio of PHC per district in the low category has a lower percentage (18.2%) than the ratio of PHC per district in the high category (72.7%). This information shows a trend towards a positive relationship between the proportion of dental and oral utilization with the ratio of PHC per district. The higher the ratio of PHC per district, the higher the proportion of dental and oral utilization. The results of this study indicate that the availability of service facilities (ratio of PHC per district) can encourage the utilization of dental and oral health services in Indonesia. More service facilities are available, making it easier for people who need to access them. Conversely, minimal availability is a barrier to access to health services19.

Conclusions

It could be concluded that the 5 variables analyzed tend to have a relationship with the proportion of dental and oral utilization in Indonesia. The five variables are the percentage of 9-year gross enrollment rate, percentage of poor people, the proportion of damaged/cavity/sore teeth, proportion of missing teeth due to extraction/date itself, and ratio of PHC per district.

Acknowledgments: The authors are grateful to the Ministry of Health of the Republic of Indonesia for providing a report as material for analysis in this study.

Source of Funding: Self-funding

Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, ethical clearance is not required in the implementation of this study.

Conflicting Interests: Nil

References


The Impact of Contraceptive use on Women Health: A Study of Rural Area, Minia, Egypt

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Abstract

Background: Women’s health concerns are associated with the female reproductive system, breast and other physiological structures. Contraception was a deliberate and willful selection of contraceptive methods. In Egypt, there is an increasing trend of using contraception to regulate births due to recent awareness of contraception. However, having insufficient knowledge about use of contraceptives would be more risky and its prolonged use sometimes results in various health problems. Aim was to reveal the prevalence of contraception use in rural area of Minia governorate and study the most common health problems among user as compared to non-users. Methodology: cross sectional community based study conducted among 564 rural married women in reproductive age during the period from November 2018 to May 2019. Results: Nearly 69.1% of women were currently using a contraceptive method, 142 (25.2%) never previously use contraception and 32 (5.7%) discontinued. There were significant increase of health problem among currently contraception user a compared to currently non user, majority (90.3%) of user complain menstrual irregularities compared to 24.1% of non-user (p=0.003* RR=29.1), 64.1% had nausea compared to 28.1% among non-user with RR =6.3, hypertension (RR=5.5) Headache (RR=2.6) Heart burn (RR=3.3) had significant increased relative risk. Conclusion: The present study illustrates that contraceptive methods have important health impacts. Health states decrease the effectiveness of any method. Awareness should be enhanced by health education using mass media and counseling, male contraceptives should be introduced, medical free camps and contraceptive availability.

Keywords: Contraception Prevalence, Health impact, rural Minia, Egypt

Introduction

Pregnancy and contraceptive methods both have essential health impact that includes risks and benefits. Contraceptives are a thoughtful and premeditated selection of a birth control technique or set of techniques (1). Every method of contraception dominates nonuse in most clinical settings. The percentage of the need for family planning satisfied by modern methods, Sustainable Development Goals (SDG) indicator 3.7.1, was 75.7% globally in 2019, yet less than half of the need for family planning was met in Middle and Western Africa(2). Increasing the rate of using more effective methods will improve health and decrease costs. Long term methods that not necessitate action on daily basis are both less costly and more effective than ones requiring daily action by users (3).

Effectiveness of contraceptive methods is influenced by socio-economic characteristics of the user and contraceptive method itself. Enhancing health awareness of women in choosing a method based on need necessitate careful assessment of women characteristics. A number of factors attribute to the woman characteristics and influence a women’s likelihood for suitable family planning method use. Life stage, demographic data, educational level, daily tasks, and nature of job are among the variables a provider needs to evaluate before selecting a recommended family planning method to a user. Health problems, religious and cultural beliefs, past experience with family planning methods have a
crucial role in selection and effectiveness of any family planning methods (1).

In Egypt, since 1990, the total fertility rate (TFR) has been slowly decreasing, from 4.1 in 1991 to 3.5 in 2000 and 3.0 in 2008, but it unexpectedly increased to 3.5 in the Egypt 2014 (4). From 2008 till 2014, the rate of family planning use slightly decreased from 60% to 58%.

The rate of intrauterine device users decreased from 36% to 30%, and the rate of pill users elevated from 12% to 16%. The United Nations Development Program (UNDP) reported that “with the current drop in family planning methods usage rate, it is unexpected for Egypt to locally or nationally achieve the MDG target relating to a family planning prevalence rate of 72%, which is essential to achieve the total fertility rate (TFR) of 2.1 children per woman by 2015 (5).

Accordingly, the Strategic National Population Plan 2015-2030 in Egypt has asked for urgent strategies to decrease the TFR to 2.4 births per woman by the year 2030. Total fertility rate can be reached by elevating family planning methods prevalence from 58% in 2014 to 72%, decreasing the rate of discontinuation (in the first year of use) from 30% in 2014 to 18%, and decreasing the percentage of unmet need for contraceptive methods from 13% to 6%. To achieve this aim, the contraceptive programs must safeguard high quality services for the provision of family planning methods and assure favorable attitudes toward the initiation and continuation of family planning methods. Though, this aim should be evaluated as aspirant, taking into consideration the elevating cost of assuring secure family planning methods due to the large increase in Egypt’s census (6).

Recognizing the factors affecting discontinuation of contraceptive use is crucial to ensuring that users can achieve the long-term fertility desires. Previous studies on the determinants of contraceptive discontinuation have concentrated on socio-demographic characteristics and fertility motivations of users, the quality of family planning services or the family planning service environment, and the experience of side effects while using a method (7). This is considered crucial conclusion that concentrate on highlighting, regions or sub-region, the used methods and user characteristics that may be necessary for improvements in policies and programs to address the elevated rates of contraceptive failure and discontinuation (8).

Demographic characteristics of women are set to be associated with stopping the use of methods failure. In Egypt, all studies searched discontinuation rates aligned with characteristics of women; discontinuation rate was raised among women of rural residence, the poorest and illiterate women. Also, studies illustrated that poorer, younger and illiterate women with one child living in rural Upper Egypt are more risky to stop contraceptive method though the desire to have contraceptive method without using another method (9). The trend of the discontinuation rate after the first year of usage in Egypt decreased from 30% in 2000 to 26% in 2008 then elevated to 30% in 2014 (6).

Study design and population

A cross-sectional research design was performed on married women aged 18 - 49 years (reproductive age) during the period from November 2018 to May 2019 in a rural residence in Minia governorate. A multistage random sample was used as Minia governorate was divided into 9 districts from which Minia district was selected by simple random sample then Minia district was classified into villages from which Tala village was selected also by a simple random method.

Setting:

A village called Talaat Minia district of Minia governorate of Upper Egypt.

Study population

The participant women were selected by using a systematic random sample from the village (the 1st
The sample size was calculated using EP Info version 7. A total of 564 women at reproductive age (15-45 years), were participated in this study.

A total of 180 students at reproductive age (15-25 years) were interviewed.

**Inclusion criteria:**
- Currently users of family planning methods
- Currently non-users of family planning methods

**2- Exclusion criteria:**

Women who stopped using contraception because
- Their husbands are working abroad.
- Women who had hysterectomy or pregnant women.

**Data collection procedures:**

The sample was selected through the following process:
- Researchers interviewed the participant women directly during their visit to the maternal health center for therapeutic or preventive purposes as family planning or child vaccination etc.
- Researchers interviewed the participant women indirectly by obtaining the addresses of them from the allocated rural health unit and with the aid of rural health pioneer called RadatRefeat and they reached to them by home visit.

**Instruments for Data Collection**

Data were collected by adopting a designed interviewing questionnaire. The original form was the client medical and nursing record called client form available at Rural Health Facilities of the Egyptian ministry of health. The questionnaire consisted of two parts; 1) **Demographical data:** it contained questions related to socio economic domains such as educational level, age, occupation and family income.

2. **Contraceptive practice:** this part included questions about currently used methods; duration of use previously used method and cause of changing this method.

3- **Medical history:** this part included the most common health problems considered as an effect of family planning use included menstrual irregularities, headache, nausea, heart burn, vaginal discharge, mood changes, hypertension, weight change, DM and depression.

**Validity:**

The questionnaire was revised for content validity by a five of experts in the field of Community Health Nursing and Public Health Medicine.

**Reliability:** The researchers examined the internal consistency of the instrument. It is the administration of the same tools to the same subjects under similar circumstances on one or more occasions. Cronbach’s α for of the questionnaire was 0.76.

**Ethical consideration**

An approval was obtained from the research ethical committee of the authors’ institutions (faculty of Medicine and Nursing). Another approval was obtained from the local council of Tala village to interview the participants. Following the ethical rules of epidemiological research, a written informed consent was obtained from the participant women included the aim, the nature of the study and ascertaining confidentiality of the information. Each participant was interviewed individually to fulfill the necessary data and informed of having the choice to withdraw from the study at any time.

**Statistical Analysis**

After completion of data collection, data entry was done. Then data were coded, analyzed using Statistical Software Packages “SPSS” version 21.

Quantitative data were presented in the form of mean and standard deviation; qualitative data were presented as frequency distribution. Independent sample test and chi square test were used. Relative risk (RR) was estimated and logistic regression analysis was used. Statistical significance was set at p < 0.05.
Results

Of the 564 women surveyed, 390 women (69.1%) were currently using a contraceptive method, 142 (25.2%) never previously use contraception and 32 (5.7%) discontinued (figure 1).

The socio-demographic characteristics of the studied women are presented in Table 1. Women who currently use contraception had a significantly lower marital age (18.7±3.5 vs. 19.9±8.2). About 54% of women with no contraception use were ≥35 years of age. About 61.5% of women who currently use contraception their family income was enough but not safe. No other statistically significant differences were found for other socio-demographic factors such as education and employment of both wife and husband.

Characteristics of women currently use contraception are described in Table 2, currently used contraceptive methods were distributed as following 44.1% use contraceptive pills, 28.7% use injections, 15.4% use IUD 8.7% use capsule and 3.1% use local methods. There was 51.8% of participant use another before the current one, these used methods were pills (14.9%), injections (26.7%), IUD (24.8%), capsules (8.9%) and local methods (24.8%). Reasons for changing method are experiencing health problems (60.4%), Contraceptive failure (19.8%) and forgetting pills (19.8%).

Figure 2 showing that menstrual irregularities was the most prevalent (69.9%) health problems among the studied females followed by headache (54.6%), Nausea (51.1%), heart burn (42.9%), Vaginal discharge (38.3%), mood changes (36.5%) hypertension (34.8%),

From tables it was found that significant increase of health problem among currently contraception user as compared to currently non user, majority (90.3%) of user complain menstrual irregularities compared to 24.1% of non-user (p=0.003* RR=29.1), 64.1% had nausea compared to 28.1% among non-user with RR =6.3, hypertension (RR=5.5) Headache (RR=2.6) Heart burn (RR=3.3) had significant increased relative risk.

Table 1:Socio-demographic characteristics of the studied women:

<table>
<thead>
<tr>
<th></th>
<th>Currently Users</th>
<th>Currently Non Users</th>
<th>t¤</th>
<th>χ2</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 25 years old</td>
<td>52 (13.3%)</td>
<td>26 (14.9%)</td>
<td>23.6</td>
<td>4.5</td>
<td>0.001*</td>
</tr>
<tr>
<td>25-34 years old</td>
<td>204 (52.3%)</td>
<td>54 (31%)</td>
<td></td>
<td></td>
<td>0.001*</td>
</tr>
<tr>
<td>≥35 years old</td>
<td>134 (34.4%)</td>
<td>94 (54%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>31.6±7.1</td>
<td>35.5±11.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at marriage</td>
<td>18.7±3.5</td>
<td>19.9±8.2</td>
<td>2.3</td>
<td>3.5</td>
<td>0.01*</td>
</tr>
<tr>
<td>Marital period</td>
<td>12.6±7.2</td>
<td>15.4±19.8</td>
<td></td>
<td></td>
<td>0.01*</td>
</tr>
<tr>
<td>Number of children</td>
<td>3.3±1.2</td>
<td>3.3±1.8</td>
<td>0.26</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Number of pregnancy</td>
<td>4.01±4.3</td>
<td>3.7±2.2</td>
<td>0.71</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Number of abortions</td>
<td>1.6±1.01</td>
<td>1.5±0.7</td>
<td>0.78</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Women’s education:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>148 (37.9%)</td>
<td>80(46%)</td>
<td>4.5</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>202 (51.8%)</td>
<td>74 (42.5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>34 (8.7%)</td>
<td>18 (10.3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University/above</td>
<td>6 (1.5%)</td>
<td>2(1.1%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women’s occupation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>352 (90.3%)</td>
<td>162 (93.1%)</td>
<td>1.2</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Works</td>
<td>38 (9.7%)</td>
<td>12 (6.9%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 1: Socio-demographic characteristics of the studied women:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ±SD</th>
<th>0.30</th>
<th>0.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>36.1±8.8</td>
<td>35.8±15.8</td>
<td>0.30¤</td>
</tr>
</tbody>
</table>

**Husband’s occupation:**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>98 (25.1%)</td>
<td>40 (23%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>32 (8.2%)</td>
<td>16 (9.2%)</td>
</tr>
<tr>
<td>Manual</td>
<td>16 (4.1%)</td>
<td>10 (5.7%)</td>
</tr>
<tr>
<td>Technician</td>
<td>200 (51.3%)</td>
<td>88 (50.6%)</td>
</tr>
<tr>
<td>Professional work</td>
<td>44 (11.3%)</td>
<td>20 (11.5%)</td>
</tr>
</tbody>
</table>

**Husband’s education:**

<table>
<thead>
<tr>
<th>Education</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>100 (25.6%)</td>
<td>46 (26.4%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>238 (61%)</td>
<td>108 (62.1%)</td>
</tr>
<tr>
<td>University/above</td>
<td>52 (13.3%)</td>
<td>20 (11.5%)</td>
</tr>
</tbody>
</table>

**Family income**

<table>
<thead>
<tr>
<th>Income</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough</td>
<td>84 (21.5%)</td>
<td>58 (33.3%)</td>
</tr>
<tr>
<td>Enough but not safe</td>
<td>240 (61.5%)</td>
<td>78 (44.8%)</td>
</tr>
<tr>
<td>Enough</td>
<td>66 (16.9%)</td>
<td>38 (21.8%)</td>
</tr>
</tbody>
</table>

* Significant. N.B. Currently no user is including ever no user (n=142) and previously user and discontinued (n=32)

### Table 2: Characteristics of currently user women (number=390):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently used method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pills</td>
<td>172</td>
<td>44.1</td>
</tr>
<tr>
<td>Injections</td>
<td>112</td>
<td>28.7</td>
</tr>
<tr>
<td>IUD</td>
<td>60</td>
<td>15.4</td>
</tr>
<tr>
<td>Capsules</td>
<td>34</td>
<td>8.7</td>
</tr>
<tr>
<td>Local methods</td>
<td>12</td>
<td>3.1</td>
</tr>
</tbody>
</table>

| Duration of use (year)        |           |     |
| Range                         |           |     |
| Mean ±SD                      | 1-30      | 5.6±5.5 |

| Changing the method           |           |     |
| Yes                            | 202       | 51.8 |
| No                             | 188       | 48.2 |

| Previously used method        |           |     |
| Pills                         | 30        | 100 |
| Injections                    | 54        | 14.9 |
| IUD                           | 50        | 26.7 |
| Capsules                      | 18        | 24.8 |
| Local methods                 | 50        | 8.9  |

| Reasons for changing method   |           |     |
| Health problems               | 122       | 60.4 |
| Contraceptive failure         | 40        | 19.8 |
| Forgetting pills              | 40        | 19.8 |

Nb. Local methods (vaginal cap, condom)
Table 3: Comparison between contraception users and non users regarding recently occurred health problem:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Currently Users N=390</th>
<th>Currently Non users N=174</th>
<th>Z</th>
<th>RR (95%CI)</th>
<th>P for RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>250(64.1%)</td>
<td>38(21.8%)</td>
<td>9.2(0.009*)</td>
<td>6.3 (4.2-9.6)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Hypertension</td>
<td>174(44.6%)</td>
<td>22(12.6%)</td>
<td>7.4(0.006*)</td>
<td>5.5 (3.4-9.1)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Headache</td>
<td>242(62.1%)</td>
<td>66(37.9%)</td>
<td>5.3(0.005*)</td>
<td>2.6 (1.8-3.8)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Mood change</td>
<td>150(38.5%)</td>
<td>56(32.2%)</td>
<td>1.2(0.07)</td>
<td>1.2 (0.9-1.9)</td>
<td>0.1</td>
</tr>
<tr>
<td>Heart burn</td>
<td>200(51.3%)</td>
<td>42(24.1%)</td>
<td>6.2(0.008*)</td>
<td>3.3 (2.2-4.9)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Vaginal discharge</td>
<td>158(40.5%)</td>
<td>58(33.3%)</td>
<td>1.3(0.05)</td>
<td>1.3 (0.9-1.9)</td>
<td>0.1</td>
</tr>
<tr>
<td>Depression</td>
<td>94(24.1%)</td>
<td>40(23%)</td>
<td>0.2(0.3)</td>
<td>1.06 (0.6-1.6)</td>
<td>0.7</td>
</tr>
<tr>
<td>Menstrual irregularity</td>
<td>352(90.3%)</td>
<td>42(24.1%)</td>
<td>15.7(0.003*)</td>
<td>29.1 (17.9-47.1)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Increased weight</td>
<td>94(24.1%)</td>
<td>44(25.3%)</td>
<td>0.2(0.3)</td>
<td>0.9 (0.6-1.4)</td>
<td>0.7</td>
</tr>
<tr>
<td>Decreased fertility</td>
<td>132(33.8%)</td>
<td>26(14.9%)</td>
<td>4.6(0.001*)</td>
<td>2.9 (1.8-4.6)</td>
<td>0.001*</td>
</tr>
<tr>
<td>DM</td>
<td>12(3.1%)</td>
<td>10(5.7%)</td>
<td>1.1(0.1)</td>
<td>0.51 (0.22-1.2)</td>
<td>0.1</td>
</tr>
</tbody>
</table>

RR (Relative risk)

Figure 1: Prevalence of family planning use among study participants.
Discussion

Prevalence of family planning use among study participants:

Family planning is crucial for women and families health, as it able to enhance the development of the country toward decreasing poorness and fulfilling growth goals. An increasing percent of women at Arabic countries are using contraceptive methods, as contraceptive services have broadened. Unmet need still not covered or satisfied (10).

The current study revealed that Of the 564 women surveyed, 390 women (69.1%) were currently using contraception, quarter of them never previously use contraception and the minority (5.7%) discontinued. Which was similar to (11) who studied “Currently Married Women with an Unmet Need for Contraception in Minia Governorate, Egypt: Profile and Determinants” found that 66.7% were currently relying on a family planning method.

Worldwide in 2017, 63 % of women were using some form of contraception. Family planning methods use was above seventy percent in Europe, Latin America and the Caribbean, and Northern America, while being below quarter in Middle and Western Africa (12).

These results are similar to report of (13) who stated that though contraceptive methods elevated significantly both nationally and regionally it was still lesser than the goal of 74.7% targeted for the year 2020 instead of the current (58.5 %), to decrease the fertility rate from 3.5 child per woman to 2.1 child as the percent of discontinuation after first year is 30.1 % to be decreased to 15 % by 2020. Also, (14) studied “family planning methods use among Egyptian women” found that the prevalence of contraception was 57.5%.

Researchers suggest that the increase in contraception may be associated with the expanding contraceptive services coverage and increasing health awareness. Also, the difference is present in the never previously use (25.7%) and the discontinued women non-use percent (5.7%) to be 30 % as a total (4).

The socio-demographic characteristics of the participant women:
The present study results revealed the socio-demographic characteristics of the participants. Women who currently use contraception had a significantly lower marital age than non-users (18.7±3.5 vs. 19.9±8.2). More than half of non-users were ≥35 years old. About two thirds (61.5%) vs. two fifths (44.8%) of users and non-users respectively have enough but not safe family income revealing statistically significant difference. No other statistically significant differences were found for other socio-demographic factors such as education and employment of both wife and husband.

These result was in agreement with (15) who studied “factors affecting the family planning methods used by the currently married women in rural Egypt” found that 66.7% of users lied in the age group 40-49 years, 80.9% having marital age 10-19 year, and 64.6% their age of marriage above 18 year.

The results of the present study are similar to (4) who reported that discrepancies in the usage rates are comparatively small by enhancing awareness among groups. Use rates are the identical for non-educated women representing fifty nine percent and a secondary or higher education participants representing sixty percent. Primary or secondary educated women are the least candidates for currently method use representing fifty five percent. Users occupied in paid cash work are more probably to use a method than non-users representing sixty seven percent, respectively. In the normal circumstances, secondary educated and paid cash job women or those having medium or higher affluence desired less than three children.

The current study results were in accordance with (16) who reported that factors affecting family planning use include access to integrated primary healthcare centers, marital age, socioeconomic status, and parity.

The present study results is convenient with (17) who studied “Prevalence and correlates of contraceptive use among female adolescents in Ghana”, reported that mother age, marital status, number of children born were all definitely associated with family planning methods use.

The results of the present study are relevant to (18) who studied Emergency contraceptive pill use among women of reproductive age in Myanmar reported that, among candidates from Brazil, Chile and Mexico possessing a low income contradicted with their contraceptive use. This was attributed to lack of knowledge. Also, the idea of motherhood is the personality and fate of a woman which made them feeling do not need contraceptive methods is reported as a barrier among low-income women. Higher income women had better access to information about contraceptive methods. Also, awareness about the available places to buy family planning methods with better accessibility to purchase them is inferential.

Characteristics of family planning users:

The current study results revealed characteristics of women currently use contraception are described in Table 2, currently used contraceptive methods were distributed as following about 44.1% use contraceptive pills, more than the quarter (28.7%) use injections, 15.4% use IUD 8.7% use capsule and 3.1% use local methods as 81.5 are using hormonal methods. There was 51.8% of participant use another before the current one, these used methods were pills (14.9%), injections (26.7%), IUD (24.8%), capsules (8.9%) and local methods (24.8%). Reasons for changing method are experiencing health problems (60.4%), Contraceptive failure (19.8%) and forgetting pills (19.8%)

The current study results are in accordance with (18) who reported that, the percentage of using short-term family planning methods including COC pills and injection (three months) was very elevated than invasive ones as the use of IUDs or implants.

(19) who studied “Determinants of low family planning use and high unmet need in Butajira District, South Central Ethiopia” reported that, oral contraception is the most preferred one among current users of contraception.

(4) reported that there was a recent change from the intrauterine device to the pill and indictable. The percentage of women depending on the intrauterine device decreased from sixty percent to fifty one percent at the period of 2008 till 2014. At the same time, the percentage of women depending on the oral contraceptive raised from twenty to twenty seven percent. A low elevation in the percentage of women depending on injection was noticed to be from twelve
percent to fifteen percent. Researchers refer recent trend toward the use of hormonal methods including pills and injection as they are not invasive methods.

**Reasons for changing the method:**

The current study results revealed reasons for changing method are experiencing health problems (60.4%), contraceptive failure (19.8%) and forgetting pills (19.8%)

This is in accordance with (20) who stated presence of barriers associated with the method itself, 63.2% of the discontinued women had a desire to have the more effective one. Also 36.1% had contraceptive failure. The most prominent cause was waiting for the menstruation to use the method (55.3%). Also, 8.2% of the discontinued women reported occurrence of severe bleeding as a serious complication. Regarding the reproductive barriers 54.6% of the discontinued women reported having side effects. Also, the most prominent side effects were related to menstrual changes.

(21), who studied “Family planning in a sub-district near Kumasi, Ghana: side effect fears, unintended pregnancies and misuse of a medication as emergency contraception” reported that users had a different experiences about contraception as one-third having feared of side effects of hormonal methods especially heart palpitations, as well as lack of knowledge or experience with specific domains for majority of contraception. Although, users desired to learn more about side effects and modern fertility awareness based methods. There is an imperative need for manipulations aimed at proper use of oral contraceptives, addressing the potential and actual health concerns of contraceptive methods through appropriate training family health nurses and fertility awareness regarding modern methods.

**Prevalence of recently occurred health problem:**

The present study results revealed that menstrual irregularities was the most prevalent (69.9%) health problems among the studied females followed by headache (54.6%), Nausea (51.1%), followed by heart burn more than two fifth (42.9%), vaginal discharge (38.3%), mood changes (36.5%) hypertension (34.8%), on the other hand, the least reported ones were depression and DM (23.8 % & 3.9 %) respectively.

These results is in agreement with (19) stated that, about one fifth of participant women reported factors concerning the health problems and contradictions of family planning methods as , severe bleeding, heart pain and the assumption of their need of balanced diet suitable with work conditions.

Likewise, (22), who studied “contraceptive experience and perception, a survey among Ukrainian women” showed that future infertility was the most terrible experienced hormonal side effect as it reported by more than third of users, followed by thrombosis and weight gain as revealed by more than fifth of them. The limited use of hormonal methods was due to actual or feared side-effects.

In the same line, (21), who summarized the common reasons of not using aspecific contraceptive method. The most reported factor did not desire to use injectable or oral contraceptives due to its side effects as reported by about a third of them. Also, they were especially afraid of heart palpitation in case of using IUDs, injectable, or implants. Other reported side effects were menstrual or weight fluctuation and vertigo with hormonal and that of IUDs or implants were painful insertion. Majority of participants described the particular side effects IUDs or implants as being feared, but others stated that they would be missed inside the body and diseased. Least of participants attributed permanent sterility to hormonal methods (5.9%).

The current study results are similar to (23) that showed the refusal of some participants to use contraception could be associated with anxiety of side effects. Also, women dislike invasive methods (IUD or implants) and of missing daily pill. Many of the side effects women reported, such as heart palpitations, vertigo, and changes of weight (decrease or increase) that may occur contraceptive methods.

The majority of women who use the birth control pill have no side-effects at all; while, some of them have mild side-effects such as spotting or bleeding, nausea, headache, tendered breast, weight changes, mood swings, low libido, and dermatologic problems. In fact, menstrual disturbances are the consequence of both the prevailing levels of estrogens and the more or less
suppressed endometrium. Short-term studies have been suggested that combined hormonal methods may mildly elevate blood pressure (24).

**Conclusion and Recommendation**

The current study revealed that contraceptive methods have important health impacts. Health states decrease the safeness and effectiveness of any contraceptive method. The effectiveness of contraception relies on its competent and proper use. Incompetent and improper use leads to many health problems and failed method. The most common health effects included menstrual irregularities, nausea, headache and heart burn. Counseling for contraception should be introduced at affordable cost with improved quality of overall services to reduce health problems. Awareness should be raised by media and to be involving male contraceptives as a choice for selective criteria, medical free campaigns and social marketing contraceptive availability and its quality.

**Conflict of Interests:** There was no Conflict of Interests

Contributors: All authors contributed substantially to the study conception and design, data collection and analysis, and drafting and revision of the article. All approved the final version to be published.

**Funding:** Self.

**References**


The Effect of Smoking on Adolescents’ Appetite for the Age (13-18) and its Relationship to Some Variables

Eman Ali Hadi¹, Fatima Faiq Juma¹
¹Scholar Researchers, University of Baghdad, Iraq

Abstract

Nutritional requirements increase for people in general and for adolescents in particular between the ages of (13-18) years to increase the speed of growth, as adolescence is considered a rapid stage after childhood. In general, the importance and necessity of nutritional elements remain, as they affect the growth of the teenager’s body, so the amount of food that the teenager eats should be increased in proportion to his nutritional needs for this stage, however during this stage, he may be exposed to some practices related to the dietary approach and among these practices smoking, so the aim of the research is to identify the effect of smoking on the nutrition of male adolescents aged (13-18) years and its relationship to some variables, the results indicated a decrease in the average of the daily intake of a teenager smoker of age (13-15) and (15-18) of all proteins, carbohydrates, energy, vitamin B12, B6, E, C, A, folic acid, iron, calcium and phosphorous, respectively for smokers adolescents aged (15-13) years, while the rates of these elements were high among non-smoking adolescents for the same age group when compared with global courses. It was also observed through the results, the continued failure to meet the prescribed daily need for these nutrients for adolescent smokers aged 15-18 years, as the levels of nutrients reached, respectively, while the rates of these elements were reached in non-smoking adolescents for the same category, The statistics of the World Health Organization for the year 2008 indicated that smoking is more prevalent among adolescents aged (13-15) and (15-18) years for both sexes. Yemen was the first in the world and Kuwait in the Gulf in terms of youth smoking.

Keywords: smoking, adolescents’ appetite, age 13-18

Introduction

Biologists (life scientists) use the ancient use of the term (adolescence) to mean the period from puberty to the end of sexual development. Many studies gathered on the behavior of adolescents began in the year 1795 and were characterized by scientific organization. Other scholars have defined it as period between childhood and adulthood during which sexual development is significant or during which developments in food habits and behavior are observed (¹,²). Some practices related to the adolescent’s dietary approach appear at this stage (³). Smoking cigarettes, drinking alcohol or using drugs are pathological behaviors that often begin during this stage, it has a psychological and social impact, smoking is usually harmful and dangerous to health, and whether the nutrition of the adolescent at this stage is good or not, it depends on the factors surrounding him in addition to the independence that is related to cultural development and social level (³,⁴). Adolescence is characterized by an increase in appetite for food with an increase in the rate of growth accompanied by an increase in energy spent daily. This may lead to an increase in food intake, and nutritionists defined appetite as a desire to eat, not the process of eating itself, and an increase in adolescents’ appetite may result in the acceptance of many new foods that were previously rejected, as well as an increase in the quantities consumed by traditional foods (⁰). In general, the nutritional requirements of adolescents between 13-18 years increase with the increase in their growth speed, but the teenager may be exposed to different types of nutritional problems. Various studies in the United States of America have indicated that most of the deficiency is in protein and energy, as well as in vitamin A, C, calcium and iron, so the skin is pale, hair is low in vitality, eyes lack luster, vitality decreases, and the chances of diseases such as anemia increase, which is

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one of the diseases prevalent among adolescents, as well as low weight, weak body resistance and intolerance to stress, so nutrition at this stage is very important due to the great need for additional quantities of the necessary elements to cause many changes, in order an adolescent becomes adult\(^{(4, 5, 6)}\).

**Materials and Methods**

To achieve the goal of the current study, a questionnaire form was prepared and included information on:

1. The profession of the parents.
2. Parents’ educational attainment and the educational stage of adolescents.
3. The economic situation.
4. Number of family.
5. Eating daily breakfast on a regular basis.

The questionnaire also included questions specific to the teenager himself and the motives that prompted him to smoke:

1. The influence of the media.
2. The influence of friends and their imitation.
3. Absence of parents
4. Failure to study.
5. Escape from reality.
6. The desire to smoke
7. Parents and teachers imitation.
8. The economic factor.
9. Arranging the (adolescent) in his family.
10. Number of family.

The questionnaires were distributed to (1000) adolescents in the city of Baghdad on both sides of AL-Karkh and AL-Rusafa, the randomized,

**Results and Discussion**

The study showed the following results:

First: Parents’ profession: the percentage is in order from highest to lowest.

A- The profession of the father:
1- Employed: 65%.
2- Freelancers: 35%.

B- Mother’s profession:
1- Employed: 55%.
2- A teacher: 35%.
3- Housewife: 10%.

Second: Parents’ Academic Achievement: The percentages are in order from highest to lowest:

1- Bachelor: 25%.
2- High school: 25%.
3- Institute (diploma): 16%.
4- Middle school: 15%.
5- Reads and writes: 14%.
6- Illiterate: 5%.

Third: Adolescent Academic Achievement:

The number of adolescents who are still continuing in middle and high school is 56%.

As for adolescents who dropped out of school, their percentage was 35%.

Fourth: The economic situation: The average monthly income of the family has reached (750 thousand Iraqi dinars).

Fifth: The number of family members: The general average is 6 members.

Sixth: As for breakfast, the percentage of adolescents who do not have daily breakfast was 55%.

The remaining 45% are those who have breakfast.
Sixth: The most common types of smoked cigarettes by (the research sample) are:

1- ASPEN 45%. Its price is 750 Iraqi dinars.
2- PINE 37%. Its price is 500 Iraqi dinars.
3- GAULOISES 18%. Its price is 750 Iraqi dinars.

Eighth: As for the reasons or motives that prompted the teenager to smoke, they were shown in the following table:

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Motives and Causes</th>
<th>Figure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The influence of friends</td>
<td>203</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>A desire to smoke (or curiosity)</td>
<td>192</td>
<td>19%</td>
</tr>
<tr>
<td>3</td>
<td>Imitation of parents or teachers</td>
<td>151</td>
<td>15%</td>
</tr>
<tr>
<td>4</td>
<td>The economic factor</td>
<td>95</td>
<td>9%</td>
</tr>
<tr>
<td>5</td>
<td>Absence of a watcher (parents or one of them)</td>
<td>89</td>
<td>9%</td>
</tr>
<tr>
<td>6</td>
<td>Media influence</td>
<td>70</td>
<td>7%</td>
</tr>
<tr>
<td>7</td>
<td>Escape from reality</td>
<td>68</td>
<td>6.8%</td>
</tr>
<tr>
<td>8</td>
<td>Teenager’s ranking in his family</td>
<td>55</td>
<td>5.5%</td>
</tr>
<tr>
<td>9</td>
<td>Number of individuals of the family</td>
<td>45</td>
<td>4.5%</td>
</tr>
<tr>
<td>10</td>
<td>Failure to study</td>
<td>32</td>
<td>3.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1000</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (1) shows the motives that prompted the teenager to smoke, ranking them from highest to lowest

In Table (1) we notice that the first reason behind teenage smoking was the influence of friends, as it occupied the highest percentage, which is 20.3%, and this comes with agreement with (1), where it indicated that the highest percentage of smokers was 78%, who they belong to centers and clubs or those who are in the same age or school stage, which gives indicative evidence that the group affects the behavior of the individual and his attitudes, so he imitates the group, and there is no awareness of the risks that this tradition entails on health.

In the same previous table, we also note that desire or curiosity ranked second after the influence of friends, with a rate of 19.2%. The result of the research in this is consistent with (7) as the first time to smoke is a result of a desire or love of curiosity, and this desire often comes from a friend or relative and this desire is repeated until the adolescent reaches the stage of addiction, the interpretation of this situation by psychologists is that desire is a pathological impulsion due to the smoker’s need to obtain something that includes a sense of security and assertion of self(7).

As for the third place, it was from the share of imitation of parents or teachers, it got a rate of 15.1%, as the teenager at this stage accepts imitation of someone who is older than him, so he imitates his father or teacher, therefore parents and educators must set an example and quit smoking before they ask their children to do so. Studies have shown that many children refuse to respond to health awareness campaigns, believing that it is based on lying and deception, and they infer that from the father who forbids his children from smoking while he still smokes or from the doctor who advises his patient not to smoke while the cigarette is still burning between his fingers(1, 8).

While the economic factor ranked fourth, where it got a rate of 9.5%, meaning that the higher the economic
level, the greater the opportunity for the teenager to obtain his daily expenses, which in turn leads to spending this money on buying cigarettes without awareness from him\textsuperscript{(1, 7)}. As for the absence of a watcher (parents or one of them), it ranked fifth and obtained a rate of 8.9%. The loss of parental or maternal care, or both, leads to this phenomenon (smoking), the absence of parents or one of them, or the family’s preoccupation far from its children, is a major cause of children’s delinquency, and it is called the “absent family”, the later may be absent from the home or has no connection in this family. As for the influence of the media, the rate was 7%. The media is considered a wide field for a daily confrontation between education and food awareness programs and commercial advertisements aimed at promoting food and non-food commodities, especially cigarettes\textsuperscript{(9)}, a teenager who watches TV for several hours a day is exposed to a large group of commercial advertisements that mainly focus on encouraging the consumption of a wide variety of cigarettes\textsuperscript{(10)}. As for escaping from reality, it ranked seventh and obtained a rate of 6.8% by the research sample. A study conducted in the Arab Gulf states, specifically in Kuwait, revealed that most smokers were suffering from a change in behavior,\textsuperscript{(11)}.

We note in the same table that the teenager’s ranking in his family and the number of individuals of the family occupied the eighth and ninth positions, and their percentage was 5.5% and 4.5%, respectively, according to the opinion of the members of the research sample. We conclude from this that children (adolescents) suffer from the enormous number of family members, among the children of a family in which the number of members exceeds 9, 51% of its children will be a smoker persons, and this percentage decreases as the number of family members decreases\textsuperscript{(10)}.

In a family that consists from 7 or 8 members, the percentage of smokers among its children is less than 25.4%, and for a family whose number is between 5 and 6 members, the percentage of young smokers (adolescents) approaches 20%, meaning that the more family members the more increasing in the number of young smokers. Finally, failure to study, as it was ranked tenth and obtained a rate of 3.2%, and this paragraph is part of the changes in the behavior of the teenager, as the teenager who smokes at this stage suffers from several difficulties, and among these difficulties is his inability to continue his studies, which leads to failure in his studies\textsuperscript{(11)}.

Table (2) R.D.A global daily nutritional comparison with the average of daily intake of nutrients for smoker and non-smoker adolescents aged (13-15)

<table>
<thead>
<tr>
<th>sequence</th>
<th>Nutrients</th>
<th>Global Courses</th>
<th>The general rate of smoker adolescents aged (13-15 years)</th>
<th>The general rate for non-smokers adolescents aged (13-15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proteins (gm)</td>
<td>52</td>
<td>40</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>Carbohydrates (g)</td>
<td>130</td>
<td>122.3</td>
<td>132</td>
</tr>
<tr>
<td>3</td>
<td>Energy (calories)</td>
<td>2700</td>
<td>2541</td>
<td>2729</td>
</tr>
<tr>
<td>4</td>
<td>V. A equivalent to Renol</td>
<td>1000</td>
<td>887</td>
<td>1021</td>
</tr>
<tr>
<td>5</td>
<td>V. C mg</td>
<td>50</td>
<td>39</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>V. B6 mg</td>
<td>18</td>
<td>5.9</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>V. B12 mg</td>
<td>305</td>
<td>2.2</td>
<td>3.6</td>
</tr>
<tr>
<td>8</td>
<td>Iron mg</td>
<td>15</td>
<td>12.3</td>
<td>14.5</td>
</tr>
<tr>
<td>9</td>
<td>Calcium mg</td>
<td>1200</td>
<td>1089</td>
<td>1212</td>
</tr>
<tr>
<td>10</td>
<td>Phosphorous mg</td>
<td>1200</td>
<td>1102</td>
<td>1227</td>
</tr>
</tbody>
</table>
Scheduled according to the National Food and Nutrition Science Recommendations for the Year (2002). (12)

Table (3) R.D.A global daily nutritional comparison with the average of daily intake of nutrients for smoker and non-smoker adolescents aged (16-18 years).

<table>
<thead>
<tr>
<th>sequence</th>
<th>Nutrients</th>
<th>Global Courses</th>
<th>The general rate of smokers adolescents aged (16-18 years)</th>
<th>The general rate of non-smokers adolescents aged (16-18) years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proteins (gm)</td>
<td>56</td>
<td>51</td>
<td>5.8</td>
</tr>
<tr>
<td>2</td>
<td>Carbohydrates (g)</td>
<td>130</td>
<td>125</td>
<td>137</td>
</tr>
<tr>
<td>3</td>
<td>Energy (calories)</td>
<td>3000</td>
<td>2678</td>
<td>2835</td>
</tr>
<tr>
<td>4</td>
<td>V. A equivalent to Renol</td>
<td>1000</td>
<td>980</td>
<td>1015</td>
</tr>
<tr>
<td>5</td>
<td>V. C mg</td>
<td>60</td>
<td>45</td>
<td>77</td>
</tr>
<tr>
<td>6</td>
<td>V. B6 mg</td>
<td>2.0</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>7</td>
<td>V. B12 mg</td>
<td>3.0</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>8</td>
<td>Iron mg</td>
<td>15</td>
<td>12</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>Calcium mg</td>
<td>1200</td>
<td>1160</td>
<td>1235</td>
</tr>
<tr>
<td>10</td>
<td>Phosphorous mg</td>
<td>1200</td>
<td>1155</td>
<td>1228</td>
</tr>
</tbody>
</table>

Scheduled according to the National Food and Nutrition Science Recommendations for the Year (2002). (12)

As for tables (2, 3), we note that the diet for adolescents for the age groups (15-13) and (18-16) generally suffers from a deficiency in the necessary nutrients. This is what we notice when comparing international courses. The teenager does not link food and body work, and much more of adolescents never think of disease, especially malnutrition, caused by loss of appetite as a result of smoking habit. At this stage (adolescence) the need for proteins, carbohydrates and energy increases, in order to balance the building of the body with the performance of daily moving activities(4).

However, we note in the two tables that the quantities of these elements are low, as it was among adolescents who smoke at the age of (15-13), (44) grams, (122.3) grams, (2553) calories, respectively, and among adolescents who smoke at the age of (15-18), (5) G, (125) gm and (2678) calories, respectively.

We also note that there is a deficiency in vitamin B12, A, C, E, B16 and folic acid, as well as a deficiency in mineral elements such as iron, calcium and phosphorous. Likewise, smoking increases the required amount of vitamin C in order to maintain the serum level of this vitamin, so if the amount or serum level of vitamin C is compared to one person smoker and the other is a non-smoker, we will find that the serum level of the smoker (who smokes more than 20 cigarettes per day) it is about 25% less than in a non-smoker, and the effect is more in people who smoke from 20 - 40 cigarettes per day, as it was found that smoking cigarettes works to reduce the absorption of vitamin C(13).
Conclusions

Behavioral symptoms: change in behavior, academic failure, absconding from school, disappearance of drugs from their storage places, repeated loss of valuables. Psychological symptoms: a state of unusual excitement obstructed by complete mental lethargy, obsession with loud music, wakefulness during the night and sleep during the day, disturbance of relations with parents, siblings and relatives. Health and nutritional symptoms: loss of appetite, not following a proper diet, not eating meals regularly, stomach pain and gastric irritation, weak body resistance, low weight below the normal limit, intolerance to stress from overwork, severe red eyes.

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Funding: Self
Ethical Clearance: Not required

References

8- Nu CT, MacLeod P, Barthelemy J. Effects of age and gender on adolescents’ food habits and preferences. Food quality and preference. 1996 Jul 1;7(3-4):251-62.
Genetic Evaluation for the Proposed role of *Staphylococcus aureus* in Burn Patients

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Abstract

**Background:** *Staphylococcus aureus* is a gram-positive spherical bacterium. It is a human skin and respiratory flora which is considered as one of the most common cause of burn infections. It always finds a way to resist antibiotics due to that it had virulence and resistance genes as well as acquired of new genes from other strains which makes it more dangerous. **Aims:** This study aims at investigating the prevalence of genetic evaluations for *Staphylococcus aureus* in the burn unit. **Methods:** A total of 223 burn swabs were collected from the burn patient’s unit during the period from September to December 2019 in AL-Hussain Teaching Hospital in AL-Nasiriya City, Southern of Iraq. These 223 burn swabs were subjected to macroscopic, microscopic, cultures, biochemical test and out of the 223 clinical swab only (70) undergoes the PCR and DNA sequence technique looking for new emergence strains. **Results:** The current study used partial 16SrRNA gene sequences for (6) *Staphylococcus aureus* isolates and found (5) of them were global and one was local according to the accession numbers of NCBI Gene bank, MT605440.1, MT605441.1, MT605442.1, MT605445.1, MT605443.1, MT605444.1.

**Keyword:** genetic evaluations, *Staphylococcus aureus*, Infections-Macrolides resistance.

Introduction

Burns are a common type of injury among people. They can occur anywhere from a household setting where heat, electricity and friction might be the source of injury to industrial settings where radiation and chemical agents might be the main source of injury (¹). Burns that effect and cause trauma to the superficial layer of skin, superficial but partial thickness and a full-thickness classified as the first, second, third and fourth degree burns (²). The skin can be exposed to a mechanical disruption by the burns injury that causes losing a part or whole of skin, since the skin acts as a protective barrier against many microorganisms and environmental conditions (³). This loss of skin enables the human flora, environmental microbes and other pathogenic microorganisms to invade the burned area of burn patients to reach the deeper tissues and become colonized with microorganisms (⁴).

*Staphylococcus aureus* is the most important pathogen in the burns unit which can take the opportunity to colonize the burn wound which are a normal human flora present in the skin and respiratory tract. Nowadays, Methicillin-resistant *Staph. aureus* (MRSA) also resistant to a broad spectrum of antibiotics, that is considered as a serious nosocomial pathogen in burn unit due to multi-drug resistance and its outbreak potential (⁵). *Mec A* and *hlb* genes were carried on chromosomes (⁶). While *erm A, erm B* and *etb* gene carried on plasmid which it can easily move from one strain to another, and it has an important role in their virulence, resistance and bacterial pathogenicity (⁷).

Material and Methods

A total of 223 burn swabs were collected from the burn patient’s unit during the period from September to December 2019 in AL-Hussain Teaching Hospital in AL-Nasiriya City, Southern of Iraq. All samples were
collected under available sterile conditions via transport-swab media and then directly transported to the laboratory to perform microscopy, culture, and sensitivity analysis. A formula was prepared for all patients, including sample number, name, date, age, gender and residence. Using both PCR and DNA sequence technique.

**Statistical Analysis**

All data of the present study were statistically analyzed by using Microsoft windows 10 Excel (version2010) and SPSS version 24 (ANOVA for Least Significant Difference LSD and Independent T. test).

**Results**

Out of total (223) clinical sample (201) were positive and (22) 9.87% were negative, (70) 31.40% represented by *Staph. aureus* followed by *Pseudomonas*. Spp and then *Enterococcus*. Spp have been had a second and the third percentage respectively 29.60% and 12.55%, while *Escherichia coli* were got the lowest percentage 0.44%, and the remained percentage for other types of bacteria. According to age groups and gender the result shown in both (Tables 1 & 2) All (70) isolates of *Staph. aureus* bacteria were subjected to antibiotic sensitivity the results showed in (figure1). The isolate designated as multidrug-resistant (MDR), (24) 34.28% were extensively drug-resistant (XDR) and only (2) 2.85% isolates were pan-drug-resistant (PDR). There were statistically significant differences in Antibiotics susceptibility against *Staph. aureus* (P>0.01).

Molecular result explains in (figure 2) There were statistically significant differences in gene frequency of *Staph. aureus* according to gene number (P>0.01).

**Table 1:** Distribution of patients according to age group and bacterial type.

<table>
<thead>
<tr>
<th>Bacteria (year)</th>
<th>Staph. aureus</th>
<th>Other bacteria</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>1-15</td>
<td>12</td>
<td>6.6</td>
<td>11</td>
</tr>
<tr>
<td>16-31</td>
<td>24</td>
<td>13.3</td>
<td>57</td>
</tr>
<tr>
<td>&gt; 31</td>
<td>26</td>
<td>14.4</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>34.3</td>
<td>119</td>
</tr>
</tbody>
</table>

Cal. χ²: 4.057  Tab. χ²: 9.21  df: 2  P > 0.01

**Table 2:** Distribution of patients according to gender.

<table>
<thead>
<tr>
<th>Gender Bacteria</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Staph. aureus</td>
<td>27</td>
<td>14.9</td>
<td>35</td>
</tr>
<tr>
<td>Other bacteria</td>
<td>64</td>
<td>35.4</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>50.3</td>
<td>90</td>
</tr>
</tbody>
</table>

Cal. X²: 1.707  Tab. X²: 6.63  df: 1  P value: 0.01
Cal.X\(^2\): 526.72    Tab.X\(^2\):33.92    df:22    p-value:0.01

(Figure 1): Antibiotics susceptibility against *Staph. aureus* bacteria.

Cal.X\(^2\): 55.84    Tab.X\(^2\):9.49    df:5    p-value:0.01

(Figure 2): Frequencies of single gene in isolated *Staph. aureus*.

**Discussion**

Bacterial identification and distribution of patients according to age group and gender

In the present time the burn wound infections become as one of the most important public health worldwide problem due to its potentially serious complication that happened approximately after injury \(^8\). The current study revealed that *Staphylococcus aureus* is the predominant pathogen in burn unit followed by *Pseudomonas*. This study was consistent with the local study in Iraq provided by Spp which concluded that (66) out of (80) *Staph. aureus* was the predominant bacteria (33.33%) followed by *Pseudomonas* Spp (31.81%) \(^9\). According to age group, the results of the current study recorded that the higher patients infected with infectious bacteria was in the second age group whereas the first age group was recorded as the lowest percentage. Hence, the third age group recorded the highest group infected with *Staph. aureus*, as that agreed with finding reported by \(^{10}\) who provided that 16-30 age group had the highest percentage. In contrast, \(^{11}\), his study revealed that burn injuries were significantly common among young age group less than 20 years (70.4%). The third age group in the current study was the most infected with *Staph. aureus* may be due to their age who susceptible to many compromised factors that made them more susceptible to *Staph. aureus* \(^{12}\). The reason behind these differences might be due to that the...
second age group (16-30) years is most active in doing cooking, driving, etc. but also most of it was due to suicides (by burning) as what I noticed during my study. Also the elderly and new-born those who are immune suppressed Particular groups at higher risk exposure to \textit{Staph. aureus} infection. According to gender, males are more exposure to infection than females whereas female recorded the highest most patients infected with \textit{Staph. aureus} as that agreed with this study \cite{13}, Ethiopia, from 114 burn patients were males’ infection 58(50.9%) more than females 56(49.1%) also the females recorded the the most infected patient with \textit{Staph. aureus} 35(53.0) while the males got the percentage 31(47.0) rather than female. This may be due to that the males are exposed to burns as they driving cars, wearing a combustible clothes. In my country males may be affected more due to their presence as revolutionaries whom they were exposed to a very hot water by suppression of the authority. In the case of females were more likely exposed to \textit{Staph. aureus} due to contamination as it appears in my result or due to other unknown reasons.

\textbf{Antibiotics susceptibility and Molecular Identification}

The current study of the antibiotic susceptibility for \textit{Staph. aureus} its 100% resistance against Oxacillin, Cefoxitin and penicillin was consistent with the local study in Iraq provided by \cite{19}. But, my results showed the beginning of an almost complete resistance against some of macrolides and aminoglycosides respectively Erythromycin, clindamycin and Tetracycline in contrast to last study that considered they were not resistance. My subsequent results were corroborated completely with other researcher from the same country which carried out by \cite{14}, also they agreed with me by the sensitivity test my results showed that the bacteria are more sensitive to the following antibiotics such as Vancomycin and Chloramphenicol as in his results, and that is also deals with study outside the country provided by \cite{15}, Iran, deals with my result in both the resistance and sensitivity to the previous antibiotics. Despite the development of control and prevention methods, challenges in the treatment of staphylococcal infections are accompanied by several mechanisms such as biofilm formation in this bacterium enzymes production such as beta lactamase \cite{16}, and also the misuse and overuse of some antibiotics \cite{15}. My own opinion, in additions to the previous reasons it is may be due to the contamination in and around the burn unit, including the staff and other than that, led to the formation of new resistance genes, the current study shows 100% resistance to \textit{Mec A} gene and \textit{erm A} gene and the appearance of new strains that possess a lot of \textit{etb} gene in Iraq, all these conditions are responsible for the appearance of more new dangerous mergence strains.

The current study showed that all (70) of \textit{Staph. aureus} isolates were positive100% for16SrRNA and \textit{Mec A} gene that the results showed almost semi complete percentage. As that’s agreed with the local study provided by \cite{17}, in Iraq, they found all 96 \textit{Staph. aureus} isolates 100 % positive that were identified by PCR. Also that is agreed with study worldwide carried out by \cite{18}. Local study carried out by \cite{19}. In Iraq out of 140 \textit{Staph. aureus} isolates 113 bacterial isolate were MRSA. Also my result deals with this study which provided by \cite{20}, Iran, all burn swab were positive to \textit{Mec A} gene. Detection of both \textit{erm A} and \textit{erm B} gene in \textit{Staph. aureus}, I could not find this percentage in my country, perhaps it is due to no one act on these genes in burn unit. Worldwide, the current study disagreed with this study provided by \cite{21}, they show that the percentage against macrolides in burn patients, the prevalence of both \textit{erm A} and \textit{erm B}, 11% (19/170) and 3.5% (6/170) respectively. My study agreed with study carried out by \cite{22}, they found that \textit{erm A} is the predominant, and the resistance rate. For \textit{etb} and \textit{hlb} Genes, all previous studies have been proven that \textit{etb} gene is not present, or present in a small quantities in both our country and worldwide as that deals with local study in Iraq provided by \cite{19}, their sources showed that this gene is not available in Iraq before, so they found that out of (113) clinical isolates 5.31% have a positive results for \textit{etb} gene, this also corresponds to other international studies In a Turkish study done by \cite{23}, detected none \textit{etb} toxin gene, it is absence ,in the United States the study carried out by \cite{24}, the frequency range of \textit{etb} gene in MRSA was 0-22%, and this is terrible compared to ( 62.58%) rates out of 70 samples as that indicated by the current study. For \textit{hlb} gene I agreed with local study from Iraq provided by \cite{25}, as well as my results disagree with next study whom showed that no one of (MRSA) strains carry the \textit{(hlb)} gene which carried out by \cite{26}.
Conclusion

There were high rates of burn infections due to *Staphylococcus aureus* resistance to many antibiotics. Thus infections cannot be easily controlled due to various virulence factors and resistance gene which most of them carried on plasmids that mediate the appearance of new resistance strains. Also for the investigation of antibiotic resistance may provide crucial information about the control of such infections so it will be necessary to accurately identify antibiotic resistance on routine susceptibility tests.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required

References


Difficulty in Baby Care Activities, Postpartum Fatigue: A Comparison between Rooming-In and Non-Rooming-In Health Care Facilities

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Abstract

Introduction: Rooming-in is one of the baby-friendly hospital initiative steps. Rooming-in has positive outcomes for mothers and newborns. However, the effect of rooming-in on postpartum fatigue and the difficulty in baby care activities is hardly investigated. Therefore, the purpose of this study is to identify and compare difficulty in baby care activities and postpartum fatigue between rooming-in health care facilities and non-rooming-in facilities.

Method: A Quasi-experimental design was used. A total of 152 postpartum women were recruited from two hospitals in Jordan. Two self-administered questionnaires were used to collect data. Independent sample t-test was used to analyze the data.

Results: The women in the rooming-in group scored significantly higher level of postpartum fatigue than women in the non-rooming-in group. There were no significant differences between study groups related to difficulty in baby care activities.

Conclusions: Postpartum rooming-in practice doesn’t affect the difficulty in baby care activities, but it influences the level of postpartum fatigue. Therefore, the health care providers should consider the level of postpartum fatigue among the women when implementing rooming-in.

Key words: Baby care activities, BFH, fatigue, Jordan, postpartum, rooming-in

Introduction

As the early postpartum period significantly affects short and long term maternal and infant outcomes, careful and proper care should be practiced during this critical period¹⁻². Health care facilities demonstrate different health care modalities during this period. Baby friendly hospitals initiative (BFHI) is one of the initiatives that hospitals perform to maximize the health benefits for mothers and newborns. Rooming-in is one of the ten steps of the BFHI³.

Rooming-in is keeping the mother and her baby together in the same room after and during hospitalization, rather than keeping them separated, until it medically recommended⁴. Rooming-in found to be beneficial to mothers, families, and their newborns, as it facilitates the transition of mothers and their newborns from hospitals to home, aiding in breastfeeding and enhances maternal-fetal attachment⁵,⁶.

On the other hand, rooming-in could affect the mother’s ability to perform the baby care activities and increase postpartum fatigue⁷. Postpartum fatigue is a common experience during postpartum that could impact the maternal and infant wellbeing⁸. Previous studies demonstrated that the level of postpartum fatigue did not differ significantly between women in the rooming-in group and women in the non-rooming-in group⁹,¹⁰. On the other hand, a recent study conducted in Korea reported that the fatigue level is higher among the rooming-in group than the non-rooming-in group¹¹.
Rooming-in and non-rooming-in issues had been scarcely investigated, previous studies comparing them focused on the neonatal and the breast feeding outcomes\[4, 12, 13\]. Therefore, the purpose of this study is to identify and compare difficulty in baby care activities and postpartum fatigue between women in rooming-in and non-rooming-in health care facilities.

We hypothesized that the difficulty in the baby-care activities perceived by women in the rooming-in group will be less than the difficulty in the baby-care activities perceived by women in non-rooming-in group. Also we hypothesized that the postpartum fatigue level among women in the rooming-in group will be more than the postpartum fatigue level among women in the non-rooming-in group.

**Materials and Methods**

**Design:** We used a quasi-experimental design (non-equivalent control after only design) to conduct the study.

**Sample and settings:** A convenience sample of women was recruited. The sample consisted of two groups, a rooming-in group, and a non-rooming-in group. The study participants were women aged between 15-49 years, gave birth normally to healthy singleton newborn at 37-plus weeks of pregnancy, whose newborn babies weighed between 2500 g and 4000 g, who developed no health issues or complications during pregnancy, delivery, and during the immediate postpartum period. Women with the following complications were excluded from the study [prolonged first stage of labor (not more than 12 hours) and second stage of labor (more than two+1 hour (one hour for epidural analgesia) for multigravida (3+1 hour (one hour for epidural analgesia),primigravida, had no instrumental delivery, and whose newborn babies had no health problem during the prenatal or delivery period]. According to neonates’ condition, Apgar score is seven or more at one and five minutes after birth, and the neonate did not have diseases. The women able to read and write Arabic language and consented to participate in the study. The sample size for medium effect size (ES) at power .80 and alpha=.05 using t-test was 64 for each group \[14\]. The sample size increased by 20% to overcome the attrition of participants, accordingly, the sample size was 155 women\[15\]. The study setting is the postpartum wards in two university hospitals in Jordan. One in Amman and the other in Irbid governorate. One is certified as a BFH, and therefore apply rooming-in, and the other doesn’t apply rooming-in.

**Data collection procedure:** The principal investigator started the data collection after getting the ethical approval from the University of Jordan and the targeted hospitals. The researcher met the women at the targeted hospitals in the postpartum wards. Screening for eligibility was done through reviewing the women’s data on the records with the nurses’ help. The women who met the criteria were invited to participate. The study purposes, the roles of the women, risks, benefits, and the rights of the women to refuse or withdraw from the study were explained. Anonymity and confidentiality were maintained and guaranteed. After accepting to participate, the study package contains the cover letter, informed consent, and the questionnaires were distributed to them. Data collection was done from July to November 2020. The questionnaires were completed in the woman’s room at the wards on the morning of discharge.

**Instrumentation:** Structured self-administered questionnaires were used to collect data. These questionnaires are: Difficulty in baby-care activities scale, and visual analogue scale, in addition to the demographic datasheet.

1. The difficulty in baby-care activities was measured by a Likert scale. The scale was developed by Lia (2015) based on an intensive literature review and her clinical experience. The 17 point Likert scale is composed of the following care categories: “feeding, cleansing, health and safety, and pacifying behavior.” This scale has 4 points ranging from 1: “not difficult” to 4: “very difficult”. A higher score indicates a higher level of difficulty. The total score ranges from 17 to 68. The content validity index (CVI) was .91\[7\]. In the current study, the CVI was .75, and the Cronbach Alpha was .95. The questionnaire was developed in Chinese language, to use in this study, it was translated to Arabic language and back translated by two independent researchers according to the WHO guidelines\[16\]. Areas of disagreement and conflict was resolved through discussion and then agreement.
2. Fatigue level was measured by the visual analogue scale (VAS). The VAS is a 10-cm horizontal line. The participants asked to mark their subjective feelings at the point that best describes their perceived fatigue: the left-hand endpoint of the line means “No fatigue at all”; and the right-hand endpoint means “complete exhaustion”; fatigue levels increase from left to right\[17\]. The last part of the questionnaire is a demographic data sheet that measured the demographic and obstetric variables.

Data Analysis: The statistical package for the social science (SPSS) (version 20), was used to analyze the data. Descriptive analysis statistics were used to describe sample characteristics, Descriptive statistics were also used to identify difficulty in baby-care activities, and postpartum fatigue level. To compare the homogeneity of the two groups concerning demographic and obstetric variables, an independent sample t-test and Chi-square test were used. Finally, an independent sample t-test was used to determine the differences in the difficulty in baby care-activities, and postpartum fatigue between the two groups.

Results

One hundred fifty-five women met the inclusion criteria and accepted to participate in the study (75 from the rooming-in group, and 80 from the non-rooming-in group). Seventy-five women completed and returned the questionnaire from the rooming-in group, and 79 women completed and returned the questionnaire from the other group. The response rate was 99.35%. Finally, one hundred fifty two questionnaires entered the analysis (73 from the rooming-in group, and 79 from the non-rooming-in one).

Demographic differences between rooming-in and non-rooming-in group

To assess the homogeneity of the sample characteristics, an independent sample t-test and Chi square test were used. There was no significant differences in the women’s demographic and obstetric characteristics between the two groups. Table(1) presents the demographic and obstetric characteristics for both groups.

Table 1: Demographic and obstetric differences between women in rooming-in and non-rooming-in group (n=152)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Rooming-in</th>
<th>Non-rooming-in</th>
<th>χ2/t</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>n (%) or</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>29.1 (4.86)</td>
<td>30.18 (5.0)</td>
<td>-.95</td>
<td>.34</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary or less</td>
<td>22(30.1%)</td>
<td>18(22.8%)</td>
<td>4.78</td>
<td>.09</td>
</tr>
<tr>
<td>College/bachelor</td>
<td>48(65.8)</td>
<td>50(63.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate studies</td>
<td>3(4.1%)</td>
<td>11(13.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>435.8 (61.3)</td>
<td>453.3(87.9)</td>
<td>-1.53</td>
<td>.13</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>33(45.2%)</td>
<td>33(41.8%)</td>
<td>.18</td>
<td>.74</td>
</tr>
<tr>
<td>Village</td>
<td>40(54.8%)</td>
<td>46(58.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Para</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primipara</td>
<td>11(15.1%)</td>
<td>16 (20.3%)</td>
<td>.69</td>
<td>.52</td>
</tr>
<tr>
<td>Multipara</td>
<td>62(84.9%)</td>
<td>63 (79.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned Pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>47(64.4%)</td>
<td>57 (72.2%)</td>
<td>1.06</td>
<td>.38</td>
</tr>
<tr>
<td>No</td>
<td>26(35.6%)</td>
<td>22(27.8%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont... Table 1: Demographic and obstetric differences between women in rooming-in and non-rooming-in group (n=152)

<table>
<thead>
<tr>
<th>Type of feeding</th>
<th>Exclusive BF</th>
<th>Synthetic feeding</th>
<th>Both of them</th>
<th>(\chi^2)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34 (46.6%)</td>
<td>5 (6.8%)</td>
<td>3 (6.8%)</td>
<td>.84</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td>31 (31.2%)</td>
<td>6 (7.6%)</td>
<td>42 (53.2%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postpartum discomfort</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33 (45.2%)</td>
<td>40 (54.8%)</td>
</tr>
<tr>
<td></td>
<td>35 (63.3%)</td>
<td>31 (36.7%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Previous information related BFH</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35 (47.9%)</td>
<td>38 (52.1%)</td>
</tr>
<tr>
<td></td>
<td>50 (63.3%)</td>
<td>29 (36.7%)</td>
</tr>
</tbody>
</table>

*\(P\) value significant at \(\alpha = 0.05\)

M: mean
SD: standard deviation
t: t value
\(\chi^2\): Chi square value

The effect of rooming-in and non-rooming in health care facility in difficulty in the baby-care activities as perceived by the participating women

To test the first research hypothesis, an independent sample t-test was used. There were no significant differences between the two groups in the total mean score of the difficulty in baby care activities, the mean score for the rooming-in group was \((M=23.31, SD=7.54)\) and \((M=23.26, SD=9.6)\) for the non-rooming-in group, \((t=.049, p=.96)\). The results indicated that women in the rooming-in and the women in the non-rooming-in group did not differ significantly in the total mean score of the difficulty in baby care activities, and both groups have low level of difficulty. Table(2) presents the results of the independent sample t-test to assess the group differences in the total mean score of difficulty in baby care activities.

| Table 2: The Independent Sample t-test of Mean Differences in the Difficulty in Baby Care Activities in the Rooming-in Group and the Non-Rooming-in Group (N=152) |
|-------------------------------------------------|-----------------|-----------------|-----------------|---------|
| Study groups                                    | Mean            | Standard Deviation | P value for leven test | T    | P value* |
| Rooming-in                                      | 23.31           | 7.255            |                   | .013   | .049    |
| Non-rooming-in                                  | 23.26           | 9.853            |                   | .049   | .961    |

\(t\): t value

P value significant at .05 (two-tailed)
The effect of rooming-in and non-rooming health care facility in the postpartum fatigue level of the participating women

To test the second research hypothesis, an independent sample t-test was run. There were significant differences in the mean fatigue level between the two groups (M=5.58, SD=2.91) for the rooming-in group and (M=4.61, SD=2.09) for the non-rooming-in group, (t=2.60, p=.010). The results demonstrated a moderate level of postpartum fatigue in both groups. However, the fatigue level in the rooming-in group was significantly higher than the non-rooming-in group. Table 3 presents the results of the independent sample t-test for the mean differences in the fatigue level between the rooming-in and non-rooming-in group.

### Table 3: The Independent Sample t Test for The Mean Differences In Fatigue Level Between Rooming-in and non-Rooming-in Group (N=152)

<table>
<thead>
<tr>
<th>Study groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>P value for leven test</th>
<th>T</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooming-in</td>
<td>5.58</td>
<td>2.91</td>
<td></td>
<td>0.70</td>
<td>2.60</td>
</tr>
<tr>
<td>Non-rooming-in</td>
<td>4.61</td>
<td>2.09</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P value is significant at .05 (two-tailed)

t: t value

**Discussion**

Postpartum women are expected to carry out most of the baby care activities in the health facilities including: feeding, cleansing, safety and health, and pacifying. Rooming-in environment enables the mothers to provide complete care for themselves and their newborns with nurses’ support[18]. It is expected that mothers in rooming-in settings experience less difficulty in providing care for their newborns. As they can observe nurses while providing care for the baby beside mothers, and asking for help and advice on issues related to baby care. Women in the rooming-in settings experience a higher level of confidence while providing care for their newborns[10]. The study results demonstrated no significant differences between the women in the rooming-in group and the women in the non-rooming-in group in the difficulty in doing the baby care activities. Both groups demonstrated a low level of difficulty. This result may be due to the time of collecting the data, as the assessment of the study variables was done at the first 24 hours after giving birth and before the women discharge, at this time, the assistance of their family members and nurses are available which explain this result. The investigation of this variable for a long time and more than one point of measurement may show the difference between groups. The results of our study are consistent with the finding of lia et al. (2015) study, which compares the difficulty in baby care activities among postpartum women who delivered in the rooming-in facility according to the type of delivery, the findings showed no significant differences between the two groups. Inconsistently, the confidence in doing baby care activities was higher in the rooming-in group compared with the non-rooming-in group in another study[10].

Postpartum fatigue is one of the most common health concerns during postpartum period that may extend from births to one year, and it can impact maternal and fetal wellbeing[8, 19]. In rooming-in settings, the mothers providing care and assessment of their newborns for about 24 hours. It is expected that women who gave birth in rooming-in settings to experience a higher level of fatigue than women who gave birth in non-rooming-in settings, as the babies in non-rooming-in settings brought to the mothers from the nursery upon their request. The study results demonstrated that postpartum women
experience a moderate level of fatigue. This finding is consistent with another study, where postpartum women reported a moderate level of fatigue [20]. Additionally, the results showed that postpartum women who gave birth at rooming-in facilities experienced a higher level of fatigue than postpartum women who gave birth at non-rooming-in facilities. These results are in line with study results conducted in Korea, which found that women in rooming-in settings had a significantly higher level of fatigue than women who partially apply rooming-in (14). On the other hand, other studies demonstrated no significant differences between groups in term of postpartum fatigue[9, 10]. The inconsistent results about postpartum fatigue might be related to the different times of data collection, and the varying fatigue scales that were used in measuring it among postpartum women. The consensus regarding a unifying and universal fatigue scale is warranted to enable the researchers to assess fatigue level among postpartum women.

**Conclusions**

Rooming-in could not affect the mother’s ability to do the baby care activities. However, it could increase the level of postpartum fatigue. Assessment of fatigue level at immediate postpartum period and regularly during hospitalization to intervene accordingly is warranted. Hospitals should apply rooming-in in a more flexible way that takes postpartum fatigue levels and the ability to do the baby care activities into considerations. Nurses in the postpartum wards should be aware of the importance of applying rooming-in according to the women’s needs and concerns.

**Implications for practice, policy, and research**

Based on the study results, health care providers, including nurses, should assess fatigue level, and the ability of postpartum women to accomplish the baby care activities, especially in rooming-in settings. The study recommended using the visual analogue scale as an easy and quick assessment tool to evaluate fatigue level during hospitalization especially, in rooming-in settings, and to intervene accordingly using pharmacological and non-pharmacological strategies. Nurses in postpartum wards should consider the importance of assessing fatigue levels frequently and then intervene assuring flexible implementation of rooming-in based on the postpartum women’s needs and concerns. It is recommended that policymakers work together with baby-friendly hospital initiative authorities to develop and implement a more flexible rooming-in policy. Improving accreditation criteria to enables nurses to implement rooming-in in a flexible way is needed.

For future studies, it is recommended to use the baby care activities scale in other population and settings to confirm its validity. It is also recommended to conduct a study utilizing a longitudinal design with more than one point of data collection to determine accurately the effect of rooming-in on the study outcomes. A comparison of primiparous women and multiparous women related to outcome variables is needed. Furthermore, a qualitative study to understand in-depth the experiences of postpartum women in rooming-in facilities is warranted.

**Conflict of Interest Statement**

No Conflicts of Interest.

**Funding**: None.

**References**


Impact of Occupational Stress on Nurses’ Job Performance According to Nurses Perception

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Abstract

Nursing is a risky profession. Nurses face a lot of stressors. The purpose of this paper is to review the previous researches discussed the impact of nurse’s job stress on nurses’ performance. This paper used the electronic searches: Google scholar, EBSCO and CINAHL. This paper discussed the level of stress and different types of stressors among nurses in different settings. And, the type of relations between job stress, clinical performance, job satisfaction, quality of life, physical and mental health of nurses were discussed.

Keywords: nurses, job stress, occupational stress, job performance, and work stress.

Introduction

Nursing is a very sensitive and demanding occupation, and nurses exposed to the different situations that influence their physical and mental health (1). Nurses are exposed to the life-threatening injuries and diseases due to their risky profession. Nurses have a compressed program, complex hierarchy of power, having human health responsibility, exposed to people who are dying, face emergency situations, and deal with complex equipment's (1). Occupational stress in nursing is very common, that affect physical, mental, and social equilibrium. These factors lead to the high level of stress among nurses, which lead to negative consequences such as: delay or absence on work, depression, fatigue, low job performance, that lead to low quality of care (1).

Job stress define as “an individual’s response to external stimuli in the environment” (2). Also, occupational stress was defined as “harmful physical and emotional responses that occur when the requirements of a job do not match the resources, capabilities and needs of the worker” (3). Job stress lead to the negative effect on individual physiology, psychology, and behaviors (such as job performance). Stress divided into two dimensions: challenge stress, that nurses can overcome it, and used it to develop their career, like: job load, and time urgency, and hindrance stress, that nurses can’t overcome it, and negatively affect their career development, like: work insecurity, and role conflict (2).

Occupational stress has a financial burden on health care systems, World Health Organization (WHO) estimated the cost of work stress and its related problems about $150 billion annually (4). Besides that, low job performance and reduced quality of nursing services, are affect patient safety (3). According to the American Institute of Stress Work, stress is responsible about 80% of work injuries and 40% of workplace turnover (5). Job or work stress is responsible about 70% of absenteeism,
and waste about 10% of country gross domestic product. It estimated that 93% of nurses under stress factors in their work (6).

Job performance was defined as “the actions and behaviors of individuals in roles and responsibilities of their work that contribute to organizational goals”(3). Developing job performance of nurses lead to organizational success (7). Occupational stress may be caused by poor management, poor working conditions, and lack of support from supervisors and colleagues, hospitals administrations can be enhanced nurse’s performance by develop strategies to improve work environment that reflect not only on performance of nurses, but also on the quality of nursing services provided (4).

This review paper aimed to search the impact of occupational stress on the job performance of the nurses.

Method

Search methods: The electronic searching was conducted in a different database: Google scholar, EBSCO, and CINAHL. Key search terms used: nurses, job stress, occupational stress, job performance, and work stress.

The studies that focused on the topic of occupational stress, were published in English between 2015 and 2020 were included in the review. While, studies published before 2015 were excluded.

Search Outcomes: The result of searching literature yields 30 studies for review, 16 studies excluded when read the title, and 4 studies excluded when reading the abstracts, and 10 studies were included in the review.

Discussion

There are two types of stress which are strongly correlated. The challenge stress is positively associated with job performance and public service motivations (PSM). While, hindrance stress is negatively associated with job performance and public service motivation(2,8).

A study was conducted to compare if there is a difference between job performance, occupational stress, and the general health between nurses in psychiatric departments and nurses in emergency departments in Milad, Erfanian, Iranian in Tehran, Iran.

The data revealed that job stress, job performance, and general health among nurses in both departments are vary. Psychiatric department nurses job performance, stress, and general health are greater than emergency department nurses, that means psychiatric nurses are more affected (1). Another study was conducted to assess occupational stress, job performance, and job satisfaction in three teaching hospitals. According to study, there is significant inverse relationship between occupational stress and job performance, and job satisfaction. Nurses have moderate level of stress and job satisfaction, and high level of job performance. There is no relation between job satisfaction and job performance. Besides that, male nurses, single nurses, and high educational level have more job satisfaction (3).

The effect of occupational stress among nurses is become more crucial in pediatric department and neonatal intensive care units. A study assessed the relationship between occupational stress among nurses working in pediatric wards and neonate intensive care units and job performance. The results showed that all nurses have high level of stress. Lack of aid and resources, work atmosphere in pediatric wards and NICU’s consider high job stressors among nurses, whereas hospital characteristics consider low job stressor. Results also showed no relationship between occupational stressors and nurses job performance in pediatric ward and NICU’s in Khartoum hospitals. Managerial support and behaviors affect job performance(4).

The relation between job stress and head nurses job performance was also assessed. A was study performed in four hospitals related to MOH in Egypt. The results revealed that most of head nurses (60%) have a high job stress level in terms of: work environment stressors, lack of organizational support, work and education stressors, staff nurse’s stressors, material stressors, work satisfaction, and achievement stressors. Also study showed that the high percentage of head nurses (83.3%) had low job performance, and there was no significant correlation between level of stress of head nurses and their job performance(7).

In accordance with the aforementioned studies a study examined also the impact of work-related stress on registered nurses’ performance in Katutura State Hospital in Windhoek, Namibia. The researchers
found that about 95% of nurses exposed to the high level of stress. And, they found that work load, staff shortage, lack of participation in decision making, and bad relations with colleagues, lack of training on stress management, absence of leisure time to reduce stress, lack of managerial support, and bad working conditions are the most common stressors (9-11).

In Jordan, a study aimed to assess the relation between job stress that resulting from (family factors, economic factors, peer competition, job difficulty and organizational climate) and nursing performance in King Abdullah Hospital in Irbid, Jordan. The results showed that the organizational climate is the major stressor. Family factors not consider a stressor according to the nurses and affect their job performance, but performance affected by other four stressors as the follow: organizational climate, then economic factors, job difficulty and finally peer competition (12-17).

The nursing students perceived stress in clinical training was examined. A Jordanian study aimed to assess the relation between nursing students perceived stress in clinical training and their clinical performance, and relation between stress related factors and clinical performance. The researchers conclude that students perceived stress in clinical training is negatively correlated with their clinical performance, and also the stress related to the lack of knowledge and skills, and that related to patient’s care are negatively correlated with clinical performance. The study also revealed that the major sources of stress among students are: student’s assignments, patient care, teacher and nursing staff, and lack of knowledge and skills, respectively. The mean perceived stress is (45.9%), and mean of student’s clinical performance is (73.4%) (18).

In Greece, a study examined the relation between nurse’s work stress, caring behaviors of patients, and nurse’s health-related quality of life. According to the study, the most common stressors for nurses were: limited knowledge in dealing with death and dying, unable to aid patients and families’ emotional needs, conflict with supervisor, and uncertainty with therapeutic effect of management. Also, there is a negative correlation between work stress and all dimensions of caring behaviors inventory. There are certain stress factors that are independent predictor for each CBI dimensions, such as: conflict with co-worker is independent predictor for affirmation of human presence, and associated with mental health. Discrimination stressor is predictors for quality of life (physical health) (5).

**Conclusion**

Nursing is one of the riskiest profession, nurses exposed to the different stressors in their work area, these stressors related to different causes, such as: work environment, co-worker relations, conflict with supervisor, work load, painful situations, lack of knowledge and skills among nurses, lack of support. There is a negative relationship between nursing occupational stress and their job performance, job satisfaction, physical and mental health, quality of life, and positive relationship between job stress and nurses’ burnout.

**Conflict of Interest:** No conflict of interest.

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**References**


Patient-related Barriers to Pain Management among Cancer Patients

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Abstract

Recently, despite the development of cancer pain treatment, many cancer patients still suffer from pain. This review aimed to explore the patients-related barriers to pain management among cancer patients. The electronic searching was conducted in a different database: Google Scholar, CINAHL and PubMed. According to previous studies barriers can be classified into patients/family-related barriers, health care provided-related barriers, and institutional-related barriers. Patient-related barriers were reluctant to report pain, fear from tolerance, addiction, and side effect, and culture. This review provides summary data about the patient-barriers to effective cancer pain control.

Keywords: Cancer Pain, Barriers, Pain Management.

Introduction

In 2016, about 15.5 million persons with cancer were alive in the United States (US) and, by 2026 that total is likely to increase to almost 20 million (1). Pain is considered one of the common symptoms in cancer patients and can be initiated by cancer itself, surgery, treatment, treatment side, tests and procedures (2). Studies proposed that pain occurs in about 50% of cancer survivor’s patients (3,4).

There are effective methods to avoid and control pain in and after cancer treatment; quick identification of pain signs, communication and classification regarding pain type and severity, pharmacologic and non-pharmacologic pain control choices and education of patient (5).

Recently, despite the development of cancer pain treatment in terms of surgical, drug and non-drug interventions, many cancer patients still suffer from pain (6,7), about 30% of cancer patients do not obtain pain medication comparative to their amount of pain (8). The untreated pain is still a major feared consequence of cancer (9,10,11). It affected on physical, functioning, psychological well-being and social interaction of patients (12,13,14). In Jordan the prevalence of pain among Jordanian cancer patients is high (15).

This study aimed to explore the patients related barriers to pain management among cancer patients.

Method

Search methods: The electronic searching was conducted in a different database: Google Scholar, CINAHL and PubMed. Key search terms used: cancer pain and barriers.
The studies that focused on the topic of Aortic valve stenosis, were published in English between 2000 and 2018 were included in the review. While, studies published before 2000 were excluded.

**Search outcome:** Exploring of literature yield about 50 studies for review, after reading the studies about 35 study were excluded and 15 studies met the inclusion criteria.

**Discussion**

In the literature, the barriers of pain management among cancer patients were classified into three groups: (1) patients related barriers, (2) physician related barriers, and (3) institutional and health care system related barriers (16). Patient related barriers were patient reluctance to report pain and adhere to treatment recommendations. Besides, cognitive, affective and sensory patient-related barriers to cancer pain management with opioid analgesics. Physician related barriers were insufficient physicians’ knowledge about cancer pain management, inadequate patterns of pain assessment, and inadequate opioid prescription. Institutional and health care system related barriers were relevant only in countries with restrictive opioid prescription regulations (16).

A cross-sectional study was conducted to identify the barriers to effective cancer pain control in patients and their families in Jordan. The study indicated a four main barriers to pain control: communication concerns, fears connected to addiction, side effects and fatalistic beliefs (17). Another cross-sectional study was conducted to investigated barriers of pain management in Australian patients. The data indicated that patients fear of opioid drug addiction, tolerance, and side effect. Patient reduce dose of opioids drug because they fear side effect such as constipation. Also, they fear from needle injection so they seek alternative therapies such as massage, acupuncture, herbal remedies and heat (18).

In Turkey, a cross-sectional study was conducted to define the patient-related barriers to cancer pain management. The study found that patients have high scores of misconception regarding pain and pain management. Also, patients did not report their pain because they fear from medicine (19). In USA, a study was carried out to search barriers to pain management in African American and Hispanic cancer patients. The data reflected that the majority of patients expressed a concerns regarding the possible addiction to opioid drugs and the tolerance development. Also, the patients defined their physicians as the most common and trusted source of data about cancer pain (20).

Patients’ perceived barriers to handling cancer pain can be influenced by culture (21-30). A recent qualitative study aimed to discover the patient’s barriers to cancer pain management from the viewpoint of cancer patients and their family. The data reflected that the main barriers to effective cancer pain management were: knowledge deficit, regulatory factors and the use of cultural and religious approaches to manage pain (21). Another study was conducted to compared differences in Asian and Western patient-perceived barriers to handling cancer pain. That study indicated that Asian patients’ perceived barriers to handling cancer pain were significantly greater than those for Western patients (particularly for concerns regarding disease progression, fatalism and tolerance) (24).

In Korea, a study confirmed poor knowledge and inappropriate practices among physicians and nurses regarding pain management (31). Studies have revealed that nurses have knowledge gaps regarding pain management, which negatively impact the quality of pain control in cancer patients (32). Nurses’ knowledge about opioids’ role in pain management was also reported as low by a study conducted in Italy, highlighting their irrational fear of the opioids’ potential to result in addiction or respiration inhibition (33).

**Conclusion**

The barriers of pain management among cancer patients were classified into three groups. Patient-related barriers were reluctant to report pain, fear from tolerance, addiction, and side effect, and culture. Study confirmed poor knowledge and inappropriate practices among physicians and nurses regarding pain management. This review provides summary data about the barriers to effective cancer pain control.

**Conflict of Interest:** No conflict of interest.

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References


Effect of Mirror Therapy on Motor Function in Extremities and Daily Activities in Stroke Patients

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Abstract

Stroke is a disease that cause of partial loss some of brain functions that can lead to many of disorders, such as motor, perception, language, sensory, and can lead to limitation in daily activities. Mirror therapy (MT) is a new therapeutic method used for stroke patients. This short review was intended to assess the effect of the MT on motor function in extremities and daily activities in stroke patients. The electronic searching was conducted in Google Scholar and PubMed. this review paper confirmed that that apply of MT on stroke patients give benefits and significant improve the some of motor function and some of daily activities. Further studies are essential to verify MT long-term effects and its impact on daily activities among stroke patients.

Keywords: Stroke, Mirror Therapy, Motor Function, Daily Activities

Introduction

Stroke is a disease that cause of partial loss some of brain functions, and may lead to many disorders, such as motor, perception, language, and sensory. In addition, stroke can lead to limitation in daily activities, such as eating, drinking, and dressing (1). Stroke is two types: Ischemic (88%) and hemorrhagic (12%) (2).

Stroke occur between 2.7 - 4.7 per 1000 people, and one of three disease cause of death, and one-third of the patient’s development of permanent disabilities (3). More than 60% of stroke patients have impaired of daily activities related to neurological deficits (4). Hemiplegia is paralysis in one side of body occurs in one upper extremity and one lower extremity occurs from stroke (5).

Rehabilitation play very important role in the recovery of patients after stroke, one of these methods is Mirror Therapy (MT). The MT is a new therapeutic method use for patients who have hemiparesis or motor disabilities occur from stroke, this method shows positive outcomes with those patients (3). It applies by place the unaffected limb front the mirror and the affected limb back the mirror, then the movement of unaffected limb give for patient illusion this occur in affected limb (6).

Many people have inadequate information about the benefits of MT. The current study may add to knowledge about this type of therapy, and so to improve movement in affected limb and help patients to take care
of themselves. This short review paper was intended to assess the effect of the MT on motor function in extremities and daily activities in stroke patients.

Method

Search methods: The electronic searching was conducted in a different database: Google Scholar and PubMed. Key search terms used: Stroke, Mirror Therapy, Motor Function, Daily Activities.

The studies that focused on the topic of MT were published in English between 2015 and 2020 were included in the review. While, studies published before 2015 were excluded.

Search outcome: Exploring of literature yield about 35 studies for review, after reading the studies about 25 study were excluded and 10 studies met the inclusion criteria.

Discussion

It is uncertain exactly how MT works, it’s been proposed that this illusion causes brain changes that assistance the patient improve his mobility. The MT is comparatively easy to do, and has the possible to be accomplished at individual household (8).

The MT was used to increase motor function after stroke. Many studies found the MT improve motor function and daily activities in stroke patients. A study aimed to examine the effects of MT together with exercise tasks on the function of the upper limbs and activities of daily living. The study finding confirmed that MT is more effective comparing with conventional therapy for the training of stroke patients to develop their upper limb function and activities of daily living (9).

Also, the MT with the conventional stroke rehabilitation program was examined. A study explored the effects of mirror therapy on spasticity, pain intensity and upper limb motor functions among patients with hemiplegia accompanied by complex regional pain syndrome type 1. The study found that adding of MT to a conventional stroke rehabilitation program provides more progress in the upper limb motor functions and pain perception than conventional therapy alone (10). Another recent study found that the use of MT in stroke patients have significant improve the level of motor function (2).

Past studies found evidence of a significant effect of MT on motor function compared with other interventions. Besides, there was evidence of a significant effect of MT for walking velocity, passive range of motion for ankle dorsiflexion, step length and balance capacity (11). Another study found that the use of MT in rehabilitation treatment for stroke patients can improve of lower limb motor function (12).

Finally, there was similarly some confirmation that MT may decrease pain. However, the level of evidence is inadequate, and further investigation is required to evaluate the influence of MT on pain (13).

Conclusion

These short review shows the MT is safe and effective and it has benefits in improve some of the motor functions in extremities and daily activities in stroke patients. This short review paper provides some information about the benefits of MT to improve motor function and daily activities in stroke patients. Further studies are necessary to verify MT long-term effects and its impact on daily activities among patients in different stage of stroke.

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References


COVID-19 and Its Relation to Takotsubo Cardiomyopathy

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Abstract

Takotsubo Cardiomyopathy (TC) is a stress caused heart condition, it might be transient or complicated with other irreversible conditions. Recently, many case reports were released indicating of COVID-19 cases complicated with TC. This paper aimed to review studies that examined the correlation between COVID-19 and TC. An electronic search was carried out using PubMed and Google Scholar data base. The TC is one of the major COVID-19 complications that must be taken into consideration. The exact mechanism is still unknown. Further studies are needed in order to confirm this relationship in addition to investigating the underlying mechanism.

Keywords: Takotsubo cardiomyopathy, Takotsubo syndrome, COVID-19.

Introduction

Takotsubo Cardiomyopathy (TC) is a cardiac event that is induced by stress, and its initial presentation is similar to that of Myocardial Infarction (MI) (¹). The TC is usually caused by major stressful or emotional events; it was also found that TC induce systemic inflammatory state that remains for more than 5 months after the initial presentation (²).

Patients with TC could have normal ECG, ST-elevation, and ST/T wave changes or transient left bundle branch block or arrhythmias (³). There is no clear optimal treatment of TC, however, in some cases the infusion of inotropic agents could be a good treatment option (⁴).

In March 11, 2020, World Health Organization (WHO) announced COVID-19 outbreak as a global pandemic. Hence, it was of a high importance to do comprehensive studies regarding the disease and its possible outcomes. Since then, several reports were released shed the light on the link between COVID-19 and TC (⁵,⁶,⁷).

This paper aimed to review studies that examined the correlation between COVID-19 and TC.

Methods

Search methods: The electronic searching was conducted in PubMed and Google Scholar. Key search terms used: Takotsubo cardiomyopathy, Takotsubo syndrome, COVID-19.

The studies that focused on the topic of Takotsubo cardiomyopathy and COVID-19, were published in English between 2016 and 2020 were included in the review. While, studies published before 2016 were excluded.

Search outcome: Exploring of literature yield about 35 studies for review, after reading the studies about 25 study were excluded and 10 studies met the inclusion
criteria.

Discussion

As a result of the conducted search, several studies were carried out that explored the correlate between COVID-19 and TC. According to (6), they studied the characteristics of patients who had confirmed COVID-19 and TC based on transthoracic echo cardiographic features, accordingly, the authors suggested that the TC was caused by the COVID-19 associated emotional distress.

A case report of a 67 years old female patient, who was presented complaining of fever and several other symptoms and was diagnosed as COVID-19 case, it was noted that the patient was anxious, three days later she developed TC with atrial fibrillation, she was treated with dual anti-platelet therapy and was discharged with caution (7).

Another case report was released about a 40 years old male patient who was admitted to emergency room complaining of cough and chest pain, later on he was diagnosed with TC and he was treated by rescue TPE for 5 days, the authors could not exclude other cardiac causes of TC due to the sensitivity of dealing with COVID-19 patients. However, they suggested that it was caused by COVID-19 emotional stress (5).

A study reported a case of TC and COVID-19 in 52 years old male patient, he was admitted complaining of shortness of breath. The lab tests revealed elevated CRP and D-Dimer. He was treated by colchicine and methylprednisolone and heparin continuous infusion. It was suggested that the cytokine storm caused by COVID-19 induced the TC along with the emotional distress (8).

On the other hand, some other studies reported that patients were diagnosed with TC without the presence of COVID-19, but the underlying cause was referred to COVID-19. In Greece, a case report indicated that a patient was admitted complaining of chest pain after she was watching the numbers of COVID-19 deaths, ECG showed ST elevation and impaired left ventricular systolic function and was diagnosed with TC (9). In USA, a case report indicated that a 72 years old female was presented and diagnosed with COVID-19 and ischemic stroke, incidentally, she was also diagnosed with TC which was complicated with cardiogenic shock and leaded to death (10).

In another case report, a 72 years old female patient was diagnosed with COVID-19, seven days later she developed TC. The report recommended that carrying frequent ECG for COVID-19 patients due to the high risk of developing TC. Moreover, the report stated that the QTc prolongation of TC could be further complicated by the medications that cause QTc prolongation leading to lifethreatening arrhythmias, hence, caution must be taken while dealing with such cases (11).

One possible explanation that the cortisol very high levels in concert with catecholamines high levels related to the common basic mediator(s) (cytokine storm and inflammation) might produce a direct ‘toxic’ impact on cardiomyocytes in COVID-19 patient, and have a role in the occurrence of TCM (12). Another possible mechanism was suggested that TC might be caused by the viral entry via ACE-2 which is highly expressed in lung and cardiac tissue (13).

Finally, to increase our understanding about the TC pathophysiology and the role of stress-related hormones. There is a needed for studies that compare stress-related hormones (such as the cortisol levels) among patients with TC and COVID-19 and others with COVID-19 without TC (12). Also, in the period of COVID-19, health care providers should give attention to different cardiovascular conditions associated with COVID-19 (14), TCM is one of these conditions that can be activated by physical and emotional impact of COVID-19 (15-27).

Conclusion

The recent studies suggest that the TC is one of the major COVID-19 complications that must be taken into consideration. Many mechanisms where suggested including the direct emotional distress and psychological stress, the elevated levels of cortisol and other stress hormones, the cytokine storm and the entry of the virus via ACE-2. However, the real underlying mechanism is still unknown. Further studies are needed in order to confirm the relationship between COVID-19 and TC. Moreover, healthcare providers have to do frequent ECG for COVID-19 patients in order to detect any cardiac complications including TC.
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Knowledge and Attitudes Regarding Pain Management among ICU Nurse’s

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Abstract

Pain management is an integral part of nursing care and is one of the most important patient rights. This short review is intended to examine the knowledge and attitudes regarding pain management among ICU nurse’s. This paper is used the electronic searches: google scholar, PubMed, CINAHL and World Health Organization (WHO). Nurses had good knowledge and a lower level of attitude towards pain management. However, the nurse’s insufficient knowledge of pain management may be due to many factors. Continuing education programs should be conducted for nurses regarding pain and its management. Future studies are needed on the knowledge and attitude regarding pain management.

Keywords: Critical Care Nurses; Pain Management; Knowledge; Attitude.

Introduction

Pain is defined as an “unpleasant sensory and emotional experience correlating with actual or potential tissue damage”(1). Pain is one among the preeminent reasons bringing people to hospitals, and it is a common symptom for several cases inside medical care units(2).

Pain is a subjective psychological and physiological experience, and accurate pain assessment and therefore the implementation of effective interventions are vital for successful pain management (3). It is a modified through physiological, psychological and environmental factors such as past events, culture, diagnosis, coping strategies, fear and anxiety(4).

Pain is a stressful experience. Many studies reported that about 55% to 78.6% of in patient’s experience moderate to severe pain. In spite of training courses, application strategies, and multidisciplinary pain management teams, there are still problems associated with pain management (5).

Pain can be managed through a multi-disciplinary team effort (6,7). In their professional capacity as part of a healthcare team, nurses play an important role in relieving pain and improve the patient comfort (8). The approach of the nursing staff toward pain management is important for relieving and reducing pain (9). In all stages of pain starting with diagnosis a nurse is one of the most important members of a healthcare team and puts the most effort into action. Thus, the ability of nurses to appropriately assess pain in order to eliminate it is critical for effective pain management (10,11). It is vitally

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important for ICU nurses to have the knowledge about pharmacological and non-pharmacological interventions used in pain management.

Pain management is a serious aspect in health care, all healthcare professionals have to eliminate pain and suffering when possible, it must be the main goal for them because ineffective pain management can affect patients’ psychological, physiologic, and financial status(12), causing more suffering, slower recovery(13).

This short review is intended to examine the knowledge and attitudes regarding pain management among ICU nurse’s.

Method

Search methods: The electronic searching was conducted in some different databases: Google scholar, PubMed, CINAHAL, and World Health Organization (WHO), using the key search terms: “Critical care nurses”; “Pain management”; “Knowledge”; “Attitude”.

The studies published within the period 2007-2020, in English language, and focused on the nurse’s knowledge and attitude regarding pain management were included in the paper.

Search outcome: Searching of literature yield 50 studies for review, 15 excluded when reviewed the title, 20 when reading the abstract and 15 studies met the inclusion criteria.

Discussion

Aydeed et al., in (2017) assess knowledge and attitude towards pain management among nurses, the researcher reported that the nurses had good knowledge and a lower level of attitude towards pain management than those reported in other studies, however, the situation requires various educational initiatives and quality improvement that can enhance the nurse’s knowledge and behavior in the field of pain management(1).

While, Issa et al. in (2017) examined the impact of an educational program on the knowledge and attitude about pain assessment and management among critical care nurses. The researchers found a significant improvement in knowledge and attitudes about pain assessment and management among ICU nurses, it was evident after delivering pain management education program. Deficiencies and preconception in pain assessment and management can be improved through implementing pain management educational programs(2).

The pain management service’s roles are described in the context that a person’s experience of pain is the result of biological, psychological and social factors(3). Regarding the knowledge of pain management among nurses, there are a significant difference between the general knowledge relating to pain management using pharmacological and non-pharmacological methods. There are statistically significant, positive, and strong correlations between the nurse’s knowledge about general knowledge on pain and knowledge about pharmacological and non-pharmacological methods (8,11).

The Turkish study was conducted at a university hospital to examine the nurse’s knowledge level toward pain management procedures that could be used for the care of patients in pain. This study reported that medical-surgical nurses had the lowest level of knowledge regarding pain control methods compared with ICU nurses who record the highest level of knowledge(14).

The nurse’s insufficient knowledge of pain management may be due to curricular gaps during training; insufficient clinical supervision, study days, and workshops for nurses and the negative attitude of nurses as the new information learned at workshops was not easily applied in clinical practice (15).

A recent study aimed to assess the effectiveness of pain management education program among nurses working in ICU. The study found that the program was effective in increasing the knowledge level and attitudes of ICU nurses to be more positive toward pain management the(16).

Conclusion

Using educational program and interactive methods can be associated with an increased level of knowledge and attitudes regarding pain management among ICU nurse’s. This can help nurses in the future to improve the quality of services for patients through better evaluation and treatment.
The nurses received low level for pain beliefs, which remained the same after education. This suggests that the nurses may use non pharmacological methods in pain management, such as visualization and distraction in addition to pharmacological methods. Using no pharmacological options may have a positive effect on patients and help them participate in pain control.

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The Role of Nursing Practice to Prevent Ventilator-associated Pneumonia in the Intensive Care Units

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Abstract

Ventilator-associated pneumonia (VAP) is considered as the foremost common hospital-acquired risk associated with patients on a ventilator, and there are numerous avoidance techniques that can be connected by Intensive care unit (ICU) nurses in arrange to diminish the hazard of frequency of VAP in ICU.

This paper aimed to evaluate the effect of the nursing role, applying guidelines and adherence of health professionals to VAP bundle prevention strategies in an attempt to decrease rates of VAP in mechanically ventilated adult patients. An electronic searching was performed in the databases: Google Scholar, ResearchGate and PubMed. The review paper showed that the applying of VAP bundle prevention as daily component of nursing care among ICU nurses in the ventilated patient can decrease incidence rate of VAP; and can be considered as a sensitive indicator that reflects patient outcomes. There are many factors among nurses for not adhering to these guidelines which may affect on patient’s health outcome. This review paper provides nurses working in ICU with efficient knowledge regarding nurses’ care guidelines to prevent the incidence rate of VAP in ICU. Further study is necessary in order to verify a good understanding and confirm the factors that may affect the development and increase incidence rate of VAP.

Keywords: Ventilator-associated Pneumonia, Prevention, Intensive Care Unit.

Introduction

Globally, Ventilator-associated pneumonia (VAP) is a lung infection that progress within 48 hours in a patient who is on a ventilator, an infection may happen if germs enter through the tube and get into the patient’s lungs (1).

The VAP is one of the most common infections that occur in the Intensive Care Unit (ICU). The development of VAP in ICU patients has been associated with increased patients’ morbidity, longer admission period, increased health care costs, and higher mortality rates (2). Compliance with the best nursing practices in ICU may help to prevent and manage serious problems such as those caused by VAP.

Therefore, Evidence-based guidelines were created in 2004 which is finally updated in 2011 by the Institute for Healthcare Improvement (IHI) in an attempt to decrease incidence rate of VAP in hospitals. These guidelines are called VAP Prevention Bundle and they integrate a number of evidence based strategies...

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and guidelines proved to prevent VAP (3). This bundle including elevation of the head of the bed between 30° and 45°, daily “sedation vacations” and assessment of readiness to extubate, deep venous thrombosis prophylaxis, peptic ulcer disease prophylaxis, daily oral care with chlorhexidine, keep endotracheal cuff pressure between 25 cm to 30 cm H2O, and endotracheal tube with inline and subglottic suctioning (3).

There are two major factors related to oral condition which may increase the risk of development of VAP. The presence of a coated tongue and oral bleeding in ICU admission. These factors increase health care provider attention and importance of proper maintenance of oral care and hygiene before endotracheal intubation, which may lead to a decrease the development, incidence and prevalence of VAP in ICU patients (4,5). On the other hand, adherence of healthcare professionals to selected measures (head of the bed elevated to 30°, proper cuff pressure between 20 and 30 cmH2O, oral hygiene performance and oral hygiene performance with chlorhexidine) of VAP prevention bundles in an adult ICU does not show difference between patients with or without VAP (6).

ICU nurses need to know the preventive strategies and the preventive methodologies and integrate them into their daily clinical practice. These strategies and methodologies may include: Suctioning of endotracheal secretions, hand hygiene before and after each suctioning (washing with soap and water or alcohol-based antiseptic solution), use of sterile suctioning equipment, aseptic technique (use of sterile gloves), use of personal protective equipment’s (facemask, goggles) during the procedure. Nurses play an important role in applying non-pharmacological preventive measures that are directly related to decrease incidence rate of VAP. There are many reasons that lead to decreases in nurse’s compliance in applying scientific evidence in their practice including lack of knowledge, working arrangements, demotivation, excessive workloads, lack of time, and reasons related to the working environment and organizational structure of the system. Nursing workload can potentially decrease compliance with VAP guidelines and increase the risk of adverse events (7).

There are many different factors that may contribute to development of VAP Including length of stay (patients staying in the ward for over 15 days). A statistically significant was found between VAP and co-morbidities (e.g., Chronic Obstructive Pulmonary Disease(COPD), diabetes, alcoholism and obesity). There was a relationship between the reason for patient ICU admission and the development, occurrence of VAP; patients with multi-organ trauma, haemorrhage / hemorrhagic shock and fractures more often suffered from VAP (8). Hyperxemia could be considered as risk factor associated with development of VAP in critically ill patient (9).

Many factors and variable affect nurses ‘compliance with VAP prevention guidelines, the nurse to patient ratio and the unit’s beds capacity were the major factors that affected the nurses’ compliance with these guidelines. Nurses in units with a 1:1 ratio achieved higher compliance than their counterparts in ICUs with a 1:2 nurse: patient ratio. Those ICUs with lower bed capacity and 1:1 nurse–patient ratio demonstrated a lower rate of VAP. Nurses who work in ICUs with the next staffing level appeared prevalent compliance with VAP-prevention rules and a lower rate of VAP in comparison with ICUs with a lower staffing level, one reason for nurses’ destitute compliance might be the need of instruction and education (10).

Continuing nurse’s education and training on bundle prevention guidelines have a crucial role in nurse’s development, which enhance their professional growth, efficient care, deliver safe appropriate practice, and improve quality of care to patients (11-13).

Among ICU nurses there’s a gap in knowledge regarding new and updated guidelines to prevent VAP and a lack of studies discussing nurse’s adherence to these guidelines, this review provides nurses with these guidelines and factors that avoid their adherence to best nursing practice. Thus, the present paper intends to present a mini critical review on the effect of the nursing role, guidelines and adherence of health professionals to VAP bundle prevention guidelines in decreasing rates of VAP in mechanically ventilated adult patients cared for in ICU; to identify current evidence-based nursing and medical care to support health care providers in preventing VAP in their patients; and present factors that may influence the nurses’ compliance with ventilator-associated pneumonia prevention guidelines.
Method

Search Methods: The search was conducted in three electronic databases include: Google Scholar, Research Gate and PubMed.

The literature was searched using the keywords “ventilator-associated pneumonia, nursing role, and prevention, ventilated associated pneumonia bundle, nursing compliance”. The studies published in 2015 and more, published in English, and discussed the specific strategies for managing VAP, factors that may affect the adherence of nursing to the VAP bundle prevention, and risk factors that may increase the incidence of VAP among ICU patients were included in the current review.

Search Outcome: Searching of the literature bring about 50 studies for review. This final evaluation resulted in 11 studies, excluding studies consisting only of abstract, review studies and irrelevant studies.

Results and Discussion

The VAP is one of the most common hospital-acquired risks associated with the patients on a Mechanical Ventilator (MV) which can be preventable by incorporating the optimal nursing bundle as a daily routine component of care in the ventilator patient in ICU, and can be considered as a nursing-sensitive indicator that reflects patient outcomes (2).

Applying and using an updated IHI care bundle approach within routine nursing care lead to a sustained reduction in the incidence and development of VAP in ICU patients. Also, the elevation of the Head of the Bed (HOB) and sedation vacation bundle elements were initially the most deficient (94%) (3).

The presence of a coated tongue and oral bleeding in ICU patients on admission could be considered markers for the development of VAP (4). So, using of hydrogen peroxide (HP) mouthwash by ICU nurses for ventilated patients is more effective than using Normal Saline (NS) for reducing VAP (14,15).

Among ICU nurses older age and lower workload were independently associated with lower compliance with non-pharmacological measures to prevent VAP; non-compliance is not because of a lack of knowledge regarding VAP bundle or an increased workload but presumably because of other contextual factors (7).

Patients with co-morbidities such as COPD, diabetes, obesity and alcoholism are a high-risk group for the development of VAP in ICU patients. Further attention by health care provider should be paid to patients admitted to the ICU with multi-organ trauma, haemorrhage and fractures /hemorrhagic shock as patients predisposed to VAP development (8). Also, hyperxemia may increase risk of VAP development (9).

Although previous studies highlighted the importance of ICU nurse’s compliance to VAP bundle prevention guidelines to reduce the occurrence of VAP, the compliance of ICU nurses with VAP-prevention guidelines was insufficient. Reasons for not strictly adhering to the guidelines and may have affected the rate of VAP and length of hospitalization are a higher nurse to patient ratio and larger ICU bed capacity (10). Furthermore, the lower nurses staffing and increased nursing workload are two major factors associated with increased incidence rate of ventilator-associated pneumonia and mortality in ICU patients, demonstrating enough nurses staffing is a prerequisite for the availability and quality of critical care services in hospitals (16,17). Accordingly, contentious education and training of ICU nurses on bundle prevention care may decrease the development of VAP in ICU’s (11,18).

Recommendations and implications for nursing

The current paper provides knowledge regarding nurses’ care guidelines to prevent the incidence rate of VAP in ICU, and provides factors that may affect nurses’ compliance with VAP prevention guidelines. This knowledge should be used to inform policymakers and infection control teams in hospitals about aspects of nursing practice such as education, training and nurse-to-patient ratios.

ICU nurses should have continuous education and training on bundle prevention care; then nursing administrators and hospitals should pay more attention on nurses’ education and training which may help to decrease the incidence rate and development of VAP in critically ill patients in ICU.

Conflict of Interest: No conflict of interest.

Ethical Clearance: Taken from Princess Salma
Faculty of Nursing, AL al-Bayt University ethical committee.

Source of Funding: Self.

References
Effect of Unsafe Actions and Conditions with Work Accidents in the Rotary Section of Plywood Industry Pt.x Jember, Indonesia

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Abstract

The current industrial development is getting more advanced and developing every year. However, these developments have not been matched by awareness in understanding and carrying out work in accordance with good occupational health and safety regulations so that work accidents still occur in every industrial environment, including the plywood industry. The general objective of this study is to analyze the circumstances that affect the incidence of corporate work accidents in Jember, Indonesia. This research is a quantitative study, using an analytic observational research design with a cross sectional method. The population used was all the rotary plywood industry workers of PT. X Jember Regency as many as 339 workers, with a sample size of 76 people. The sampling technique used in this study was quota random sampling. The results showed that there was an influence between unsafe actions on the incidence of work accidents with the Sig. .042, and there is an influence between unsafe conditions and work accidents with the Sig. .016. The occurrence of work accidents does not just happen but happens because of something wrong either because of the fault of the worker or because of the unsafe conditions of the worker or the work environment.

Keywords: Industry, Work Accident, Unsafe Action, Worker

Introduction

Potential occupational health and safety hazards (K3) lead to long-term impact risks (physical, chemical, biological, and ergonomic factors hazards), direct safety risks (fire, electrical short circuit, mechanical hazards, housekeeping), risks to disruption of daily activities (drinking water facilities, toilets, dining room or canteen, first aid facilities, transportation), and psychological risks (sexual harassment, work stress, violence in the workplace) (10). Work accidents occur in the process of interaction due to contact between humans and tools, materials, and the work environment. 88% of work accidents occurred due to unsafe actions, 10% due to unsafe conditions, and 2% due to things that could not be avoided. Work accidents can occur due to a work environment that is not conducive (unsafe conditions), and can also occur due to factors of the workers themselves (unsafe actions) (7).

Unsafe action is a dangerous action committed by workers which occurs due to various reasons such as lack of knowledge, inability to work, physical disabilities, unsafe attitudes and behavior, stress, lack of skills, decreased concentration, lack of motivation, job satisfaction. Meanwhile, unsafe conditions are unsafe conditions of equipment, machines, aircraft, materials, work environment, work processes, and work systems (6).

Based on data obtained from BPJS TK in Isafety Magazine December 2018 period, the number of work accidents in 2015-2016 has decreased, namely, as many as 110,285 cases in 2015, as many as 101,367 cases in 2016. Work accident cases increased again in 2017, namely as many as 123,000 cases, and increasing in...
2018, namely as many as 157,313 cases, ranging from minor, serious accidents to those with fatal impacts such as disability or death.

The plywood industry is one type of industry that uses a lot of machines in its production process. According to the Ministry of Forestry of the Republic of Indonesia in CDMI, the number of plywood factories still operating in 2013 was around 150 companies. One of the largest plywood producing provinces is East Java, amounting to 705,519 m$^3$. The number of wood industries in Jember Regency since 2013-2017 is as many as 139 industries which are generally engaged in the manufacture of furniture such as cots, cupboards, and the manufacture of other home materials. There are four plywood industries in Jember Regency including, PT. Murocco, PT. Kayu Lapis Sejahtera, PT. WijayaCahaya Timber, and PT.X, and of these companies PT.X is the industry with the highest rate of work accidents, namely 402 cases of work accidents from December 2015 to August 2018$^3$.

Based on the data obtained from the research site, there are 10-17 work accidents every month, which are based on several factors. First, unsafe action factors such as ignoring the use of PPE, not being careful when installing rotary engine blades, not complying with the SOP for using tools properly, joking with colleagues, rushing to finish the job. Second, unsafe conditions such as cables that are scattered and some are peeled off, working equipment that is not tidy, wood chips scattered on the floor, unsuitable work clothes, namely wearing a short sleeve shirt that makes the sleeve get caught in the wood peeling machine rotating, and there are other factors that cause work accidents that are not identified.

There are five areas in the PT.X plywood industry, namely, log pool (where to wash logs), rotary (cutting wood into veneer or wood sheets), press dryer (drying), and core repair (veneer repair), quality control (sorting and packing veneers that are ready to send, and of the five areas the rotary area is the area most frequently accidents at work. In the rotary area there is a wood cutting machine, where the machine continues to operate and rotate. Change of blades on each existing machine, still using the manual method, namely workers changing knives every half and every shift of work or when it is felt that the knife is no longer sharp. Cutting and stripping logs in this area produces wood chips, as well as the remaining unused sheets of wood. Often occurs in rotary parts, namely, the arm is scratched because the clothes are stuck into the rotating wood cutting machine, the hand cut by a hand clipper machine knife, the hand or finger is scratched by a rotary knife when installing the knife on the machine, the leg is hit by a log, punctured by a nail, and the eye is hit by a wood chip. The work accidents mentioned above occurred due to unsafe actions and unsafe conditions$^{11}$.

The general objective of this study was to determine the effect of unsafe actions and unsafe conditions with work accidents that occurred in the rotary section of PT.X, Jember Regency.

**Methods**

This research was categorized into a quantitative research which exerted analytic descriptive research design. This research collected the research data through quota random sampling. The research population was taken from all workers of plywood industry of PT. X Jember District in rotary section as many as 339 workers. The total sample of this research were 76 respondents. The method of analysis was multivariate and descriptive analysis. The dependent variable in this research was case of work accident, while independent variables were unsafe action and unsafe condition. The multivariate analysis was used and aimed to identify the effect of unsafe action and unsafe condition variables to the occurrence of work accident. Further, the data analysis in this research employed simple linear regression analysis method. This method was used because the data scale for either dependent variable or independent variables was categorical.

**Research Findings**

The unsafe action was a dangerous action which could harm people or environment. The unsafe action could occur based on internal factor from either work environment or external factor from outside of work environment. The following table 1 would list the unsafe actions which performed by workers at PT. X in the rotary section, Jember District.
Table 1. The Overview of Unsafe Action at PT. X Jember District

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Workers act safely</td>
<td>1</td>
<td>1,3</td>
</tr>
<tr>
<td>3.</td>
<td>Workers act unsafely</td>
<td>75</td>
<td>98,7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the table 1, it referred that the majority of workers in about 75 respondents (98.7%) still worked with unsafe actions, and only 1 respondents (1.3%) who have worked in safe action.

A work environment must be in safe and comfortable condition for the workers, wither it was related to work character, work machine and tool, and work environment condition should fulfill several points that must be implemented in order to create a safe work environment persistently, as the use of proper and complete personal protective equipment, work environment was free from hazardous material, lighting, ventilation, and many other supportive aspects. The condition of work environment in rotary section at PT. X Jember could be seen on this following table 2:

Table 2. An Overview of Unsafe Condition at PT. X Jember District

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Safe condition</td>
<td>75</td>
<td>98.7</td>
</tr>
<tr>
<td>3.</td>
<td>Unsafe condition</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>76</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the table 2, it referred that the majority of workers in about 75% respondents (98.7%) were in unsafe condition, while only 1 respondent (1.3%) who was working in safe condition.

The accident in workplace was not a case expected by either the workers or industry itself. But, the work accident was an unplanned and unexpected occurrence that just happened. Moreover, the work accident could be happened from either human factor or work environment factor. The following table 3 was an identification of work accident case at PT. X Jember District, especially in rotary section:

Table 3. The Identification of Work Accident Case

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable of Work Accident</th>
<th>Severity Level of Work Accident Case</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Light %</td>
<td>Medium</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Rotary Knife</td>
<td>0 0 48</td>
<td>63.1</td>
<td>28</td>
</tr>
<tr>
<td>2.</td>
<td>Hand Clipper Knife</td>
<td>0 0 49</td>
<td>64.5</td>
<td>27</td>
</tr>
<tr>
<td>3.</td>
<td>Material (log wood)</td>
<td>0 0 23</td>
<td>30.3</td>
<td>53</td>
</tr>
<tr>
<td>4.</td>
<td>Roll and Conveyor</td>
<td>0 0 46</td>
<td>60.5</td>
<td>30</td>
</tr>
</tbody>
</table>
Based on the table 3 regarding to an identification of work accident case, based on the injury severity level, the work accident case which caused by rotary knife, there were 48 respondents (63.1%) who have gotten an accident with medium injury level, and 28 respondents (36.9%) who have gotten an accident with severe injury level. In term of hand clipper knife, there were 49 respondents (64.5%) who have gotten an accident with medium injury level, and 27 respondents (35.3%) who have gotten an accident with light injury level. In term of material (log wood), there were 23 respondents (30.3%) who have gotten an accident with medium injury level and 53 respondents (69.7%) who have gotten an accident with light injury level. Last, in term of roll and conveyor, there were 46 respondents (60.5%) who have gotten an accident with medium injury level and 30 respondents (39.5%) who have gotten an accident with light injury level.

The most influential factor between unsafe action and occurrence of work accident on the workers of PT. X Jember District would be analyzed in this following table 5.

Table 5. The Most Influential Factors between Work Stress, Unsafe Action, and Work Accident Case

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E</th>
<th>Exp(B)</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe action</td>
<td>.887</td>
<td>.386</td>
<td>.253</td>
<td>2.299</td>
<td>.024</td>
</tr>
<tr>
<td>Unsafe condition</td>
<td>-1.428</td>
<td>.558</td>
<td>-.288</td>
<td>-2.557</td>
<td>.013</td>
</tr>
<tr>
<td>Constant</td>
<td>49.209</td>
<td>5.947</td>
<td></td>
<td>8.275</td>
<td>.000</td>
</tr>
</tbody>
</table>

The dimension of effect was indicated by EXP (B) value or odd ratio (OR) value. Based on the analysis result on the table 5, it referred the odd ratio (OR) value on variable of unsafe action, the odd ratio (OR) value was 0.253 which was denoted that the workers who worked with unsafe action would get the probability of work accident 0.245 times higher than the workers who worked with safe action. Next, on the variable of unsafe condition, the odd ratio (OR) value was -0.288 which was referred that the workers who were in unsafe condition would tend to have probability of work accident -0.288 times higher than the workers who were in safe working condition. Regarding to that analysis result, it showed that the most influential variable between unsafe action, unsafe condition, and work accident occurrence was unsafe action variable.

Discussion

Working, struggling to fulfill and achieve life goals, stress can be a great motivator. However, things that must be considered and emphasized are how to manage stress so that it does not get worse, heavier, and prolonged because it can reduce the body’s condition caused by physical and psychological disorders caused as a result of stress that is not immediately controlled. Someone who is diligent and accustomed to working under pressure may make stress a flavor and see threats as a challenge. Maybe they are able to turn stress into a possibility or opportunity to grow and develop in their work. For someone who is not used to stress in his work, he will show anxiety, helplessness, and even isolation because he feels threatened in facing a change or problem\(^\text{11}\). Some of the factors that contribute to work stress are insufficient time to complete work, unclear purpose of work, unclear instructions from leaders, no recognition of employee work results, lack of opportunities to participate in the workplace, responsibilities answer without clear authority, lack of social interaction between workers and leaders resulting in social disparities and differences in vision and mission, dangerous and unpleasant working conditions, less comfortable workplaces, less control than supervisors or leaders\(^\text{2}\). Unsafe action is an action that is endangering someone so that it causes an accident or incident. The
more someone acts unsafe, the more likely it is that an accident will occur. Minimizing the occurrence of work accidents must also be minimized so that workers act unsafe, namely by conducting safety training for new workers and holding additional training for other workers. Efforts to add training to change the mindset and habits of workers who still often underestimate work safety and act carelessly at work(3).

The things that underlie someone tend to take unsafe actions because they feel they are experts in their field, are in a hurry to finish a job, are accustomed to doing unsafe actions and have never had work accidents (workplace culture), following other workers who are not obedient to safety, lack of supervision from the leadership so that workers underestimate safety measures, there is no motivation from the leadership to work in safety, there is no clear warning or sanction related to unsafe actions(3). The majority of workers, namely 80.9%, act unsafe at work and this is due to inadequate knowledge of how to act safely at work and low motivation to work to take safe actions while working. Unsafe actions that many workers do, such as not wearing Personal Protective Equipment (PPE) by 62.7%, joking while working (23.7%), and placing oneself in an inappropriate position at work (13.5%)(1). There are several causes of work accidents, starting from the basic cause, namely the underlying causes in general, the occurrence of work accidents covering the social and economic environment, including stress. This basic cause can affect how the actions taken by workers while working and also the conditions that occur in the work environment which, if not controlled, will result in work accidents. All the components that cause work accidents affect each other, but there are those that affect directly and there are those that have an indirect effect.

The effect of unsafe actions and unsafe conditions on work accidents that occur in construction which concludes that the unsafe action variable has a 1,170 times higher effect on the incidence of work accidents than unsafe conditions which have an effect on 1,116 times higher on the incidence of work accidents(6). The first position that causes work accidents is unsafe action and after that unsafe conditions are followed by other factors(8). The practice of working safely for rotary employees shows the same results, namely as many as 85% of work accidents that occur are caused by the behavior of workers who work unsafe such as not wearing protective clothing while working, not wearing hand gloves, not wearing protective shoes with correct, do not tie the wedge of the rotary machine properly and carefully, removing the safety installation (machine guarding leveling) while others are working(9).

Suggestions that can be given by researchers are based on the results of the research, namely that the supervisors are expected to provide input about 3-5 minutes for each shift change related to the SOP of machines and work equipment, especially for machines that must operate continuously, and provide understanding to employees about the importance of health and work safety to minimize work accidents. In addition, the company is expected to train a safe work culture for all employees. It is necessary to carry out a sudden inspection (sidak) by the relevant Manpower Office to ensure that the work health and safety culture and programs in the company are running well.

**Conclusion**

Work accidents occur unconsciously, uncontrollably, unplanned, unexpectedly and unwanted by anyone. Unexpected because behind the accident there is no element of intent, let alone planned. There is an influence between unsafe actions and the incidence of work accidents with the Sig. .042, and there is an influence between unsafe conditions and work accidents with the Sig. .016.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** This research has undergone ethical test in ethics commission of health research of Faculty of Dentistry, University of Jember in this following registration number 926/UN25.8/KEPK/DL/2020

**References**

2. DahlanMaarifah. Analysis of the Causes of Work


Lungs’ Microscopic Patterns of Vessels in Patients Deceased with or by SARS-CoV-2 Infection

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Abstract

Background: even if specific mechanisms are not completely understood, several studies highlighted Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) ability to alter vascular homeostasis. In the literature, multiple reports of microscopic pulmonary findings of vascular structures in patients deceased by or with SARS-CoV-2 infection are available. Nevertheless, the scientific literature lacks a systematic analysis of these findings. Methods: the authors realized a systematic review of the literature in order to identify common microscopic patterns representative of pulmonary vascular damage: useful data for pathologists in clinical and forensic settings. The research yielded 23 articles (79 total cases). Quali/quantitative analysis was carried out. Conclusion: the review allowed to identify vascular thrombosis (especially in lesser caliber vessels) as common microscopic pattern. The recurrence of this pattern was confirmed by scientific literature data which demonstrate SARS-CoV-2 ability to interfere with coagulation cascade. Other meaningful microscopic findings were also discussed, even if their low frequency in study population did not allow to define them as common.

Keywords: COVID19; endothelium; forensics; lung parenchyma; pathology; SARS-CoV-2; vessels

Introduction

Even if specific mechanisms are not completely understood, several studies highlighted Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) ability to alter vascular homeostasis. Pulmonary vascular damage seems to have a fundamental role in the aforementioned phenomenon, because vascular structures (especially the endothelium) are considered as the anatomical substrate in which coagulative, immune, and inflammatory balances interact. Thus, according to the literature, the same vascular damage caused by the virus can simultaneously determine coagulation’s over-activation, improper cytokine release (cytokine storm), and immune system alterations. Several authors stated that the latter events constitute foundation for the progression of Coronavirus Disease 2019 (COVID19).

In the literature, multiple reports of microscopic pulmonary findings of vascular structures in patients deceased by or with SARS-CoV-2 infection are available. Nevertheless, the scientific literature lacks a systematic analysis of these findings. Their systematic study would be fundamental because it may allow to identify common microscopic patterns representative of pulmonary vascular damage: useful data for pathologists in clinical and forensic settings. For these reasons, the authors realized a systematic review of the literature in order to identify the aforementioned data, and to propose their systematic analysis in the light of the scientific literature.

Materials and Methods

At first, a systematic review of the scientific literature was conducted in order to identify articles...
containing pulmonary histological data of deceased people with positivity for Sars-CoV-2 infection. The research was performed on Medline electronic database (until November 10th, 2020) using the following algorithm: [histology AND (Sars-Cov-2 OR Covid19)]. The following inclusion criteria were used: articles written in English; articles containing the report of one or more cases in which the deceased had ante-mortem/post-mortem positivity for Sars-CoV-2 infection; articles reporting specific pulmonary histologic data for each case. On the contrary, articles containing generic summaries/descriptions of microscopic evidences of more cases were excluded.

The research yielded 2,152 potentially relevant articles. Among them, 33 articles and 3 cross-references matched the aforementioned criteria (Table 1). Then, the 36 articles were analysed in order to identify only the cases in which specific microscopic findings of vascular structures were described. This analysis yielded 23 articles that underwent full review (Table 1). Collected data of the latter articles are available in Table 2. They were finally reviewed in the light of the scientific literature. Excel statistic formulas were used to calculate Average, Standard Deviation, Median, and Mode.

Table 1: Number of Articles Included/Excluded for pulmonary microscopic findings

<table>
<thead>
<tr>
<th>Exclusion/Inclusion</th>
<th>Number of articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excluded reading the title</td>
<td>1622</td>
</tr>
<tr>
<td>Excluded reading the abstract</td>
<td>207</td>
</tr>
<tr>
<td>Excluded reading the entire article</td>
<td>265</td>
</tr>
<tr>
<td>Not in English</td>
<td>25</td>
</tr>
<tr>
<td>Positive for pulmonary microscopic findings</td>
<td>33</td>
</tr>
<tr>
<td>Cross references positive for pulmonary microscopic findings</td>
<td>3</td>
</tr>
<tr>
<td>Reviewed articles (positive for microscopic vascular findings)</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 2: Summary of reviewed cases

<table>
<thead>
<tr>
<th>Reference</th>
<th>Case #</th>
<th>Sex</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1</td>
<td>M</td>
<td>48</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>M</td>
<td>62</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>M</td>
<td>62</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>M</td>
<td>73</td>
</tr>
<tr>
<td>8</td>
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<td>F</td>
<td>81</td>
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<td>8</td>
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<td>F</td>
<td>75</td>
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<td>F</td>
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<td>8</td>
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<td>M</td>
<td>92</td>
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<td>8</td>
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## Table 2: Summary of reviewed cases

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### Table 3: Summary of the most common comorbidities

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Number of cases</th>
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<tr>
<td>Diabetes</td>
<td>42</td>
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<tr>
<td>Heart failure</td>
<td>36</td>
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<tr>
<td>Obesity</td>
<td>17</td>
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<tr>
<td>Aortic stenosis</td>
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<tr>
<td>Coronary artery disease</td>
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<tr>
<td>Kidney failure</td>
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<tr>
<td>Hypertension</td>
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<tr>
<td>Atrial fibrillation</td>
<td>6</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>6</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
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<tr>
<td>Dyslipidemia</td>
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<tr>
<td>Cardiovascular disease</td>
<td>3</td>
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<tr>
<td>Ischemic cardiomyopathy</td>
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<tr>
<td>Obstructive sleep apnea syndrome</td>
<td>3</td>
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<td>Congestive heart failure</td>
<td>2</td>
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<tr>
<td>Dementia</td>
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* not specified, F: female, M: male
### Table 4: Quali/quantitative representation of vascular microscopic findings

<table>
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<tr>
<th>Vascular localization</th>
<th>Findings</th>
<th>Number of cases</th>
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<tr>
<td>Peri-vascular findings</td>
<td>LC infiltrate</td>
<td>5 (1/5 CD3+)</td>
</tr>
<tr>
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<td>Generic inflammatory infiltrate</td>
<td>4</td>
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<tr>
<td></td>
<td>Fibrin</td>
<td>2</td>
</tr>
<tr>
<td>Vascular findings in vessels</td>
<td>Generic thrombi</td>
<td>37 (25/37 micro-thrombi)</td>
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<tr>
<td></td>
<td>Fibrin thrombi</td>
<td>7</td>
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<tr>
<td></td>
<td>Platelet thrombi</td>
<td>3 (1/3 CD61+)</td>
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<tr>
<td></td>
<td>Hyaline thrombi</td>
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<tr>
<td></td>
<td>Congestion</td>
<td>28</td>
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<tr>
<td></td>
<td>Inflammatory infiltration</td>
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<tr>
<td></td>
<td>Fibrin</td>
<td>3</td>
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<tr>
<td></td>
<td>Megakaryocytes</td>
<td>3</td>
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<tr>
<td></td>
<td>Platelets and NET</td>
<td>3 (PF4+ and H31+)</td>
</tr>
<tr>
<td></td>
<td>Platelets</td>
<td>1 (CD61+)</td>
</tr>
<tr>
<td></td>
<td>Complement</td>
<td>2 (1/2 5b-9+; 1/2 C4d+,C3d+,C5b-9+)</td>
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<tr>
<td></td>
<td>TE signs</td>
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<tr>
<td>Vascular walls</td>
<td>Hyperplasia</td>
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<td></td>
<td>Endotheliitis</td>
<td>5 (3/5 aspecific; 1/5 lymphocytic; 1/5 neutrophilic)</td>
</tr>
<tr>
<td></td>
<td>Necrosis</td>
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<tr>
<td></td>
<td>Apoptotic bodies associated with the endothelium</td>
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<tr>
<td>Neovascularization</td>
<td>Neovascularization</td>
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LC: lymphocyte, NET: neutrophil extracellular trap, TE: thromboembolism

### Table 5: Vessels’ caliber in case of thrombi

<table>
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<th>Caliber of vessels characterized by thrombi</th>
<th>Caliber</th>
<th>Number of cases</th>
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<td>Caliber of vessels characterized by thrombi</td>
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<td></td>
<td>Small/capillaries</td>
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<tr>
<td></td>
<td>Not specified</td>
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### Results

The 36 articles contained the description of 142 cases. Among them, in 79/142 cases specific microscopic findings of vascular structures were described. Main characteristics of these cases are summarized in Table 2 - 5. Average age of the 79 cases was 69.64 years old (Standard Deviation 13.81, Median 73, Mode 71). Their sex distribution was: male 52, female 23, 4 not specified. The most common comorbidities were diabetes (42), hypertension (36 cases), and obesity (17 cases). Quali/
quantitative analysis of vascular microscopic findings is summarized in Table 4 and 5.

Discussion

In the literature, multiple reports of microscopic pulmonary findings of vascular structures in patients deceased by or with SARS-CoV-2 infection are available1-4. However, these reports usually refer to single cases or small case series1,3. Thus, until now the scientific literature lacks a systematic analysis of these findings. In particular, common microscopic patterns of pulmonary vascular involvement/damage are not described. The present review pointed out the following indications on this topic.

COVID19 and coagulative thrombotic microscopic patterns

The results of the present review did not allow to identify a vascular pattern that was present in all reviewed cases. However, common findings were intravascular thrombi that recurred 49 times. The most part of them were described as micro-thrombi and/or identified in medium/small/capillary vessels. At microscopic evaluation, large vessel involvement was reported only in one case. In the scientific literature, pulmonary microvascular thrombosis was early suggested as responsible for COVID19 progression41,42, observing that infected patients were characterized by “profound hypoxia which was out of proportion to the preserved lung mechanics suggestive of significant pulmonary shunting, raising the possibility of a lung injury mechanism different from that of traditional ARDS”2. This statement was confirmed by Ackerman and colleagues who compared lungs of influenza A infected patients against SARS-CoV-2 ones, revealing as micro-thrombi were more prevalent in COVID-191. It is well known that viral infections – via multiple pathways – can impair the coagulation cascade causing haemorrhagic and/or thrombotic complications2. Indeed, in COVID19 one of the most common manifestations of altered coagulation cascade is the elevation of D-Dimer that is “a marker of coagulation cascade activation in the microvascular beds which has been shown to be pathologically elevated in 46% of SARS-CoV-2-infected patients and in 56% of those with severe disease”2. Typical features of coagulopathy in SARS-CoV-2 infected patients (i.e. D-Dimer, fibrinogen, von Willebrand factor, and VIII factor elevation, mostly normal or slightly depressed partial thromboplastin time (PTT), variable variation of platelet count, and normal XIa factor) suggest the prevalent activation of extrinsic coagulation cascade2. The latter is also known as the tissue factor pathway because it is triggered by tissue trauma and endothelial activation. This event causes the expression of high levels of tissue factor on vascular cells, resulting in activation of coagulation factors2. Several authors suggested direct and/or indirect SARS-CoV-2 ability to cause vascular tissue trauma/endothelial activation2,3,43. The direct activation hypothesis is based on SARS-CoV-2 ability to infect the host through the angiotensin converting enzyme 2 (ACE2) receptor which is also expressed by endothelial cells3. On the contrary, the indirect activation one has foundation in the so-called cytokine storm (principally IL-1 and IL-6 elevation) caused by the virus2.

In addition, it is important to note that in two cases the authors reported vascular deposits of C5b-9at immunocytochemistry, demonstrating complement activation (especially the alternative pathway). The latter finding is particularly suggestive because it is well known that complement system cross talks with the coagulation cascade at different levels2,44,45. In particular, the complement can induce tissue factor expression on the endothelium, and it can suppress mast cells’ fibrinolytic activity causing clot progression2,46. Thus, this phenomenon can be considered as a possible cause/concurrent cause of the aforementioned thrombosis in COVID19. Similar considerations can be related to the so-called neutrophil extracellular traps (NETs) that were identified in three cases at immunohistochemistry. NETs are principally composed by decondensed chromatin (DNA and histones) that is released by neutrophiles to immobilize microorganisms when they are activated by strong stimulations43. Recent studies highlighted NET’s immune-thrombosis ability in COVID19, demonstrating that “NET release is positively correlated with in vivo thrombotic potency in COVID-19”47. In particular, these complexes would be capable to activate tissue factor/thrombinaxis and platelets43,47. Indeed, different authors recognized NETs as linking factors between inflammation, coagulation, and thrombosis (locally
In addition, from a clinical point of view the aforementioned data are particularly meaningful because they seem to agree with the recent manuscript by Zuo and colleagues who reported the correlation between cell-free-DNA levels (NETosis) and acuity of COVID19, inflammatory response, and need for mechanical ventilation 49.

Talking about megakaryocytes, multiple studies suggested their common presence in SARS-CoV-2 affected lungs 50. In the present review, megakaryocytes’ population was identified in vessels in three cases. Despite this small number, the latter microscopic finding seems to agree with the scientific literature that highlighted megakaryocytes’ altered functions in SARS-CoV-2 disease. In particular, Bernardes and colleagues recently “hypothesized that altered presence and function of MKs might be a distinct feature of COVID-19”, describing higher number of megakaryocytes in severe COVID19 and reporting “an increased metabolic activity of MKs along the disease trajectory compared with that in healthy controls” 50. Thus, megakaryocytes may have a specific role in SARS-CoV-2 infection, however neither literature data nor the present review pointed out a common vascular microscopic pulmonary pattern of these cells.

In the light of the above, the aforementioned results allowed to identify vascular thrombosis (especially in lesser caliber vessels) as common microscopic pattern of pulmonary parenchyma in SARS-CoV-2 infected patients in lethal cases. The recurrence of this pattern is confirmed by scientific literature data which demonstrate SARS-CoV-2 ability to interfere with coagulation cascade. However, so far SARS-CoV-2 pro-coagulant mechanisms are not completely understood. In addition, it is not yet defined the reasons why thrombosis activation tends to involve especially lesser caliber vessels.

**COVID19 and vascular/endothelial inflammatory patterns**

Lymphocytic endotheliitis and apoptotic bodies are already described in surgical tissue specimens of SARS-CoV-2 infected patients. These findings are considered as the result viral interaction with endothelial cells. Even if SARS-CoV-2 ability to infect engineered human blood vessels – binding ACE 2 receptors of endothelial cells – is already demonstrated 51, it is important to highlight that apoptosis may not be triggered only by viral entry. The binding with endothelial cells’ surface can activate apoptotic pathway signaling 52. In the present review, apoptotic bodies within the endothelium were described in one case. Thus, the latter finding cannot be identified as a common vascular microscopic pattern, even if literature data report direct and/or indirect viral activity on the endothelium. Similar considerations can be related to endotheliitis that was reported in 5 cases. In particular, in 2/5 cases the authors respectively described this inflammatory phenomenon as lymphocytic and neutrophilic. Immunology of COVID19 is not yet completely understood 5, even if preliminary data suggest the following considerations on lymphocytic and neutrophilic cells: as mentioned above, neutrophilic cells seem to be implicated in NET formations; several reports pointed out the occurrence of T lymphopenia (reduction of CD4+ and CD8+ counts in peripheral blood in moderate and severe COVID19); on the contrary, the scientific literature highlighted that SARS-CoV-2 elicits a significant B cell response, determining rapid increase of virus-specific IgM, IgG and IgA, and neutralizing IgG antibodies 5. Thus, the localization of lymphocytes and neutrophiles in correspondence with the endothelium is consistent with literature data, even if – especially for lymphocytes – in the reviewed articles there were few immunohistochemistry studies which allowed to identify cells’ specific sub-types. In the present review, 15 cases were characterized by vascular/peri-vascular inflammatory infiltration. Among them in 5/15 cases the authors specifically described lymphocytes as prevalent population; on the contrary, in 10/15 cases they did not described cells’ specific pattern. In addition, in only 1/15 case at immunohistochemistry lymphocytes were characterized as CD3+. Thus, even if these data are consistent with literature’s indications, it was not possible to identify a specific vascular/peri-vascular microscopic pattern.

In the light of the above, the aforementioned results allow to state that – as for COVID19 immunology – until now common inflammatory microscopic patterns of endothelial/vascular pulmonary structures are not clearly identified in SARS-CoV-2 infected patients in
COVID-19 and pulmonary thromboembolism

In the scientific literature, pulmonary thromboembolism (PTE) was reported as a common finding in patients admitted to intensive care units. For example, in a cohort study of 107 patients the 20% was affected by PTE despite thromboprophylaxis. The comparison of this cohort “to a similar one hospitalized a year earlier and a smaller influenza cohort from the prior season” yielded the following result: “the frequency of PE was twice as high in the COVID group despite less computed tomography (CT) angiogram tests performed”. In the present review, even if multiple findings of thrombosis (especially micro-thrombosis) were identified, specific signs of PTE were described in 3 cases. Thus, the present review did not allow to define microscopic PTE signs as common in lung parenchyma of SARS-CoV-2 deceased patients.

COVID-19 and neovascularization

Pulmonary microscopic neovascularization was reported in one case. Thus, this finding cannot be considered common of SARS-CoV-2 infection in deceased individuals. However, Ackerman and colleagues recently pointed out the recurrence – at transmission electron microscopy – of new blood vessel formation by enhanced intussusive angiogenesis in lungs of patients who died from COVID19. This type of angiogenesis does not occur by conventional sprouting of new vessels, but it is characterized by “the presence of a pillar or post spanning the lumen of the vessel”. In addition, the authors reported that vascular angiogenesis allowed to distinguish “the pulmonary pathobiology of Covid-19 from that of equally severe influenza virus infection”, suggesting that “although tissue hypoxia was probably a common feature in the lungs from both these groups of patients, we speculate that the greater degree of endothelialitis and thrombosis in the lungs from patients with Covid-19 may contribute to the relative frequency of sprouting and intussusceptive angiogenesis observed in these patients”. Even if further studies are necessary in order to clearly understand this phenomenon (especially its relations with the clinical course of the disease), the abovementioned statement is confirmed by the high number of cases in which vascular thrombosis and/or endotheliitis were described in the present review.

COVID-19 and vascular wall hyperplasia

Significant growth of vascular endothelial and myointimal cells was reported in skin biopsies of cutaneous lesions during SARS-CoV-2 infection period. The authors reported a skin vasculopathic reaction pattern, suggesting “amicrovascular process with vascular wall cell injury” and vascular cell proliferation “confirmed by the increased numbers of replicating cells positive stained for Ki67 and Cyclin D1 found in both vascular endothelial cells and myointimal vascular cells”. In addition, they pointed out that the possible underlying pathophysiological process would rely on vascular response to hypoxic insult, which is considered as a fundamental feature of COVID19. The present review identified vascular wall hyperplasia of pulmonary parenchyma in 5 cases. However, these cases – especially in relation to their low number – did not allow to identify specific microscopic pattern which could be useful to understand the underlying pathophysiological process or to define these findings as common in SARS-CoV-2 infected patients in lethal cases. Further studies will be necessary on this topic.

Conclusions

This review represents the first systematic analysis of microscopic pulmonary findings of vascular structures in patients deceased by or with SARS-CoV-2 infection. It allowed to identify vascular thrombosis (especially in lesser caliber vessels) as common microscopic pattern of pulmonary parenchyma in these patients. The recurrence of this pattern is confirmed by scientific literature data which demonstrate SARS-CoV-2 ability to interfere with the coagulation cascade. However, until now SARS-CoV-2 pro-coagulant mechanisms are not completely understood. In addition, it is not yet defined the reason why thrombosis activation tends to involve especially less caliber vessels.

This analysis also pointed out the recurrence of other meaningful pulmonary microscopic findings of vascular structures. So far, they cannot be defined as common in SARS-CoV-2 infected patients in lethal cases; indeed,
Limitations of the present review are related to the non-homogeneity of microscopic evaluations of histologic slides. In particular, the aforementioned results came from operators who have different backgrounds and different ways to describe microscopic pulmonary findings. Indeed, in the present review the most difficult task relied on interpretation and aggregation of the same/similar microscopic findings in quali/quantitative groups that would have allowed to implement a coherent systematic analysis avoiding results’ distortions. For this reason, the authors divided microscopic findings in few and simple categories (peri-vascular findings, vascular findings in vessels, vascular walls, and neovascularization) in order to reach this goal.

Another limitation was related to the impossibility to clearly distinguish between patients deceased with or by SARS-CoV-2 infection. Thus, all indications of the present review are referred to SARS-CoV-2 infected patients in lethal cases. In addition, it cannot be excluded that some microscopic results could be the manifestation of other comorbidities and/or pathophysiologic processes. For this reason, the authors also proposed a systematic analysis of results in the light of the scientific literature, in order to verify their coherency with the available literature data.

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Ethical Clearance: Taken From University of Turin ethical committee.

Source of Funding: Self-funding.

Conflict of Interest: Nil.

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The Effectiveness of Nursing Delivered Interventions on Readmission Rate among Patients Post Coronary Artery Bypass Graft Surgery; a Systematic Review

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Abstract

Introduction: Despite that hospital readmission after CABG surgery became an international concern, few studies have focused on nurse’s role in the reduction of the readmission rate. The purpose: This review aims to assess the effectiveness of nursing interventions that are reported to reduce patient’s readmission post CABG surgery. Methods: a systematic review following the PRISMA protocol was operated. Relevant studies were retrieved from two main electronic databases. Results: Eight studies met the inclusion criteria. The retrieved studies were conducted to identify the effectiveness of nursing interventions on readmission rate among patients post CABG surgery. Different types of nursing interventions were identified and generally, it decreased the readmission rate among patients in most of the studies. Conclusion: Different nursing interventions have been reported to reduce readmission rate after coronary artery bypass graft surgery. However, a better reporting of these nursing interventions and linking it with nursing staff training and qualification is recommended.

This review is registered at PROSPERO; the registration number is: CRD42020143206

Keywords: coronary artery graft, discharge education, nursing interventions, readmission

Introduction

Coronary Artery Bypass Graft (CABG) surgery is the first line treatment for multi-vessel coronary artery disease. Around 151,474 patients underwent CABG surgery in the United States (US) during the year 2015. However, the readmission rate of CABG patients within 30 days after discharge is impressively high. More specifically, they reported that 28,601 adult CABG patients out of 177,229 (16%) in the US were readmitted within 30 days. Another study revealed that more than 60% of CABG patient readmissions occur within the first week post discharge.

Decreasing readmissions post cardiac surgery has turned into a priority worldwide. Unclear discharge instructions and lack of follow up plans are among the reported reasons for hospital readmissions. Patient experience with discharge instructions shows that patients who discharged with sufficient information and provided follow-up care were better in managing post-operative problems and experienced improved post discharge.

Nurses play a major role in providing multidimensional interventions, for instance; support, training and education, and rehabilitation. Examples of these interventions include home visits, rehabilitation programs, discharge education, telephone follow-up.
calls, telehealth, discharge planning, and discharges to short-term skilled nursing facilities help to reduce readmission rate\cite{8}. A major intended outcome of these nursing delivered interventions is to reduce hospital readmission among CABG patients\cite{9}.

The aim of this paper was to estimate the effectiveness of nursing interventions that are reported to reduce patient’s readmission post CABG surgery.

**Materials and Methods**

**Eligibility criteria and Information sources:** Our literature review was managed by the PICOT system in order to develop a systematic search strategy. The components include interest population (P), interest question (I), interest comparison (C), interest outcome (O) and timeframe (T)\cite{10}. Our research centered on post CABG patients (P) and the use of nursing procedures to decrease readmission (I). The interest comparison (C) was not related to our intent. With regard to the findings (O), it was hypothesized that the use of nursing administered therapies will minimize post-CABG surgery readmissions. We agreed on a timeframe (T) of all studies published from 1999 to 2019.

The papers retrieved were included if they were: (1) clinical studies, literature review, or master’s or doctoral thesis; (2) post coronary artery bypass graft surgery in adult patients; (3) nursing strategies aimed at preventing post-CABG readmission; (4) written in English and (5) published between 1999-2019. To find qualifying publications, two researchers searched two electronic databases: Medline (through PubMed) and CINAHL. The search started on June 20th, 2019 and ended on July 20th, 2019.

**Search strategies:** Through the search, Study records and systematic analyses have been identified. In order to include medical subject heading (MeSH) terminology, words were typically entered and extended where appropriate. Primarily, large categories of search words, containing readmission, coronary artery graft, and nursing, were picked. To discover target studies, all available variations of the words for each class were then checked. In order to identify publications not found by electronic search, a manual search of the reference lists of qualifying studies was also performed.

**Study selection:** Separately, to choose studies that technically meet the inclusion criteria, two researchers checked headlines and abstracts of selected papers. After that, for eligibility, the full text of these studies was closely checked. Discrepancies were explained by discussions and by a third reviewer over the eligibility of studies.

**Data items and Data collection process:** The researchers carried out a systematic analysis of the included papers, extracted and compiled information from the studies in tables. A data extraction sheet was created by the researchers, and two reviewers extracted the data. Any inconsistencies were resolved, and information was included only if agreement was reached between the researchers.

**Risk of bias in individual studies and Synthesis of results:** The probability of bias in all studies was independently calculated by two researchers. The quantitative studies were analyzed using the checklist\cite{10, 11} of the Successful Public Health Practice Project with the Quality Assessment Method (QAT) (EPHPP). The retrieved systematic reviews were analyzed using the Essential Appraisals Skills Program (CASP) Checklist\cite{12, 13}. If the scores were in disagreement, by consulting a third reviewer, consensus was reached. Two researchers analyzed and synthesized information, by consensus, any difference between them was resolved, data was only included if both researchers agreed. It gave the facts a narrative-descriptive summary.

**Results**

**Study Selection and Characteristics:** An overall of (1208) papers was retrieved. After duplicates removal, (703) research paper titles and abstracts were screened. There were (72) related articles which were reviewed in full text, eight of which were deemed appropriate to be part of the analysis according to the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) protocol for systematic reviews\cite{14}.

Eight studies, published between 1999 and 2018, were part of the review. There were (n=5) experimental studies, (n=2) review articles, and one observational retrospective study. Three articles described the effect of more than one intervention on the readmission
rate among CABG patients, and 5 studies reported the effect of only one intervention. Generally, the 8 articles reported interventions carried by nurses with divers nursing qualifications. One study reported the participation of cardiac surgery nurse practitioner, 2 reported advance practice nurses, 1 reported on trained research nurses, and 4 reported cardiac/coronary care nurses. A summary of studies characteristics is shown in table 1.

Table 1. Characteristics of literature included in review (N = 8).

<table>
<thead>
<tr>
<th>Sample size</th>
<th>N (%)</th>
<th>References (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>2(25)</td>
<td>(Barnason, Zimmerman, Nieveen, &amp; Hertzog, 2006; Fredericks &amp; Yau, 2013)</td>
</tr>
<tr>
<td>50-200</td>
<td>3(37.5)</td>
<td>(Carroll, Rankin, &amp; Cooper, 2007; Naylor &amp; McCauley, 1999; Negarandeh, Nayeri, Shirani, &amp; Janani, 2012)</td>
</tr>
<tr>
<td>&gt; 400</td>
<td>1(12.5)</td>
<td>(Hall et al., 2014)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study design</th>
<th>N (%)</th>
<th>References (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>5(62)</td>
<td>(Carroll et al., 2007; Naylor &amp; McCauley, 1999; Negarandeh et al., 2012)</td>
</tr>
<tr>
<td>Observational</td>
<td>1(13)</td>
<td>(Hall et al., 2014)</td>
</tr>
<tr>
<td>Review</td>
<td>2(25)</td>
<td>(Fredericks &amp; Yau, 2017; Mares &amp; McNally, 2013)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>N (%)</th>
<th>References (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>4 (50)</td>
<td>(Barnason et al., 2006; Carroll et al., 2007; Hall et al., 2014; Naylor &amp; McCauley, 1999)</td>
</tr>
<tr>
<td>Canada</td>
<td>2(25)</td>
<td>(Fredericks &amp; Yau, 2013, 2017)</td>
</tr>
<tr>
<td>Australia</td>
<td>1(12.5)</td>
<td>(Mares &amp; McNally, 2013)</td>
</tr>
<tr>
<td>Iran</td>
<td>1(12.5)</td>
<td>(Negarandeh et al., 2012)</td>
</tr>
</tbody>
</table>

Risk of Bias within Studies: Reliable checklists were used to test the content of included papers. Using the QAT, the quality of quantitative studies was evaluated, which was interpreted by referring to the tool dictionary and a research analysis that analyzed components of quality evaluation and ratings for the EPHPP instrument[15]. In general, an appropriate consistency ranking was demonstrated by the research findings using quantitative designs (Supplemental Digital Content risk of bias in individual studies). Three out of 6 articles were rated as fair or good for selection bias monitoring, three articles used clinical trial design, and three were cohort studies. The confounding factors were discussed by just one article and two experiments were blinded. The reliability and validity of the instruments for collecting data were stated in most of the papers, and three articles discussed the withdrawal rate. On the other hand, the two reviews included showed a high-quality rating, only one of the studies failed to specify a research question.
Identification of commonly used interventions delivered by nurses

Two out of 8 studies reported more than two interventions delivered by nurses. The first study[16] examined the effect of a discharge planning program consist of multiple interventions delivered by Advance Practice Nurses (APNs). The program consists of a comprehensive discharge plan, followed by a 2 home visits within the first 10 days after discharge and a provision of a telephone call initiated on a weekly basis for 4 weeks. In the second study[17], the researcher recruited coronary care nurses to implement the intervention. The intervention consists of a discharge plan initiated at admission and continued for 2 weeks after discharge by 2 home visits and provision of telephone numbers to enable patients to contact the nurses for any questions or clarification.

Two studies examined the effects of an individualized education delivered by nurses on the readmission rates among CABG patients. The first examined the effect of an individualized education delivered by a trained nurse via a telephone call on two points of time. Each call started with an identification of the learning needs followed by the educational material[18]. The second was a systematic review[19] of 17 trials; 4 studies which examined the effect of individualized education on readmission rates among CABG patients. Nurses delivered the education in more than half of the trials (8/17). Of the 17 trials 10 reported that patients were given access to contact nurses who were responsible to answer questions and clarify issues related to the education.

One study[20] reported the effect of home visits conducted by the same cardiac surgery nurse practitioner (NP) who was delivering care to the patient during in-hospital period. The two visits took place within the first 10 days after discharge. During the visit, the NP was responsible to assessing the patient’s recovery, providing necessary education, assessing adherence to medications and even changing the medication if required with coordination with the surgeon.

One study examined the effect of a tele-health technology delivered by nurses[21]using a health communication intervention that utilizes a device called ‘health buddy’. The nurse researcher prepared scripts including educational material related to the recovery of the CABG patients, recovery symptoms, strategies to manage symptoms, and reinforcement to enhance patient self-efficacy to manage their recovery. The study reported no direct contact between nurses and patients except through the device however; nurses were able to receive patient’s questions through the health buddy and answer them.

Two studies reported the participation of nurses in cardiac rehabilitation programs after CABG surgery. The first study[22]examined the effect of a shared intervention delivered by peer advisors (family or friend) and APNs. The intervention was built to enhance CABG patient’s self-efficacy and ultimately increases their participation in the rehabilitation programs and reduces the readmission rates. The intervention starts in hospital before discharge and last for 12 weeks after discharge. Two APNs with a Master degree and clinical experience in cardiac surgery nursing were responsible to recruit, train, and assign the peer advisors to the treatment group. The APNs provided home visits and at least 3 telephone calls to the patients, whereas the peer advisors called the patients on a weekly basis for 12 weeks. Moreover; the APN provided support to both patients and peer advisors.

The second study[23] was a systematic review aimed to report the effectiveness of nurse-led cardiac rehabilitation program on readmission rates and other outcomes among CABG patients. The review included three trials however none of them examined the effectiveness of the nurse-led cardiac rehabilitation programs on readmission rates. A summary of reported interventions in each study is presented in table 2.
Evaluation of the effect of the interventions on the readmission rates

The eight studies presented a substantial variation in the length of follow up period and outcome measurement. Two studies evaluated the outcome ‘readmission rate’ at different time points; at 6 weeks, 3, 6, and 12 months[22], and at 1 week, 3 weeks, 8 weeks and 12 weeks[18]. Another two studies evaluated the outcome after 3 months of discharge[17, 21] and one study[20] evaluated the outcome after 30 days. Naylor and McCauleystudy evaluated the outcome at 24 weeks[16]. The Fredericks and Yausystatic review[19] didn’t specify any restrictions related to the follow-up periods and frequency of outcome measurements, whereas the Mares et al review didn’t report a measurement of the outcome of concern[23]. Overall, 4 studies showed a significant reduction in the readmission rate. The first study found zero readmission rates among the treatment group compared with 4 readmissions in the control group[18]. The second[19]found that nurse delivered individualized education regardless of the number of sessions and delivery method, have significant effect on the reduction of the readmission rates after CABG surgery. The third study[16] reported a significant reduction of the readmission rate after multiple interventions delivered by APNs at discharge and for 6 weeks after(12 readmission in the control group compared to 4 readmission in the treatment group; p= 0.02) readmission remained significantly lower in the intervention group at 6 weeks and 24 weeks post discharge. The fourth study[20] reported that home visits by cardiac surgery NPs resulted in a significant reduction in the readmission rate within
30 days of discharge (3.85 % in the intervention group compared with 11.54 % in the usual group (N= 156 , p= 0.023).

Another three studies reported an insignificant reduction of the readmission rate among CABG patients after the delivery of multiple interventions developed and administered by nursing staff. The first study [17] recruited coronary care nurses to administer the interventions. The authors reported no statistically significant reduction of the readmission rate (p = 0.5). Even though; the percentage of readmission rate in the intervention group was lower than the percentage in the control group (4.76 % and 14.63 % respectively). The second study [21] used telehealth technology, which showed no statistically significant reduction of the readmission rate (2 patients from the treatment group were readmitted compared with 1 patient from the control group). The third study [22] showed no statistically significant difference in the readmission rates. Nevertheless; the trend of the readmission showed a fewer readmission between 3-6 months in the treatment group.

Discussion

Apparently; the review shows a scarcity of nursing studies that examine the effects of interventions delivered by nurses on the readmission rate of CABG patients. More than one third of the studies (n= 3, 38 %) reported that the intervention was delivered by nurses with advanced education; APNs and NPs [16, 20]. Of these, 66.6 % (two studies) reported that the APN and the NPs who delivered the interventions were the same nurses who cared for the patients during hospitalization period after the surgery. The continuity of care provided by the nurses appeared clearly in the statistically significant results on the outcome variables.

Two studies (25 %) examined the effect of remote education and follow-up of the patients through the use of technology (Health buddy) without any contact with the nurses except through the device [21] or through the use of peer advisors with support from APNs [22]. The results of these studies showed insignificant results which might be explained by the partial or complete physical absence of the nurses during the delivery of the intervention.

Three studies reported the utilization of professional nurses with specialized training in cardiac intensive care or coronary care [17, 18, 23] Whereas; 25% of the studies reported that the intervention delivered by professional nurses without any details if they have any other qualifications or training [19, 21]

Our review limitations include constraints on English-language papers, a limited number of qualifying studies, and differences in the nature of the studies used.

Conclusions

This review gives an overview of nurses’ interventions to reduce the readmission rate after CABG surgery. Our review revealed that; although nurses represent a significant part of healthcare providers in any health care organization and despite their role as health educators; the reporting of their participation continues to be limited. Most of the studies emphasize the intervention itself, regardless of the provider. This review has shown that the nurses as the providers of the intervention, their qualification or advanced education, their presence at the time of intervention and their familiarity with the patients while in-hospital has a significant effect on patients’ outcome. The results of this review highlight the importance of reporting nurses’ participation in improving CABG patient’s outcomes after the discharge. We recommend that researchers (nurses or others) use the term “nurse” or “professional nurse” not health care provider or health educator when reporting on studies using nursing interventions to improve patients’ outcomes and to report any advanced education or training of the nursing staff as this was found to have an effect on the results of the studies.

Ethical Statement: There were no necessary for ethics approvals

Funding Statement: none

Conflict of Interest Statement: No conflicts of interest exist.

References


**Relationship between G3BP and R4BP with Some Biochemical Parameters in Iraqi Patients with Nonalcoholic Fatty Liver Disease**

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**Abstract**

Nonalcoholic fatty liver disease starts with liver fat accumulation which is a dangerous factor for disease progression. So, we aimed to determine some biochemical parameters among patients with NAFLD and healthy individuals. Sixty patients with NAFLD and thirty healthy control who were attending Gastroenterology and Hepatology Teaching Hospital/Baghdad during the period from August /2019 to March /2020. Which included age, sex, BMI, and abdominal ultrasound result with other medical information. Then all the biochemical test is done by Autoanalyzer, while serum galectin 3 binding protein and serum retinol 4 binding protein measured using ELISA technique. Our study found that obesity (70%) and dyslipidemia (50%) were more common in patients with NAFLD than other metabolic diseases. NAFLD subjects show a highly significant elevated (p=0.000) in the mean ± SD of BMI, FBS, HbA1, ALP, triglyceride, VLDL, GGT, and G3BP compared to the healthy controls. Also, serum ALT, total bilirubin, cholesterol, and RBP4 were highly significantly elevated (p=0.001) in the mean ± SD of NAFLD when compared to mean ± SD of healthy control. However, it revealed a significant raise (P=0.027) in the mean ± SD of the serum albumin in the NAFLD patients when compared to the mean ± SD of the healthy control and a significant elevated (P=0.002) in the mean ± SD of the LDL in the NAFLD patients and healthy control. But showed a significant decrease (P=0.029) in the mean ± SD of the serum HDL of the NAFLD patient when compared to the mean ± SD of the healthy control. Finally, we found that the optimal cut-off value for GGT was >25 IU/l with sensitivity and specificity (93.33% and 70%) respectively and RBP4 has an optimal cut-off value >22.28 ng/ml with sensitivity and specificity (83.33% and 56.67 %) respectively. Therefore, the optimal cut-off value was > 9.49 ng/ml for G3BP with sensitivity and specificity (93.33 % and 83.33% ) respectively.

**Keywords:** Galectin 3 binding protein, Retinol 4 binding protein, nonalcoholic fatty liver disease.

**Introduction**

Nonalcoholic fatty liver disease (NAFLD) is one of the most common chronic hepatic diseases and its occurrence is about 25 % of the world-wide ¹. The term “NAFLD” includes a common liver histological change from simple steatosis to steatohepatitis (NASH) and NASH related to fibrosis or cirrhosis². Frequently, NAFLD patients are more probable to be complemented by insulin resistance, obesity, hyper-glycemia, hypertension, and dyslipidemia, therefore NAFLD is believed a liver demonstration of the metabolic syndrome³. In addition to obesity and diabetes, the incidence of NAFLD is increasing steadily, progressing to the largest communal reason of liver diseases in developed countries for adults, teenagers, and infants. A few research on proteins convoluted in NAFLD has so far been addressed ⁴. While NAFLD pathogenesis is not well recognized, insulin resistance has long been deemed to play a main role in NAFLD production⁵.
It is less likely that we could find hepatic specific proteins/molecules which can be used in commercial surroundings for identifying fat in the liver. Presently, little importance was being known to the levels of ALT and AST in the diagnosis of hepatic diseases. Also, raised aminotransferase levels in the hepatic function test are a very communal cause for referral of patients to Gastroenterology and/or Hepatology clinics. Identification of NAFLD was dependent on the abnormal concentration of transaminases in greatest of the studies. While there are many inflammation markers, it was difficult to discover hepatic markers that are unique to classic hepatic enzymes such as ALT. Albumin transfers fatty acids, hormones, and other chemicals, retains oncotic pressure and pH buffers, among other roles. Other research has shown that NAFLD dysregulated cholesterol metabolism, which may lead to the seriousness of the disease. G3BP is involved in inflammatory distress and immune response. Retinol-binding protein (RBP4) is known as a unique biomarker for insulin resistance and obesity. Newly identified RBP4 refers to the lipocalin family and is the exact transporter protein for vitamin A in the blood. It is prominently expressed on the hepatic cell and adipose tissue. In individuals, several studies have found that elevated circulating RBP4 levels were related to obesity, insulin resistance, and diabetes mellitus type 2. A recent study found that unusual serum gamma glutamate transferase levels were independently correlated with severe hepatic fibrosis in patients with nonalcoholic fatty liver disease. We should consequently aim to found appropriate prognostic markers rather than accurate diagnostic markers which will assistance to decreased the incidence of liver biopsies to estimate disease development. So we made screening and particular diagnosis of G3BP and R4BP with some biochemical markers in NAFLD.

Materials & Methods

Patients & control

In this prospective study, a total of ninety blood samples were collected from two groups of participants: Group I includes 60 cases of nonalcoholic fatty liver disease patients ages ranged between (20-65 ) years. Group II comprises 30 healthy subjects ages (24-67 ) years who were negative for Hepatitis C and B virus by negative enzyme-linked immunosorbent assay (ELISA). Participants were enrolled in Gastroenterology and Hepatology Teaching Hospital during the period from August /2019 to March /2020. A Special form questionnaire includes descriptive information that was designed and filled up for each patient. The questionnaire includes age, sex, abdominal ultrasound result, and other medical information. Weight was measured with a scale. Their heights were also measured by stadiometer. The body mass index was calculated according to weight (Kg) divided by the square of height (meters). Inclusion criteria were based on a negative (ELISA) test for hepatitis C and B virus, patients with metabolic disorders ( DM, hypertension, dyslipidemia, and obesity ). An establishment of fatty liver disease was done by abdominal ultrasounds, biochemical tests, and clinical examination by the specialists. The exclusion criteria in this study include patients with no other causes of liver disease, autoimmune, HCC, or co-infection with hepatitis B and C virus and/or human immunodeficiency virus, malignancies, and alcoholic fatty liver disease. This study was agreed by Ethics and Research Committee of the hospital under the supervision of the consultant, while approval for the sampling was got from patients and control.

Biological Samples

From each individual that was included in this study, 10 ml of the blood sample was drawn by vein puncture using disposable syringes then was centrifuged at 3500xg for 10 min and serum was separated from each anticoagulant-free blood sample by centrifugation and was divided into two aliquots; one was immediately used for biochemical tests by SIEMENS Autoanalyzer/Dimension®Xpand® Plus Integrated Chemistry System /Germany and the other was placed into Eppendorf tubes and frozen at -20 °C until used for serum G3BP, serum R4BP, measurement by ELISA technique. (all commercial kits were used supplier from Mybiosource / USA)

Statistical Analysis

Analysis of data was made via the available statistical package of SPSS-24
Data were available in simple methods of frequency, percentage, mean, standard deviation, and range.

The significance of the difference of means (quantitative data) was tested using the Students t-test for the difference between two independent means. Receiver Operating Characteristic “ROC” curve technique was used to determine the use of any parameter as a diagnostic or screening tool for disease and the capacity to determine the “cut-off value” which of optimum sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (+LR), negative likelihood ratio (-LR) for diagnosing disease.

**Findings**

Characteristics of the NAFLD patients were shown in Table 1. We found that the percentage of obesity (70%) and dyslipidemia (50%) are more common in NAFLD patients than other metabolic diseases such as hypertension (20%) which is diagnosed based on if patients are on antihypertensive therapy or their blood pressure is more than 140/90 mmHg and diabetes mellitus type 1 and 2 (3% and 30%) respectively. Also, our study showed that only 20(33.3%) of NAFLD patients have no sign or symptom while other NAFLD patients have weakness (43%), abdominal pain (40%), and extreme tiredness (36.7%). In addition to the others sign and symptom jaundice (23.3%), edema (6.7%), and loss of appetite (3.3%).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NAFLD group (n= 60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Metabolic disease</td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>42(70%)</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>30(50%)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>12(20%)</td>
</tr>
<tr>
<td>DM type 1</td>
<td>2(3%)</td>
</tr>
<tr>
<td>DM type 2</td>
<td>18(30%)</td>
</tr>
<tr>
<td>No other metabolic disease</td>
<td>14(23.3%)</td>
</tr>
<tr>
<td>Sign &amp; symptom</td>
<td></td>
</tr>
<tr>
<td>Extreme tiredness</td>
<td>22(36.7%)</td>
</tr>
<tr>
<td>jaundice</td>
<td>14 (23.3%)</td>
</tr>
<tr>
<td>weakness</td>
<td>26(43.3%)</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>24(40%)</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>2(3.3%)</td>
</tr>
<tr>
<td>edema</td>
<td>4(6.7%)</td>
</tr>
<tr>
<td>No sign and symptom</td>
<td>20(33.3%)</td>
</tr>
</tbody>
</table>
While in Table-2 it was observed the age and gender of the studied groups with the comparison of significance. This Table showed that there were 31 male (51.6%) and 29 (48.3%) female patients with mean age (45.03±12.03) years in the NAFLD patients group. While participants 9 male (30%) and 21 female (70%) as a healthy control group and the mean age was (37.40±12.45) years. There was a significant difference among age group (p=0.006) and no significant difference among gender of these groups were (P=0.051).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Patients</th>
<th>Healthy Control</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Range</td>
<td>20-65</td>
<td>24-67</td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>45.03±12.03</td>
<td>37.40±12.45</td>
</tr>
<tr>
<td>Genus</td>
<td>Male No. (%)</td>
<td>31(51.7)</td>
<td>9(30.0)</td>
</tr>
<tr>
<td></td>
<td>Female No. (%)</td>
<td>29(48.3)</td>
<td>21(70.0)</td>
</tr>
<tr>
<td>Total No.</td>
<td>60</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

*Significant difference between proportions using t-test for quality of means at 0.05
** nonSignificant difference between proportions using Pearson Chi-square test at 0.05

Some demographic and biochemical parameters of NAFLD subjects compared to that of healthy controls showed in Table 3. NAFLD subjects were have a highly significant increased (p=0.000) in the mean ± SD of BMI, FBS, HbA1c, AST, ALP, triglyceride, VLDL, GGT and G3BP (31.53±4.32 kg/m², 115.09±25.46 mg/dl, 6.48±1.38 %, 38.23±13.49 IU/L, 111.05±31.14 IU/L, 172.40±93.04 mg/dl, 34.48±18.60 mg/dl, 73.02±61.29 IU/L and 14.46±3.10 ng/ml) respectively compared to the healthy controls (22.89±3.05 kg/m², 85.90±8.72 mg/dl, 4.48±0.36 %, 21.17±5.52 IU/L, 70.13±18.96 IU/L, 94.37±18.30 mg/dl, 18.65±3.41 mg/dl, 22.50±10.10 IU/L and 8.61±1.02 ng/ml) respectively. Also, revealed significant raised (P=0.027) in the mean ± SD of the serum albumin (4.11±0.42 g/dl) in the NAFLD patients when compared to the mean ± SD of the serum albumin in healthy control (3.89±0.45 g/dl) and significant elevated (P=0.002) in the mean ± SD of the LDL (105.6±32.63 mg/dl) of the NAFLD patient and healthy control (85.07±16.41 mg/dl). But showed a significant decrease (P=0.029) in the mean ± SD of the serum HDL (85.07±16.41 mg/dl) of the NAFLD patient when compared to the mean ± SD of the healthy control (47.80±7.21 mg/dl). While no significant differences between mean ± SD of the serum urea and creatinine in NAFLD patients and healthy control (P=0.903 and P=0.110) respectively.
Table (3): Some demographic and biochemical parameters of studied groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>NAFLD group (n=60)</th>
<th>Control group (n=30)</th>
<th>t-test for Equality of means (sig.(2-tailed))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>31.53±4.32</td>
<td>22.89±3.05</td>
<td>.000***</td>
</tr>
<tr>
<td>BMI : normal/overweight/obese (N)</td>
<td>1/17/42</td>
<td>20/0/0</td>
<td></td>
</tr>
<tr>
<td>F.B.S (mg/dl)</td>
<td>115.09±25.46</td>
<td>85.90±8.72</td>
<td>.000***</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>6.48± 1.38</td>
<td>4.48±0.36</td>
<td>.000***</td>
</tr>
<tr>
<td>AST (IU/l)</td>
<td>38.23±13.49</td>
<td>21.17±5.52</td>
<td>.000***</td>
</tr>
<tr>
<td>ALT (IU/l)</td>
<td>54.28±23.05</td>
<td>33.47±19.05</td>
<td>.001***</td>
</tr>
<tr>
<td>ALP (IU/l)</td>
<td>111.05±31.14</td>
<td>70.13±18.96</td>
<td>.000***</td>
</tr>
<tr>
<td>Total bilirubin (µmole/l)</td>
<td>14.47±9.65</td>
<td>8.01±2.85</td>
<td>.001***</td>
</tr>
<tr>
<td>S. Albumin (g/dl)</td>
<td>4.11±0.42</td>
<td>3.89±0.45</td>
<td>.027*</td>
</tr>
<tr>
<td>S. Cholesterol (mg/dl)</td>
<td>205.43±51.19</td>
<td>156.80±43.38</td>
<td>.000***</td>
</tr>
<tr>
<td>Triglyceride (mg/dl)</td>
<td>175.05±91.87</td>
<td>94.37±18.30</td>
<td>.000***</td>
</tr>
<tr>
<td>HDL (mg/dl)</td>
<td>34.18±10.73</td>
<td>47.80±7.21</td>
<td>.000***</td>
</tr>
<tr>
<td>LDL (mg/dl)</td>
<td>136.24±52.81</td>
<td>90.35±39.99</td>
<td>.000***</td>
</tr>
<tr>
<td>VLDL (mg/dl)</td>
<td>35.01±18.37</td>
<td>18.65±3.41</td>
<td>.000***</td>
</tr>
<tr>
<td>B. urea (mg/dl)</td>
<td>27.17±6.61</td>
<td>26.97±8.99</td>
<td>.903*</td>
</tr>
<tr>
<td>S. creatinine (mg/dl)</td>
<td>0.84±0.18</td>
<td>0.78±0.14</td>
<td>.110*</td>
</tr>
<tr>
<td>GGT (IU/l)</td>
<td>73.02±61.29</td>
<td>22.50±10.10</td>
<td>.000***</td>
</tr>
<tr>
<td>RBP4 (ng/ml)</td>
<td>31.43±10.75</td>
<td>23.53±9.73</td>
<td>.001**</td>
</tr>
<tr>
<td>G3BP (ng/ml)</td>
<td>14.46±3.10</td>
<td>8.61±1.02</td>
<td>.000***</td>
</tr>
</tbody>
</table>

***highly significant (p<0.001) ** significant (p<0.05) * non significant (P>0.05)

Recently, ROC analysis has been recommended to calculate the power of serum assays to detect advanced liver disease which table-4 showed AUC, P-value, 95% confidence interval, optimal cut-off value, sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio and negative likelihood ratio for GGT (0.907, 0.000, 0.827-0.958, >25 IU/l, 93.33%, 70%, PPV 86.2%, NPV 84%, 3.11% and 0.095%); RBP4 (0.907, 0.001, 0.602-0.798, >22.28 mg/ml, 83.33%, 56.67%, PPV 81.4%, NPV 60%, 1.92% and 0.92%) and G3BP (0.958, 0.000, 0.893-0.989, >9.49 ng/ml, 93.33%, 83.33%, PPV 79.4%, NPV 63%, 5.60% and 0.08%) respectively as in Figure-1.
Table(4): Estimation of ROC analysis with some of the diagnostic tests in the NAFLD and healthy control group.

<table>
<thead>
<tr>
<th>Variable(s)</th>
<th>AUC</th>
<th>P-value</th>
<th>95% CI</th>
<th>Cut-off value</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV</th>
<th>NPV</th>
<th>+ve LR</th>
<th>-ve LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>GGT (IU/l)</td>
<td>0.907</td>
<td>0.000</td>
<td>0.827 - 0.958</td>
<td>&gt;25</td>
<td>93.33</td>
<td>70</td>
<td>86.2</td>
<td>84</td>
<td>3.11</td>
<td>0.095</td>
</tr>
<tr>
<td>RBP4(ng/ml)</td>
<td>0.707</td>
<td>0.001</td>
<td>0.602 - 0.798</td>
<td>&gt;22.28</td>
<td>83.33</td>
<td>56.67</td>
<td>81.4</td>
<td>60</td>
<td>1.92</td>
<td>0.92</td>
</tr>
<tr>
<td>G3BP(ng/ml)</td>
<td>0.958</td>
<td>0.000</td>
<td>0.893 - 0.989</td>
<td>&gt;9.49</td>
<td>93.33</td>
<td>83.33</td>
<td>79.4</td>
<td>63</td>
<td>5.60</td>
<td>0.08</td>
</tr>
</tbody>
</table>

AUC: Area under curve; CI: Confidence interval; p: Probability for null hypothesis (true area = 0.5), positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (+LR), negative likelihood ratio (-LR)

Figure -1: ROC curves estimation for studied parameters in NAFLD and Healthy control group.

Discussion

NAFLD has become a developing public health problem in recent years and dramatically elevated worldwide13. A higher percentage was demonstrated than previous studies which found that 51.34% of NAFLD patients were suffering from obesity and 22.51% suffering from diabetes type 2. Beside, the lower percentage was demonstrated than previous studies which found that suffering from dyslipidemia and hypertension were 69.16% and 39.34% respectively14. Although in NAFLD patients were usually non-specific their symptom. AlKhater SA. (2015) clinically found that only 42–59% of NAFLD patients present with abdominal pain15. While Khoonsari M et al. (2017) found that fatigue was the common symptom and
abdominal pain (37.4%) and loss of appetite (27.2%)\(^{16}\). In similar to other studies done by Tsuneto A. \textit{et al.} were found that no gender differences in the development of NAFLD\(^{17}\). In similarity with other studies, we found that progress of age leads to an elevated risk of severe liver fibrosis \(^{18}\). Then identified HbA1c elevated in NAFLD as an increase in intracellular glucose in NAFLD patients\(^{19}\). Like other studies done by Sunitha S. \textit{et al.} which revealed that a highly significant elevated in AST and ALP in NAFLD patients\(^{20}\). Furthermore, the highly significant elevation in cholesterol, triglycerides, VLDL, and LDL was observed with significant decreases in HDL levels in patients with NAFLD due to hepatic increased production of triglyceriderich VLDL particles in fasting conditions in patients with NAFLD leading to insulin decrease VLDL production by inhibiting adipose tissue lipolysis and directly suppressing hepatic production of VLDL, then Insulin fails to inhibit both lipo-lysis and the making of triglyceride rich VLDL particles from the liver. As a result, an increase in VLDL leads to the lowering of HDL cholesterol\(^{12,21}\). Also, we observed like other studies several factors that may influence bilirubin–albumin binding affinity such as elevated free fatty acid concentrations leading to decreased binding affinity resulting elevated in serum albumin with total bilirubin\(^{22,23}\). Then, we confirmed a significant associated circulating RBP4 in NAFLD patients as shown by other studies\(^{24,25}\). However, we found similarities with studies done by Moon H-W et al. which observed that elevated circulating G3BP in chronic liver disease\(^{26}\). For the role of GGT as an indicator of metabolic hepatic damage, we demonstrated that GGT activity was a sensitive but non-specific marker of NAFLD\(^{12,27}\). At this moment we found a less result than other studies which found that cut-off serum RBP4 was 26 μg/ml with a sensitivity of 100% and a specificity of 92.94\(^{28}\). Finally, our studies have shown that elevated G3BP >9ng/ml was a more sensitive and specific marker for NAFLD patients. In contrast, other studies observed ROC-curves for G3BP in hepatitis C-related fibrosis-grades had 60% sensitivity and 65% specificity for the recognition of F2–F4 when levels were above 12.9 mg/ml\(^{29}\). This difference was mostly due to differences in the selection of patients and regional area ……etc.

**Conclusions:** G3BP was a more sensitive, specific with a high positive likelihood value marker for the diagnosis of NAFLD patients. Also, GGT was a good marker for the diagnosis of NAFLD with less specificity and a high positive likelihood value than RBP4. Finally, we observed that older age, obesity, dyslipidemia, hypertension, and type 2 diabetes were risk factors for NAFLD

**Acknowledgment:** We are thankful to the staff of Gastroenterology and Hepatology Teaching Hospital/Baghdad for their cooperation in providing the clinical specimens during the work in this research.

**Ethical Clearance:** No need

**Source of Funding:** None

**Conflict of Interest:** The authors have declared no conflict of interest.

**References**


21. Idzior-walus B. Nonalcoholic fatty liver disease is associated with low HDL cholesterol and coronary angioplasty in patients with type 2 diabetes mellitus. Published online 2013:1167-1172. doi:10.12659/MSM.889649


Evaluation of Ovarian Reserve by Using AMH Test before Collection the Oocytes for ICSI Technique

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Abstract

This study was conducted on goats with the purpose to evaluate the ovarian reserve before females submit to the ova retrieval for intracytoplasmic sperm injection (ICSI). The study was conducted at the college of veterinary medicine – the University of Baghdad and Middle East Labs - Baghdad (2019-2020). The study included thirty female goats (does) within the age of puberty and sexual maturity. The animals were divided into two groups: group I (< 4 years old), and group II (> 4 years old). A blood sample (6 ml) was collected from each animal through the jugular vein (before slaughter) in tubes containing anticoagulants and then sent to the laboratory for estimation of antimullerian hormone (AMH). The study showed significant increases in the level of AMH (4.02 ± 0.17) of the group I (< 4 years old) comparative with (2.22 ± 0.54) to the group II (> 4 years old) at the (<0.01), and this result relation with the number of oocytes obtained from ovarian samples of animals after slaughtering, it was found that the number and quality of oocytes increased in the group I (29 oocytes from a 15 ovarian samples), compared with group II (16 oocytes from 15 ovarian samples. This result explains the decrease in the ovarian reservoir of follicles with an increase in the age in the doe as a result of the decrease in the level of AMH in the serum, which is considered an indicator for knowing the ovarian reservoir from the follicles and determining the productive age of the ovaries. According to the results of this study, the decrease in the level of AMH in the serum is an indication of a decrease in the number of follicles on the surface of the ovaries, which negatively affects the fertility and productivity of the goats or may affect the fertilization rate and the number of fertilized embryos. The AMH test is considered one of the important tests that must be taken before oocyte collection to reduce the effort and costs involved in conducting any assisted reproduction technique that requires collecting the oocytes from the donor.

Keywords: Reproductive, ovarian reserve, AMH, Oocytes, goat

Introduction

Ovarian development of and primordial follicles occurs during the fetal period in several mammalian species including ruminants and humans, and in turn, each female is born with a fixed number of primordial follicles, which is considered as the ovarian reserve [1]. Given that there is no development of primordial follicles after birth, the size of ovarian reserve depletes as continuous reproductive cycles occur as a female age until a limited number of primordial follicles remains, at which time ovarian activity becomes irregular causing ovarian failure [2]. Furthermore, the size of the ovarian reserve is associated with oocyte quality [3], embryonic competence [4], and fertility [5].

Anti-Mullerian hormone (AMH), also known as Mullerian-inhibiting hormone (MIH), is a glycoprotein hormone structurally related to inhibin and activin from the transforming growth factor-beta superfamily, whose key roles are in growth differentiation and folliculogenesis [6]. AMH is activated by SOX9 in the Sertoli cells of the male fetus [7]. Its expression inhibits the development of the female reproductive tract, or Mullerian ducts (paramesonephric ducts), in the male embryo, thereby arresting the development of fallopian tubes, uterus, and upper vagina [8]. AMH is also a product of granulosa cells of the preantral and small antral follicles in a female. As such, AMH is only present in the ovary until menopause in women [9].
Production of AMH regulates folliculogenesis by inhibiting the recruitment of follicles from the resting pool to select for the dominant follicle, after which the production of AMH diminishes [10]. As a product of the granulosa cells, which envelop each ovum and provide them energy, AMH can also serve as a molecular biomarker for the relative size of the ovarian reserve [11]. In bovine, AMH can be used for the selection of females in multi-ovulatory embryo transfer programs by predicting the number of antral follicles developed to ovulation [12]. AMH is expressed by granulosa cells of the ovary during the reproductive years and limits the formation of primary follicles by inhibiting excessive follicular recruitment by FSH [13].

AMH expression is greatest in the recruitment stage of folliculogenesis, in the preantral and small antral follicles. This expression diminishes as follicles develop and enter the selection stage, upon which FSH expression increases [14]. AMH is expressed by granulosa cells of the ovary during the reproductive years and limits the formation of primary follicles by inhibiting excessive follicular recruitment by FSH [13].

AMH expression is greatest in the recruitment stage of folliculogenesis, in the preantral and small antral follicles. This expression diminishes as follicles develop and enter the selection stage, upon which FSH expression increases [14]. AMH is expressed by granulosa cells of the ovary during the reproductive years and limits the formation of primary follicles by inhibiting excessive follicular recruitment by FSH [13].

Blood sample and AMH assay

Blood samples were collected from the does before slaughter using venipuncture from the jugular vein. 30 blood samples were collected. Send to the lab. Blood samples were centrifuged for 10 min at 2000 \( \times \) g within 2 h after collection. Serum was stored at 20 °C until hormonal assay.

Statistical Analysis

Data were collected, revised, coded, and entered into the Statistical Package for Social Science (IBM SPSS) version 20. The qualitative data were presented as numbers and percentages while quantitative data were presented as mean, standard deviations, and ranges when their distribution was found parametric. The comparison between two independent groups with quantitative data and parametric distribution was done by using an independent t-test. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: [\( P > 0.05 = \) non-significant (NS), \( P < 0.05 = \) significant (S), \( P < 0.001 = \) highly significant (HS)] [16].

Results and Discussion

The study showed significant increases in the level of AMH (4.02 ± 0.17) of group I (˂ 4 years old) comparative with (2.22 ± 0.54) to the group II (> 4 years old) at the (<0.01), table (1), and this result relation with the number of oocytes obtained from ovarian samples of animals after slaughtering, it was found that the number and quality of oocytes increased in the group I (29 oocytes from 15 ovarian samples , compared with group II (16 oocytes from15ovarian samples , table (2). This result explains the decrease in the ovarian reservoir of follicles with increase the age in the doe as a result of the decrease in the level of AMH in the serum, which is considered an indicator for knowing the ovarian reservoir from the follicles and determining the productive age of the ovaries related to the association of AMH with age or parity seems contradictory in cattle [18] and compatible with [17] reported there were greater conception rates in primiparous than multiparous heifers and similar fertility. While with the study of [19] there was not any significant correlation between AMH and parity, in other studies concentrations of AMH in second and third lactation cattle were greater than in cows with their first and fourth or more lactations [5]. Nevertheless, AMH concentration has been reported to decrease with age in
According to the results of this study, the decrease in the level of AMH in the serum is an indication of a decrease in the number of follicles on the surface of the ovaries, which negatively affects the fertility and productivity of the goats or may affect the fertilization rate and the number of fertilized embryos. The AMH test is considered one of the important tests that must be taken before oocyte collection to reduce the effort and costs involved in conducting any assisted reproduction technique that requires collecting the oocytes from the donor. The AMH concentration is closely correlated with the size of the ovarian primordial follicle reserves and.

**Table 1: Comparison between Group I and Group II regarding antimullerian hormone (AMH)**

<table>
<thead>
<tr>
<th>AMH</th>
<th>Group I</th>
<th>Group II</th>
<th>Test value</th>
<th>P-value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No= 15</td>
<td>No= 15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SE</td>
<td>4.02 ± 0.17</td>
<td>2.22 ± 0.54</td>
<td>3.156</td>
<td>0.004</td>
<td>HS</td>
</tr>
<tr>
<td>Range</td>
<td>3.1 – 5.5</td>
<td>0.02 – 6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A highly significant (HS) difference between the two groups for the AMH at P-value <0.01

**Table 2: number and quality of collected oocytes from different ages of the donor does**

<table>
<thead>
<tr>
<th>Age of doe</th>
<th>Number of samples of reproductive systems</th>
<th>Number of collected oocytes</th>
<th>Total Number of oocytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(&lt; 4 years old)</td>
<td>15</td>
<td>11 8 10</td>
<td>29</td>
</tr>
<tr>
<td>(&gt; 4 years old)</td>
<td>15</td>
<td>5 3 8</td>
<td>16</td>
</tr>
</tbody>
</table>

**Conclusion**

According to the results of this study, it is concluded that the application of the protocols of any to assisted reproductive technologies in mammals must take into interpretation the type of animal used, age, and reproductive status. Therefore, the AMH test is one of the most important tests that indicate the ovarian reservoir of follicles and its effectiveness, which saves time and materials in the process of recovery the ova in quantity and quality, which will positively affect the success of the technique used to assist reproduction. Obtaining a larger number of ova increases the chance of fertilization, and thus increases the rates of pregnancy and reproduction.

**Conflict of Interest:** None

**Funding:** Self

**Ethical Clearance:** Not required

**References**


Effect of Protecting Proteins From Degradation in the Rumen and Replacing Percentages of Treated Proteins with Formaldehyde on Biochemical Blood Parameters of Al Awassi Lambs

Ibrahim S. Jasim
Scholar Researcher, Prime Minister Advisory Commission, Baghdad, Iraq

Abstract

The present experiment was carried out to investigate the effect of different percentages (50 and 100%) of dried whey powder and sunflower meal treated with blood or formaldehyde on Biochemical blood parameters: Blood Glucose (BG), Blood Urea Nitrogen (BUN), Blood Cholesterol (BCH), Blood Total Protein (BTP), Blood Albumin (ALB) and Blood Globulin (GLO) in lambs fattening diets. The results showed insignificant effect in (BG), (BUN), (BCH), (BTP), (ALB) and (GLO) for dried whey powder treated with blood or formaldehyde compared sunflower meal treated with blood or formaldehyde, while there was significant increase (P < 0.05) in (BTP) and insignificant effect in (BG), (BUN), (BCH), (ALB) and (GLO) for dried whey powder treated with formaldehyde in percentages 100% compared sunflower meal treated with formaldehyde in percentages 100%, and for dried whey powder treated with formaldehyde in percentages 50% compared sunflower meal treated with formaldehyde in percentages 50%.

Key words: dried whey powder, sunflower meal, blood, formaldehyde, Biochemical blood parameters.

Introduction

Increasing the degradation protein in the rumen beyond the permissible limit in the ruminant diets increases the level of NH3-N in the rumen, which leads to its increase in the blood (1). The increase in the level of undegradable protein in the rumen leads to an increase in the level of glucose in the blood due to the increase in the flow of amino acids into the duodenum due to the decrease in the degradation of dietary protein, which leads to the provision of greater quantities of the base material used in the processes of synthesis of glucose by Gluconeogenesis (2,1,16). Nutrition of a high percentage of sources of undegradable protein in the rumen led to a decrease in BUN (3), the level of ammonia in the rumen, increase of BUN due to reduced absorbed ammonia that enters the liver to convert to urea (4). In what is considered Lipid content or tissue catabolism are indicators of blood cholesterol level (5), (12) reported that the level of blood cholesterol was significantly increased as a result of reduced degradation in dietary protein, (6) and the level of muscle tissue destruction (7) influencing the level of Total proteins, albumin and globulin in the blood.

The third largest source of protein used for ruminants feed after soybean and canola seedling (19). The protein of the sun flower is characterized by its solubility and high decomposition compared to the other protein sources. Therefore, there are obstacles to meet the needs of highyielding dairy cows, calves and fast-growing sheep because the protein is rapid decomposition in the rumen, producing peptides, amino acids and ammonia, which reduces the degree of utilization and loss of amino acidsand low digestibility (20).

Whey was considered a non-conventional, fast degradable protein source, it is a byproduct of cheese making process of milk, containing 7% solid materials consisting of 4.9% lactose, 0.6% ash, low amounts of fat acid and protein (15-20%) and most whey is eliminated as a neglected product, so the challenge for nutritionists is to find the best way to benefit from it (21,17).
Materials and Methods

Treatment of the sunflower meal or dried whey powder with fresh blood

Blood was collected from ruminants that were slaughtered in the Karkh massacre in containers containing citrate of sodium (6.8 g/L blood). The blood was then added to the sunflower or dried whey powder by using an equal weight of blood and weight (1:1) and then mixed by hand and dried in a fan oven at 60°C for 24 hours, after that, the sunflower or dried whey powder was manually broken and packed in bags until it was used (22).

Treatment of sunflower meal or dried whey powder with formaldehyde

The sunflower or dried whey powder was treated with 5% formaldehyde solution and 1 liter solution/10 kg dry matter from the sunflower or dried whey powder by sprinkler after brushing the sunflower or dried whey powder over a piece of nylon on the ground in a closed chamber with constant flipping to ensure that the solution reaches all parts of the sunflower or dried whey powder to obtain a homogeneous level of treatment. The formaldehyde sunflower or dried whey powder was kept in tightly sealed nylon bags and left for 72 hours for interaction between formaldehyde and sunflower meal or dried whey powder. The bags and their contents were then emptied onto a nylon piece inside a well-ventilated hall for 48 hours to allow for the volatilization of the unformed formaldehyde solution, then the sunflower or dried whey powder was put in bags until it was used (18).

<table>
<thead>
<tr>
<th>Feeding materials</th>
<th>Barley</th>
<th>Wheat</th>
<th>Sunflower treated with blood</th>
<th>Sunflower treated with formaldehyde</th>
<th>Whey treated with blood</th>
<th>Whey treated with formaldehyde</th>
<th>Fresh alfalfa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry matter</td>
<td>90.12</td>
<td>89.87</td>
<td>94.77</td>
<td>93.30</td>
<td>97.59</td>
<td>95.86</td>
<td>27.22</td>
</tr>
<tr>
<td>Organic matter</td>
<td>93.58</td>
<td>91.59</td>
<td>89.31</td>
<td>85.78</td>
<td>96.13</td>
<td>94.68</td>
<td>91.13</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>5.72</td>
<td>10.11</td>
<td>15.35</td>
<td>15.55</td>
<td>----</td>
<td>----</td>
<td>27.15</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>3.15</td>
<td>4.63</td>
<td>9.79</td>
<td>10.05</td>
<td>7.39</td>
<td>8.17</td>
<td>3.03</td>
</tr>
<tr>
<td>Ash</td>
<td>6.42</td>
<td>8.41</td>
<td>8.00</td>
<td>8.04</td>
<td>6.39</td>
<td>6.02</td>
<td>8.87</td>
</tr>
<tr>
<td>Nitrogen free extract</td>
<td>72.49</td>
<td>62.13</td>
<td>42.42</td>
<td>42.44</td>
<td>64.32</td>
<td>65.82</td>
<td>42.74</td>
</tr>
<tr>
<td>Acid detergent fiber</td>
<td>27.13</td>
<td>48.45</td>
<td>38.44</td>
<td>37.88</td>
<td>----</td>
<td>----</td>
<td>45.75</td>
</tr>
<tr>
<td>Neutral detergent fiber</td>
<td>6.27</td>
<td>14.24</td>
<td>26.92</td>
<td>27.50</td>
<td>----</td>
<td>----</td>
<td>33.91</td>
</tr>
<tr>
<td>Lignin</td>
<td>1.35</td>
<td>2.88</td>
<td>9.88</td>
<td>10.50</td>
<td>----</td>
<td>----</td>
<td>8.77</td>
</tr>
<tr>
<td>Cellulose</td>
<td>4.92</td>
<td>11.36</td>
<td>17.04</td>
<td>17.00</td>
<td>----</td>
<td>----</td>
<td>25.14</td>
</tr>
<tr>
<td>Hemicellulose</td>
<td>20.86</td>
<td>34.21</td>
<td>11.52</td>
<td>10.38</td>
<td>----</td>
<td>----</td>
<td>11.84</td>
</tr>
<tr>
<td>Metabolic energy (Mica Gul/kg)</td>
<td>12.7</td>
<td>12.3</td>
<td>12.7</td>
<td>12.7</td>
<td>14.1</td>
<td>14.2</td>
<td>10.2</td>
</tr>
</tbody>
</table>
Table 1: Chemical composition of raw materials in the installation of concentrates and fresh grit based on dry matter (%).

\[ \text{Metabolic energy (Mg / kg of material as is)} = 0.012 \times \text{crude protein} + 0.031 \times \text{ether extract} + 0.005 \times \text{raw fiber} + 0.014 \times \text{nitrogen-free extract} \] (23).

Table 2: Chemical analysis of experimental treatments for first experiment based on dry matter.

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Treatment with formaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement ratio %</td>
<td>50</td>
</tr>
<tr>
<td>Treatments</td>
<td>T3</td>
</tr>
<tr>
<td><strong>Chemical composition</strong></td>
<td></td>
</tr>
<tr>
<td>Dry matter</td>
<td>98.14</td>
</tr>
<tr>
<td>Organic matter</td>
<td>93.85</td>
</tr>
<tr>
<td>Crude protein</td>
<td>15.28</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>8.29</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>5.10</td>
</tr>
<tr>
<td>Ash</td>
<td>6.14</td>
</tr>
<tr>
<td>Nitrogen free extract</td>
<td>65.18</td>
</tr>
<tr>
<td>Acid detergent fiber</td>
<td>35.20</td>
</tr>
<tr>
<td>Neutral detergent fiber</td>
<td>13.29</td>
</tr>
<tr>
<td>Lignin</td>
<td>2.50</td>
</tr>
<tr>
<td>Cellulose</td>
<td>10.79</td>
</tr>
<tr>
<td>Hemicellulose</td>
<td>21.91</td>
</tr>
<tr>
<td>Metabolic energy</td>
<td>12.9</td>
</tr>
</tbody>
</table>

Metabolic energy (Mg / kg of material as is) = 0.012 × crude protein + 0.031 × ether extract + 0.005 × raw fiber + 0.014 × nitrogen-free extract (23).
Table 3: Chemical analysis of experimental treatments for Second experiment based on dry matter.

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Treatment with formaldehyde</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement ratio %</td>
<td>50</td>
</tr>
<tr>
<td>Treatments</td>
<td>T3</td>
</tr>
<tr>
<td><strong>Chemical composition</strong></td>
<td></td>
</tr>
<tr>
<td>Dry matter</td>
<td>96.30</td>
</tr>
<tr>
<td>Organic matter</td>
<td>92.09</td>
</tr>
<tr>
<td>Crude protein</td>
<td>15.50</td>
</tr>
<tr>
<td>Crude fiber</td>
<td>8.87</td>
</tr>
<tr>
<td>Ether Extract</td>
<td>5.28</td>
</tr>
<tr>
<td>Ash</td>
<td>7.90</td>
</tr>
<tr>
<td>Nitrogen free extract</td>
<td>62.44</td>
</tr>
<tr>
<td>Acid detergent fiber</td>
<td>35.14</td>
</tr>
<tr>
<td>Neutral detergent fiber</td>
<td>13.22</td>
</tr>
<tr>
<td>Lignin</td>
<td>2.73</td>
</tr>
<tr>
<td>Cellulose</td>
<td>10.49</td>
</tr>
<tr>
<td>Hemicellulose</td>
<td>21.92</td>
</tr>
<tr>
<td>Metabolic energy (Mica Gul/kg)</td>
<td>12.6</td>
</tr>
</tbody>
</table>

Metabolic energy (Mg / kg of material as is) = 0.012 × crude protein + 0.031 × ether extract + 0.005 × raw fiber + 0.014 × nitrogen-free extract (23).

**Study some blood parameters**

(BG), (BUN), (BCH), (BTP), (ALB) : was determined using the Bio System BTS - 350.

(GLO) : was calculated by subtracting albumin from total proteins.

**Chemical analysis**

DM, CP, CF,: was estimated according to (24).

(OM) : was calculated by subtracting the amount of ash from dry matter.

NFE : = OM – (CP + CF + EE).

(NDF), (ADF) and(ADL): was estimated according to (25).

Cellulose : was calculated: ADF – ADL.

Hemicellulose : was calculated: NDF – ADF.

**Statistical analysis**

The Statistical Analysis System (26) according
to (Completely Randomized Design-CRD), The differences between the averages were compared with Test (T).

**The mathematical model**

\[ Y_{ij} = \mu + E_i + e_{ij} \]

\[ Y_{ij} = \text{the value of the transaction j return to the transaction i.} \]

\[ \mu = \text{The general mean of the studied character.} \]

\[ E_i = \text{It represents two experiences i.} \]

\[ e_{ij} = \text{Random error distributed by a normal distribution with an average of 0 and a variance of } \sigma^2. \]

**Results and Discussion**

The level of degradation and digestibility of dietary protein in the rumen affects some parameters of the blood as it is used as an indicator of protein status, especially in qualitative comparisons of protein sources and the level of dietary protein intake (8,9,10).

**Effect type of protein treatment with blood or formaldehyde on Biochemical blood parameters.**

Table 4 showed that there were insignificant effect in (BG), (BUN), (BCH), (BTP), (ALB) and (GLO) for dried whey powder treated with blood or formaldehyde compared sun flower meal treated with blood or formaldehyde, This may be due to the fact the difference between the protein type (13,14) did not affect the level of blood glucose, as these results agreed with (6,16). While the results did not agree with (15) who stated that increasing the level of undegradable protein in the rumen with an increase in the substitution ratio of dried whey powder treated with blood or formaldehyde leads to an increase in the level of (BG) due to an increase in the flow of amino acids into the duodenum, to decrease the solubility of dissolution Dietary protein, which leads to greater quantities of the matrix used in the gluconeogenesis process (3,2,17). And these results agreed with (8,9,16) Regarding (BUN), (BCH), (BTP), (ALB) and (GLO).

<table>
<thead>
<tr>
<th>Studied traits</th>
<th>dried whey powder</th>
<th>standard error</th>
<th>sun flower meal</th>
<th>standard error</th>
<th>Effect significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>68.937</td>
<td>±0.395</td>
<td>68.770</td>
<td>±0.312</td>
<td>N.S</td>
</tr>
<tr>
<td>BUN</td>
<td>41.375</td>
<td>±0.351</td>
<td>42.145</td>
<td>±0.313</td>
<td>N.S</td>
</tr>
<tr>
<td>BCH</td>
<td>67.375</td>
<td>±0.392</td>
<td>67.937</td>
<td>±0.293</td>
<td>N.S</td>
</tr>
<tr>
<td>BTP</td>
<td>6.987</td>
<td>±0.031</td>
<td>6.927</td>
<td>±0.031</td>
<td>N.S</td>
</tr>
<tr>
<td>ALB</td>
<td>3.355</td>
<td>±0.026</td>
<td>3.340</td>
<td>±0.021</td>
<td>N.S</td>
</tr>
<tr>
<td>GLO</td>
<td>3.631</td>
<td>±0.039</td>
<td>3.586</td>
<td>±0.037</td>
<td>N.S</td>
</tr>
</tbody>
</table>

N.S Non significant.

**Effect type of protein treatment with formaldehyde in 100 % on Biochemical blood parameters.**

Table 5 showed that there were significant increase (P < 0.05) in (BTP) whereas insignificant effect in (BG), (BUN), (BCH), (ALB) and (GLO), for diets dried whey powder treated with formaldehyde in 100 % compared diets sun flower meal treated with formaldehyde in 100 %, This may be due to the effect of the type of treatment (formaldehyde) in filling the deficiency in the protein profile provided by the microbial protein (6) and the level of muscle tissue destruction (7) that affects the level of total proteins, and this may be due to the nature of the flower gain. The sun flower meal as a protein
source compared to dried whey powder as its content of fibers and phenolic compounds may affect the level of protection resulting from treatments (11). The percentage of phenolic compounds for sunflower meal treated with formaldehyde (0.13 ± 11.02) The percentage of fiber for sunflower meal treated with formaldehyde (0.11 ± 15.55) and there are no phenolic compounds or fibers in dried whey powder (27). As these results agree with (12,2,16), while these results are not in agreement with (14,15,13).

Table 5: Effect type of protein treatment with formaldehyde in 100% on Biochemical blood parameters.

<table>
<thead>
<tr>
<th>Studied traits</th>
<th>dried whey powder</th>
<th>standard error</th>
<th>sun flower meal</th>
<th>standard error</th>
<th>Effect significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>69.666 ±0.432</td>
<td>69.416 ±0.398</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUN</td>
<td>41.250 ±0.565</td>
<td>41.583 ±0.451</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCH</td>
<td>68.666 ±0.619</td>
<td>68.666 ±0.449</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTP</td>
<td>6.7092 ±0.029</td>
<td>6.985 ±0.029</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALB</td>
<td>3.378 ±0.042</td>
<td>3.345 ±0.038</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLO</td>
<td>3.714 ±0.067</td>
<td>3.640 ±0.060</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Different characters within the same column indicate significant differences (p <0.05); N.S Non significant.

Effect type of protein treatment with formaldehyde in 50% on Biochemical blood parameters.

Table 6 showed that there were significant increase (P < 0.05) in (BTP) whereas insignificant effect in (BG), (BUN), (BCH), (ALB) and (GLO), for diets dried whey powder treated with formaldehyde in 50% compared diets sunflower meal treated with formaldehyde in 50%, these results agree with (12,2,16), while these results are not in agreement with (14,15,13).

Table 6: Effect type of protein treatment with formaldehyde in 50% on Biochemical blood parameters.

<table>
<thead>
<tr>
<th>Studied traits</th>
<th>dried whey powder</th>
<th>standard error</th>
<th>sun flower meal</th>
<th>standard error</th>
<th>Effect significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BG</td>
<td>66.583 ±0.483</td>
<td>67.083 ±0.621</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUN</td>
<td>43.500 ±0.722</td>
<td>43.833 ±0.519</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCH</td>
<td>65.416 ±0.398</td>
<td>66.250 ±0.462</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTP</td>
<td>a6.850 ±0.029</td>
<td>b6.731 ±0.032</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALB</td>
<td>3.380 ±0.039</td>
<td>3.294 ±0.037</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLO</td>
<td>3.470 ±0.055</td>
<td>3.437 ±0.060</td>
<td>N.S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Different characters within the same column indicate significant differences (p <0.05); N.S Non significant.
Conclusion

The treatment of dried whey powder with formaldehyde in 100 and 50% led to a significant increase (P < 0.05) in the level of (BTP) compared to the sunflower meal, while there was no significant effect on the biochemical blood parameters of the treatment with blood or formaldehyde.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required

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Subjectivity Study on Anxiety in Clinical Practice of Nursing Students

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Abstract

The purpose of this study is to apply Q methodologies to identify and understand the type of anxiety in clinical practice of nursing students. The study organized the Q population through in-depth interviews to select 30 Q samples that could represent the Q population by coordination with two professors and researchers familiar with the Q methodology, and 29 nursing students were selected as P-samples. The data collection was about three months from August 31 to September 11, 2020 and was analyzed using the PQ Method Program. According to this study, nursing students anxiety in clinical practice was divided into four types: Type 1 ‘Anxiety related to lack of knowledge’, Type 2 ‘Anxiety related to self-satisfaction and expectations’, Type 3 ‘Anxiety related to vague expectations’, Type 4 ‘Anxiety related to personal factors’. As a result of this study, it is significant that it provided basic data that could suggest customized current interventions by analyzing the subjective perception patterns of nursing students about clinical practice anxiety. Therefore, it is considered that it is necessary to strengthen the competency of nursing students by applying the intervention plan to the comparative course in the future.

Key Words: Nursing students, Anxiety, Clinical practice, Q method, Subjectivity

Introduction

Clinical practice is essential in nursing education, and it prepares nursing students to apply what they learn in real theories in clinical practice through practice, and helps students develop critical thinking skills for problem solving1. In Korea, students are required to complete 1,000 hours of individual clinical practice training in order to apply the theories learned in the clinical field, and clinical practice training is provided for more than 1,000 hours at all nursing colleges in Korea2. Nursing students experience communication with patient caregivers and other medical staff through clinical practice education, and apply the basic nursing skills and nursing courses practiced in the on-campus practice room, systematically learning theories and practice, and basic skills as professional nurses3. However, nursing students complain of anxiety when they start clinical practice4. Beck and Srivastava5 report that nursing students show anxiety in clinical practice due to lack of clinical experience, unfamiliarity, difficult patient, fear of practice, and evaluation of faculty in clinical practice. The negative experience in the first clinical practice is a factor that decreases motivation and interest in clinical practice4, and as a result, it leads to negative results for nursing education and actual clinical practice, resulting in decreased satisfaction with clinical practice. As a result, it is a major factor in the decline in job identity as a nurse6.

Accordingly, sufficient preparation is required before the practice so that students can practice clinical practice with confidence in nursing without fear of practice. Currently, nursing education has a simple clinical practice orientation to help students prepare for practice, but there is a lack of systematic programs for clinical practice considering the cause of anxiety or...
In addition, student anxiety can be an important variable for nursing students’ career vocation, sense of accomplishment, clinical performance, and reduction of nurse turnover after graduation, so an in-depth study is needed7-9.

In previous studies, studies related to clinical practice anxiety in nursing college students included state anxiety and self-efficacy before clinical practice10-11, and stress. And anxiety12-13, etc., and most of the studies confirming the influential factors or effects. Research has not been conducted.

Therefore, in this study, the subjective worries or fears that nursing students feel before they begin clinical practice, and what level and form they are doing, will be investigated in detail. Through this, it is expected to be possible to understand the practical anxiety of nursing students. Human subjectivity, which means an individual’s beliefs and attitudes about a specific object or situation, is limited in grasping the human’s inherent psychological state with data based on objective measurements, so the Q methodology for research on human behavior We intend to derive scientific, deep and insightful results through the application of 14.

For this reason, many studies, such as a study on the classification of nurse images of actual nursing students15-16, have applied the Q methodology to confirm individual subjective attitudes and types of experiences. Therefore, in this study, by applying the Q methodology to confirm the subjectivity of each nursing student and the characteristics of each type according to it, it lays the foundation for nursing students to form a more positive view of anxiety about anxiety before practice, and furthermore the expertise of nursing education It is intended to provide basic data that can contribute to strengthening.

Research Purpose

This study aims to provide basic data for nursing intervention strategies by applying the Q methodology to explore the types of subjective perception of nursing students’ clinical practice anxiety, and by analyzing the structure of each type of subjective perception of nursing students’ clinical practice anxiety.

The specific purpose of this study is as follows.

1) Confirm the subjective perception type of anxiety in clinical practice among nursing students.

2) Analyzing and describing the characteristics of nursing college students’ subjective perception of anxiety in clinical practice by type.

Research Methods

Research Design

This study is an exploratory study applying the Q methodology, a subjective research method, to explore the perception of anxiety in clinical practice among nursing students in a systematic and scientific way.

Research Subject

The subject of this study is to understand the clinical practice anxiety subjectively perceived by nursing college students. It is a P-sample that can best reveal clinical practice anxiety, and nursing who has experienced clinical practice attending the Department of Nursing in City C. It was targeted at university students. Q To form a recruitment group, a total of 30 subjects, including 5 subjects who participated in the interview, were conveniently sampled, and 30 subjects who were recruited through the recruitment announcement explained the purpose and procedure of the study and received voluntary consent for the study. The study explained that the subject can withdraw from the study at any time they do not want to participate in the study, and there is no disadvantage due to it. A total of 29 P-samples were used in the study, excluding one who responded unfaithfully to the questionnaire.

Composition Process

Composition of Q population and Q sample

The selection of Q-sample proceeds in two stages: the composition of the Q population and determining the Q-sample. First, the Q population is the stage before the Q sample, which collects statements until the statement becomes saturated and no more statements can be added17. In general, a range of 30-50 is suitable for extracting Q samples from the Q population18. In this study, 130 statements were first collected through prior research and
indepth interviews on clinical practice anxiety among nursing students. In addition, 30 statements were finally selected by re adjusting the questions with overlapping meanings, and as a result of reading and analyzing them several times in relation to clinical practice anxiety, 4 factors (anxiety related to lack of knowledge, anxiety related to self-satisfaction and expectations, current It could be categorized as anxiety related to vague expectations about the situation and anxiety related to personal characteristics). Finally, in order to find out the representativeness and discrimination of each category, one professor of nursing department with experience in performing more than three Q studies and two persons who have completed the doctoral course in nursing and attended the Q methodology workshop in the region once agreed. Thus, the final 30 questions were selected (Table 1).

P sample

The Q methodology is not limited to the number of P samples, as it deals with differences between individual internal meanings, not between individuals, and that the selection of P samples has different views on the subject to be studied rather than according to the probabilistic sampling method. It is better to do what is expected. In this study, for nursing students in area C who agreed to participate in the study from August 31 to September 11, 2020, gender, age, and attitude toward nursing students’ clinical practice anxiety can be sufficiently revealed. 29 students were selected as the P sample in consideration of grade, religion, and motivation to enter school, as shown in (Table 2). The motivation for entering the department of nursing is based on subjective judgment. For the ethical protection of the research participants, the research subjects were notified of the purpose of the research, confidentiality, and withdrawal of their intention to participate in the research and received written consent.

Q sorting

The time required for Q classification, general characterization, and interview was about 40 minutes, and the Q sample classification period was conducted from August 31 to September 11, 2020.

Is a process in which respondents classify Q samples and give points to each items. To this end, the statement selected as the Q sample was made into a 5×3 cm card and a serial number was marked on each card. The Q classification was forcibly arranged on the distribution chart from strong positive to strong negative (-4 to 4).

As for the classification procedure, the Q card and the Q classification distribution were distributed to the subjects, and after listening to the explanations of the researchers, the two most positive cards were arranged at 4, and the most negative cards were arranged at -4. Immediately after the classification was completed, information related to general characteristics of participants and anxiety in clinical practice was collected through 1:1 in-depth interviews with the P sample and the researcher. Q

When sorting cards, first, I chose a card that coincided or disagrees with my thoughts on’ what feelings or thoughts do I have when I think about clinical practice, and what is the most worrisome and fearful?’ and put them on the distribution chart. In general, card sorting took about 10-20 minutes, and after sorting, the 1:1 in-depth interview with the researcher took about 25-35 minutes.

Data analysis

This study was analyzed using the principal component analysis of the PQ method program, and the specific analysis method is as follows.

1) 21 Q statements were entered with -4 to 4 points assigned to each P sample depending on the level of consent or disagreement.

2) In order to determine the most ideal number of factors, the most appropriate one was selected based on an Eigen value of 1.0 or higher.

3) The standard score for each type (Z-score) and the average of the standard scores for each type were analyzed.

4) Strong consent items (Z-score 1.00 or higher) and strong disagreement items (Z-score -1.00 or higher) by type were extracted and analyzed.

5) In order to analyze the reasons for selecting consent items and non-consent items of each type, general characteristics, questionnaire data, and statements of the subject were considered together to comprehensively
analyze the characteristics of the types.

Results

Analysis of results

Of the 29 subjects of this study, 5 (P-2, 17, 20, 23, 27) were not classified as one factor because the difference in factor weights was not significant. The age ranged from 20 to 23 years old (Table 2).

The four types of anxiety perceptions of nursing students in this study were classified according to the characteristics of each type. Type 1 was 5 people, ‘Anxiety related to lack of knowledge’, Type 2 is 8 people, ‘Anxiety related to self-satisfaction and expectations’, Type 3 is 4 people, ‘Anxiety related to vague expectations’, Type 4 is 7 people, classified as ‘Anxiety related to personal factors’.

The Eigen Value for each type of this study is shown in <Table 3>, and the explanatory power was 55%. In addition, in the correlation between types showing similarity between types, the correlation coefficient between type 1 and type 4 was the highest at r=.50, and the correlation coefficient between type 2 and type 3 was somewhat lower at r= -.02 (Table 4)

Q type analysis

Type 1: Anxiety related to lack of knowledge

Type 1 subjects reported that clinical practice anxiety was associated with lack of knowledge (Table 5). They felt anxiety due to the lack of theoretical learning content even though they had to learn nursing skills, critical thinking, and analytical skills by applying the theoretically learned content to the nursing field. Looking at this in detail, the statements of respondents with the first type of representativeness (factor weight 1.0 or more) are as follows. P-11 (factor weight = .76), the epitome of this type, said, “I think I learned something, but when I come to practice, I can’t get a sense of what this is and I feel like I’m just looking with my eyes. If you go to practice before the theory starts on schedule at school, you have to read the theory book in your mind, but it doesn’t work.” Said. Through this, in this study, type 1 with these characteristics was named ‘Anxiety related to lack of knowledge’.

Type 2: Anxiety related to self-satisfaction and expectations

Type 2 subjects reported that clinical practice anxiety was related to self-satisfaction and expectations (Table 5). Unlike learning in college, they felt anxious because they had to prepare a variety of things they wanted in clinical practice. Looking at this in detail, the statements of respondents with the second type of representativeness (factor weight 1.0 or more) are as follows. The epitome of this type, P-28 (factor weight = .73), said, “I want to do well, but I think I am only motivated. I want to do one more because it helps me a little when I get a job if I can see it well when I practice, but I am afraid that I will make a mistake, and I am worried that the nurse teachers will not look good.” Said. Through this, in this study, type 2 with these characteristics was named ‘Anxiety related to self-satisfaction and expectations’.

Type 3: Anxiety associated with vague expectations

Type 3 subjects reported that clinical practice anxiety was related to vague expectations (Table 5). In particular, they have limited practice content, a feeling of atrophy due to an authoritative field atmosphere or rejection from nursing targets, unstable practice environment, and simple work, even though the clinical practice experience is a major requirement to establish a positive image of a nurse or a correct nursing officer. He said he felt anxious due to the repetition of Looking at this in detail, the statements of respondents with the third type of representativeness (factor weight 1.0 or more) are as follows.

P-22 (factor weight = .80), which is the epitome of this type, said, “When I went to practice, it was clinical, so I saw and communicated with patients and thought. However, it is more difficult than I thought and the image of the nurse I thought was broken.” Said. Through this, in this study, type 3 with these characteristics was named ‘Anxiety related to vague expectations’.

Type 4: Anxiety related to personal factors

Type 4 subjects reported that clinical practice anxiety was related to personal factors (Table 5). In particular, they said they felt anxious about their lack
of understanding and response to patients and their caregivers, and that they would not be able to adapt to changes in the medical environment. Looking at this in detail, the statements of respondents with the third type of representativeness (factor weight 1.0 or more) are as follows. Typical of this type, P-5 (factor weight = .66) says, “I wake up in the morning, go to work, take over, and I am so sleepy and difficult. I have to do assignments and study for exams, but I am anxious that I can’t happen. After the practice, it is burdensome to play with friends.” Through this, in this study, type 3 with these characteristics was named ‘Anxiety related to personal factors’.

### Table 1. Q statement

<table>
<thead>
<tr>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The new environment is unfamiliar.</td>
</tr>
<tr>
<td>2. I don’t know when the practice will be stopped because of covid-19.</td>
</tr>
<tr>
<td>3. The school practice environment and clinical practice seem different.</td>
</tr>
<tr>
<td>4. The hospital makes me do miscellaneous work.</td>
</tr>
<tr>
<td>5. Is after zen practice learn theoretical course.</td>
</tr>
<tr>
<td>6. Is compared to other university students.</td>
</tr>
<tr>
<td>7. Compared to the nurses who do not have a break, it is burdensome because I only seem to be relaxed.</td>
</tr>
<tr>
<td>8. It’s not the medical field I expected.</td>
</tr>
<tr>
<td>9. I don’t know which patient to meet.</td>
</tr>
<tr>
<td>10. I don’t know how to communicate with the people I have a relationship with</td>
</tr>
<tr>
<td>11. Seems to be ignored by nurses who are actually learning.</td>
</tr>
<tr>
<td>12. The patient and his family praise me.</td>
</tr>
<tr>
<td>13. The nurse in the practical ward want to take for me a junior.</td>
</tr>
<tr>
<td>14. I don’t feel burdened to be in a group with friends I’m not close to.</td>
</tr>
<tr>
<td>15. Have not good relationship with the professor in charge of practical training</td>
</tr>
<tr>
<td>16. It’s different from the image of the nurse I thought it would be.</td>
</tr>
<tr>
<td>17. I heard stories about the negative nursing culture.</td>
</tr>
<tr>
<td>18. I want to do well because it is a hospital of my hope.</td>
</tr>
<tr>
<td>19. I don’t know if I’m doing nursing or nursing assistant duty.</td>
</tr>
<tr>
<td>20. The ward nurse asks me questions about nursing knowledge.</td>
</tr>
<tr>
<td>21. The amount of learning tasks is large.</td>
</tr>
<tr>
<td>22. After practicing, I don’t know what I learned at school.</td>
</tr>
<tr>
<td>23. I received sufficient orientation.</td>
</tr>
<tr>
<td>24. There seems to be nothing to learn through practice.</td>
</tr>
<tr>
<td>25. I am confused because the knowledge I learned in school is different for each clinical practice.</td>
</tr>
<tr>
<td>26. It’s hard to get up at dawn.</td>
</tr>
<tr>
<td>27. I am very quick to learn something.</td>
</tr>
<tr>
<td>28. I’m afraid I’ll be harmful to the patient.</td>
</tr>
<tr>
<td>29. I am sensitive reaction to small things.</td>
</tr>
<tr>
<td>30. I’m full of confidence.</td>
</tr>
</tbody>
</table>
Table 2. General characteristics and factor weights of P samples by type

<table>
<thead>
<tr>
<th>Type</th>
<th>ID</th>
<th>Factor weights</th>
<th>Age (yrs)</th>
<th>Religion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type1</td>
<td>P-1</td>
<td>0.72</td>
<td></td>
<td>Protestant</td>
</tr>
<tr>
<td>(n=5)</td>
<td>P-8</td>
<td>0.56</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-11</td>
<td>0.76</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-14</td>
<td>0.74</td>
<td></td>
<td>Buddhism</td>
</tr>
<tr>
<td></td>
<td>P-16</td>
<td>0.68</td>
<td></td>
<td>Buddhism</td>
</tr>
<tr>
<td>Type2</td>
<td>P-3</td>
<td>-0.59</td>
<td></td>
<td>Catholic</td>
</tr>
<tr>
<td>(n=8)</td>
<td>P-7</td>
<td>0.55</td>
<td></td>
<td>Protestant</td>
</tr>
<tr>
<td></td>
<td>P-13</td>
<td>0.63</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-24</td>
<td>0.61</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-25</td>
<td>0.45</td>
<td></td>
<td>Buddhism</td>
</tr>
<tr>
<td></td>
<td>P-26</td>
<td>0.67</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-28</td>
<td>0.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-29</td>
<td>0.72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type3</td>
<td>P-9</td>
<td>0.68</td>
<td></td>
<td>Protestant</td>
</tr>
<tr>
<td>(n=4)</td>
<td>P-19</td>
<td>0.72</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-21</td>
<td>0.51</td>
<td></td>
<td>Protestant</td>
</tr>
<tr>
<td></td>
<td>P-22</td>
<td>0.80</td>
<td></td>
<td>Catholic</td>
</tr>
<tr>
<td>Type4</td>
<td>P-4</td>
<td>0.60</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>(n=7)</td>
<td>P-5</td>
<td>0.66</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>P-6</td>
<td>0.50</td>
<td></td>
<td>Buddhism</td>
</tr>
<tr>
<td></td>
<td>P-10</td>
<td>0.59</td>
<td></td>
<td>None</td>
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<td></td>
<td>P-12</td>
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<td>P-15</td>
<td>0.62</td>
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<td></td>
<td>P-18</td>
<td>0.59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Eigen value and Variance by Type

<table>
<thead>
<tr>
<th></th>
<th>Type1</th>
<th>Type2</th>
<th>Type3</th>
<th>Type4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eigen values</td>
<td>7.87</td>
<td>3.53</td>
<td>2.66</td>
<td>2.02</td>
</tr>
<tr>
<td>Variance (%)</td>
<td>14</td>
<td>16</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Cumulative (%)</td>
<td>14</td>
<td>30</td>
<td>41</td>
<td>55</td>
</tr>
</tbody>
</table>
### Table 4. Correlations among the Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Type1</th>
<th>Type2</th>
<th>Type3</th>
<th>Type4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type2</td>
<td>0.40</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type3</td>
<td>0.09</td>
<td>-0.02</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Type4</td>
<td>0.50</td>
<td>0.34</td>
<td>0.14</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Table 5. Z-score for each type

<table>
<thead>
<tr>
<th>Statement</th>
<th>Type1</th>
<th>Type2</th>
<th>Type3</th>
<th>Type4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The new environment is unfamiliar.</td>
<td>-1.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I don’t know when the practice will be stopped because of the covid-19.</td>
<td>1.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The school practice environment and clinical practice seem different.</td>
<td>1.11</td>
<td>2.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The hospital makes me do miscellaneous work.</td>
<td>-1.23</td>
<td>-1.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Is after zen practice learn theoretical Course.</td>
<td>1.42</td>
<td>-1.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Is compared to other university students.</td>
<td></td>
<td></td>
<td>-1.63</td>
<td></td>
</tr>
<tr>
<td>7. Compared to the nurses who do not have a break, it is burdensome because I only seem to be relaxed.</td>
<td></td>
<td></td>
<td>-1.28</td>
<td></td>
</tr>
<tr>
<td>8. It’s not the medical field I expected.</td>
<td>1.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I don’t know how to communicate with the people I have a relationship</td>
<td>-1.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Seems to be ignored by nurses who are actually learning.</td>
<td>-2.37</td>
<td>-1.40</td>
<td>-1.31</td>
<td></td>
</tr>
<tr>
<td>12. The patient and his family praise me.</td>
<td></td>
<td>1.35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I don’t feel burdened to be in a group with friends I’m not close to.</td>
<td>1.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Have not good relationship with the professor in charge of practical training</td>
<td></td>
<td>-1.16</td>
<td>-1.27</td>
<td>-1.77</td>
</tr>
<tr>
<td>17. I heard stories about the negative nursing culture.</td>
<td></td>
<td></td>
<td>1.32</td>
<td></td>
</tr>
<tr>
<td>18. I want to do well because it is a hospital of my hope.</td>
<td></td>
<td></td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td>19. I don’t know if I’m doing nursing or nursing assistnat duty.</td>
<td></td>
<td></td>
<td>-1.07</td>
<td></td>
</tr>
<tr>
<td>21. The amount of learning tasks is large.</td>
<td>1.51</td>
<td>1.66</td>
<td>2.54</td>
<td></td>
</tr>
<tr>
<td>24. There seems to be nothing to learn through practice.</td>
<td></td>
<td></td>
<td></td>
<td>-1.34</td>
</tr>
<tr>
<td>26. It’s hard to get up at dawn.</td>
<td></td>
<td></td>
<td></td>
<td>1.47</td>
</tr>
<tr>
<td>27. I am very quick to learn something.</td>
<td>1.56</td>
<td>-1.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. I’m afraid I’ll be harmful to the patient.</td>
<td>2.17</td>
<td>-1.66</td>
<td>1.46</td>
<td></td>
</tr>
<tr>
<td>29. I am sensitive reaction to small things.</td>
<td>1.64</td>
<td>-1.22</td>
<td>1.53</td>
<td></td>
</tr>
<tr>
<td>30. I’m full of confidence.</td>
<td></td>
<td></td>
<td>1.48</td>
<td></td>
</tr>
</tbody>
</table>

※ Blank is a statement with no significant standard score.
Discussion and Conclusion

This study was attempted to prepare basic data for nursing intervention strategies by applying the Q methodology to explore the types of subjective perception of nursing students’ clinical practice anxiety, and by analyzing the structure of each type of subjective perception of nursing students’ clinical practice anxiety. Four types of subjective perceptions of anxiety in clinical practice among nursing students were identified as ‘lack of knowledge’, ‘self-satisfaction and expectation’, ‘vague expectations’, and anxiety related to ‘individual factors’.

The anxiety of clinical practice among nursing students in Type 1 is ‘Anxiety related to lack of knowledge’, and it is difficult to read the theoretical textbook before going on to practice, so not only the motivation and interest in clinical practice decrease, but also anxiety from lack of knowledge. Since it may be difficult to achieve the purpose of clinical practice to apply sufficient theoretical knowledge and skills to the field before practice, type 1 nursing students have the opportunity to acquire sufficient prior knowledge before clinical practice. It is necessary to provide specific information to reduce confidence and anxiety in clinical practice by providing the information.

Anxiety in clinical practice among nursing students in the 2nd type is “Anxiety related to self-satisfaction and expectation,” and there are many situations that nursing students have to learn while encountering themselves. He was scolded and had anxiety that he would be disadvantaged when he was hired, and despite being physically and mentally difficult, and trying to act consciously in the practice field, he tried not to lose sight of his efforts. Therefore, it is important for the 2nd type of nursing students to look back on their own faults, think once more from the standpoint of others, and overcome anxiety through a self-development program that seeks to change themselves in a positive direction.

The anxiety of clinical practice among nursing students in the 3rd type is ‘Anxiety related to vague expectations’, and the attitude of non-educational medical personnel to nursing students in a rapid medical environment and unilateral communication raise the anxiety of nursing students in clinical practice. In addition, it was found to decrease the coping ability, satisfaction with clinical practice, and clinical practice performance related to clinical practice education. It is said that nursing students feel anxious because they are not familiar with the environment and everyone they meet, such as hospitals, patients, and medical staff, and this is consistent with the research results of Song’s19. Therefore, if the 3rd type of nursing college students experience the role of clinical nurses focusing on clinical reasoning and nursing performance through the application of various cases of nursing courses, anxiety about clinical practice can be reduced and performance confidence can be improved.

Anxiety in clinical practice among nursing students in type 4 is ‘Anxiety related to personal factors’, and due to personal factors, they felt anxiety that they would not be able to adapt to changes in the medical environment and lack of understanding and response to patients and caregivers. In particular, the study of Alzayyat & Al-Gama20 said that the highest stress was the assignment, and because of this, they were anxious that they would not be able to wake up at work. Therefore, it is believed that the 4th type of nursing college students will be able to lower their anxiety about the assignments and to have a leisure life during the practice period if appropriate assignments and detailed evaluation criteria for the assignments are presented.

As a result of this study, it is meaningful to propose a customized intervention plan by analyzing the subjective perception patterns of nursing college students about clinical anxiety. Therefore, it can be used as useful data to improve the knowledge, skills, and attitudes of nursing college students according to the subjective type of clinical anxiety of nursing college students. However, in order to conduct clinical practice efficiently, there is anxiety due to some degree of stress, but it is thought that anxiety that students cannot overcome will lead to negative consequences that students cannot perform clinical practice. Ultimately, it is necessary to develop a program to reduce the anxiety of nursing students or to modify the developed program to suit nursing education and apply it to the curriculum or education.
The results of this study are limited to generalization as a result of interviewing a total of 30 people including those who participated in the interview to form a Q-recruitment group for 3rd and 4th grade nursing students at one university. It is necessary to understand the characteristics of subjectivity type targeting nursing students at universities.

Acknowledgments: The authors would like to thank the students who participated in this study and shared their experiences with us.

Declaration of Conflicting Interests: The Author declare that there is no conflict of interest.

Ethical Clearance: All protocols followed the University’s approved guidelines.

Source of Funding: The study is self-funded.

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18. Kim SE. Q Methodology and Social Science. CM

Adverse Effects of Khat (Catha edulis) Chewing in Yemeni Adults: A Case-Control Study

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Abstract

Background: Khat is the common name for the plant Catha edulis. The leaves and buds of Khat are chewed and their use is an established cultural tradition for many social situations in Yemen. Traditionally, Khat has been frequently chewed on social occasions, in public spaces or designated rooms in private homes. The medical and psychosocial impacts of khat chewing have been reported previously. However, the effect of chewing Khat on some biochemical and hematological parameters needs further investigation.

Objectives: This study was carried out to investigate the effect of Khat chewing on a number of biochemical and hematological parameters in a population-based groups.

Materials and Methods: One hundred and eighty eight (n=188) subjects who have completed the questionnaire were included in this study. Ninety eight (n= 98) subjects among these were Khat chewers and ninety (n= 90) were non-chewers of Khat. Blood samples were collected from each subject in the study to measure uric acid, rheumatoid factor (RF) and complete blood cell (CBC) counts.

Results: It has been shown that joint pain and kidney disease were significantly more prevalent in Khat chewers than Khat non-chewers. Uric acid levels were markedly higher in Khat chewers than Khat non-chewers, while differences in RF levels between the two groups were not significant. Although RBCs indices showed no significant difference among the study groups, a statistical significance in the white blood cells (WBCs), lymphocytes, and platelets counts was observed.

Conclusion: The present study strongly suggeststhat Khat chewing had an adverse effect on the development of arthritis and kidney diseases. Moreover, altered immune defence mechanisms due to Khat chewing have also been documented in this study.

Keywords: Khat chewing, Catha edulis, arthritis, kidney diseases

Introduction

Khat (Catha edulisForsk) has been grown for use as a stimulant for centuries in different countries including Ethiopia, Somalia, Yemen, Kenya, Uganda, the Congo, Zambia, and South Africa1-2. The chewing of Khat leaves for social and psychological reasons has been practiced for many centuries and its use has been gradually
expanded to many countries worldwide\textsuperscript{5,6}. In Yemen, it has become a serious national concern because of its widespread use. The adverse effects of Khat chewing habit on different human body systems were extensively reviewed\textsuperscript{5-7}. In their literature review, Rassool and Abou-Saleh, have suggested that Khat affects the digestive, respiratory, endocrine and cardiovascular systems\textsuperscript{7}. The quality of life of Khat chewers and non-Khat chewers was assessed and compared using a health survey. The investigators showed that lower quality of life and lower socioeconomic status are correlated with Khat chewing\textsuperscript{8}.

Khat-chewing has been reported as a harmful activity by several studies around the world on the basis of health and socio-economic consequences as reviewed by Karunamoorthi and colleage\textsuperscript{9}. However, it can lead to health consequences like oral infection if it is chewed excessively and in large quantities\textsuperscript{10}. Some studies indicated that hypertension, myocardial infarction, and liver diseases are among the major health consequences of Khat chewing\textsuperscript{11-13}. It has been documented that Khat intake results in improved energy levels and alertness, enhances imaginative ability and the capacity to associate thoughts, and improves the ability to communicate\textsuperscript{14}. It has been reported that psychosis was induced by Khat\textsuperscript{15}. A large survey among Yemeni adults done by Numan has excluded any correlation between Khat chewing and psychopathological alterations\textsuperscript{16}. Although Khat is used as a stimulant drug that increases brain awareness, it has an adverse effect on the body physiology and causes many diseases. The effect of Khat chewing on the development of kidney disease and arthritis has not been studied well on a population that commonly use Khat. Therefore, the purpose of this prospective study was to evaluate whether arthritis and kidney disease are developed by Khat use. The changes in immune defense parameters due to Khat chewing are also evaluated.

Materials and Methods

1. Study population

A total of 222 adults who met the eligibility criteria were selected, of which 34 were smokers and were thus excluded from the study. The others 188 subjects have completed both the questionnaire and measurements. Among the 188 study participants, 98 were Khat chewers (group 1) and 90 were non-chewers as controls (group 2). Khat chewers and non-chewers were randomly selected from different populations including students, teachers, and farmers from different areas in Ibb province of Yemen. Other participants in the study were selected from patients who regularly attending the Internal Medicine Clinics at Jeblah Hospital and other health centers at Ibb city. All diseases stated in this study were diagnosed by specialists in Jeblah Hospital or other health centers. Each participant has been interviewed and completed a questionnaire. Smokers, former smokers, pregnant women, diabetes and participants with age of 70 and above were excluded from the study. The two groups were matched for different parameters including age, sex, nutritional habits, and all the exclusion criteria.

2. Sample collection

Blood samples were taken in the morning between 8:00 and 10:00 a.m. from all participants. Samples were collected from each participant in two tubes, 5 ml in EDTA (1 mg/ml) tube and 5 ml in an anticoagulant-free tube. The EDTA anticoagulated blood was used for analysis of Complete Blood Cell count (CBC) by hematology analyzer. Blood samples in the anticoagulant-free tube were centrifuged at 3000 \textit{xg} for 10 minutes at room temperature within 90 min after collection and the serum was stored in eppendorf tubes at -20°C for uric acid and rheumatoid factor analysis.

3. Laboratory measurements

CBC was analyzed by hematology analyzer (CBC analyzer, KX-21N, Germany). Uric acid concentration in the serum was assessed using reagent kit obtained from Spinreact (S.A. Ctra Santa Coloma, Spain). Rheumatoid Factor (RF) was estimated in the serum of the study population using RF-latex supplied by Spinreact (S.A. Ctra Santa Coloma, Spain). The RF-latex is a slide agglutination test for the qualitative and semiquantitative detection of RF in human serum. Polystyrene latex particles coated with human gammaglobulin are agglutinated when mixed with samples indicating that the RF is present in the serum (cut-off < 8 IU/ml). The approximate RF concentration in the individual sample was calculated.
4. Statistical Analysis

The qualitative data were expressed as a number and percentage. Chi-square was used as a test of significance for qualitative data. Student t-test was used to study significance of quantitative data. Significance was calculated according to the P value. P value of less than 0.05 is considered significant while P value more than 0.05 considered insignificant. Statistical analysis was performed by using SPSS software version 16.

Results

1. Frequency of different parameters in Khat chewers and non-chewers

The age of Khat chewers and non-chewers groups are 33.6 ± 11.7 and 31.0 ± 13.6 years ($P = 0.16$), respectively. Of the study groups, 36.70% were males and 63.30% were females. As shown in Table 1, there were no significant difference in the frequency of study subjects in different parameters including body mass index (BMI), diuretics use, hypertension, and rheumatoid factor results among both groups. However, most of the study participants are normotensives (88.4%) and have normal weight (56.6%). The percentages of individuals who are having arthritisand kidney diseases were significantly more in Khat chewers than Khat non-chewers subjects; 40.9% vs. 26.3%, $P = 0.001$ and 36.6% vs. 24.2%, $P = 0.011$, respectively. Furthermore, the percentages of Non-steroidal anti-inflammatory drugs (NSAID) use in Khat chewers were increased significantly as compared with Khat non-chewers.

Table 1. Frequency of clinical characteristics in Khat chewers and non-chewers groups

<table>
<thead>
<tr>
<th></th>
<th>Khat chewers (No. = 98)</th>
<th>Khat non-chewers (No. = 90)</th>
<th>$P$-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>Gender (males/females)</td>
<td>33/65</td>
<td>17.6/34.6</td>
<td>36/54</td>
</tr>
<tr>
<td>Plant food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4 times/day</td>
<td>81</td>
<td>43.1</td>
<td>69</td>
</tr>
<tr>
<td>5-7 times/day</td>
<td>17</td>
<td>9.0</td>
<td>21</td>
</tr>
<tr>
<td>Animal food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nothing/week</td>
<td>7</td>
<td>3.7</td>
<td>13</td>
</tr>
<tr>
<td>1 time/week</td>
<td>73</td>
<td>38.8</td>
<td>60</td>
</tr>
<tr>
<td>2-4 times/week</td>
<td>14</td>
<td>7.4</td>
<td>8</td>
</tr>
<tr>
<td>5-7 times/week</td>
<td>4</td>
<td>2.1</td>
<td>9</td>
</tr>
<tr>
<td>BMI groups (kg/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt;18.5)</td>
<td>13</td>
<td>6.9</td>
<td>10</td>
</tr>
<tr>
<td>Normal (18.5-24.9)</td>
<td>50</td>
<td>26.6</td>
<td>53</td>
</tr>
<tr>
<td>Overweight (25-29.9)</td>
<td>27</td>
<td>14.4</td>
<td>17</td>
</tr>
<tr>
<td>Obese (≥ 30)</td>
<td>8</td>
<td>4.3</td>
<td>10</td>
</tr>
<tr>
<td>Arthritis</td>
<td>76</td>
<td>40.9</td>
<td>49</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>68</td>
<td>36.6</td>
<td>45</td>
</tr>
<tr>
<td>Diuretics users</td>
<td>56</td>
<td>54.9</td>
<td>40</td>
</tr>
<tr>
<td>NSAID users</td>
<td>59</td>
<td>36.0</td>
<td>29</td>
</tr>
<tr>
<td>Hypertension</td>
<td>13</td>
<td>7.9</td>
<td>6</td>
</tr>
<tr>
<td>Positive Rheumatoid Factor</td>
<td>14</td>
<td>7.5</td>
<td>10</td>
</tr>
</tbody>
</table>

* Based on Chi-Square test. NSAID= Non-steroidal anti-inflammatory drugs.
2. Laboratory characteristics of the study populations

The major clinical and laboratory characteristics of the study groups are summarized in Table 2. A statistical significance was observed in the WBCs, lymphocytes, and platelets counts among the study groups. It has also been revealed that uric acids levels were markedly higher in Khat chewers than Khat non-chewers, 5.04 ±1.83 vs. 4.12±1.39, \( P < 0.001 \) (Table 2). Furthermore, Figure 1 shows that the increased uric acids values were significantly and positively correlated with duration of Khat chewing (\( R = 0.323, P = 001 \)). There were no significant differences in systolic blood pressure, diastolic blood pressure, and RBCs indices (PCV, MCV, MCH, and MCHC) between the study groups.

<table>
<thead>
<tr>
<th>Table 2: Clinical and laboratory characteristics of the study groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Khat chewers</strong></td>
</tr>
<tr>
<td>Uric acid (mg/dl)</td>
</tr>
<tr>
<td>RBCs (X10¹²/l)</td>
</tr>
<tr>
<td>Hemoglobin (g/dl)</td>
</tr>
<tr>
<td>WBCs (X10⁹/l)</td>
</tr>
<tr>
<td>Lymphocytes (X10⁹/l)</td>
</tr>
<tr>
<td>PCV (l/l)</td>
</tr>
<tr>
<td>MCV (fl)</td>
</tr>
<tr>
<td>MCH (pg)</td>
</tr>
<tr>
<td>MCHC (g/dl)</td>
</tr>
<tr>
<td>Platelets (X10⁹/l)</td>
</tr>
<tr>
<td>Systolic blood pressure (mmHg)</td>
</tr>
<tr>
<td>Diastolic blood pressure (mmHg)</td>
</tr>
</tbody>
</table>

Values are mean ± standard deviation (SD). *Significantly different between Khat chewing and non-chewing groups if \( P < 0.05 \). NS; the difference between groups is not significant. PCV; packed cell volume, MCV; Mean cell (or corpuscular) volume, MCH; Mean cell hemoglobin, MCHC; Mean cell hemoglobin concentration.
Figure 1. Correlation analysis between Khat chewing period (hours/day) and uric acid levels showing positive correlation ($P = 0.001$).

Discussion

Khat chewing is a common social habit in Yemen that has been practiced for decades by both men and women and sometimes even children for a few hours per day, and in many cases it is a lifetime habit. The Khat chewing process leads to the storage of Khat leaves in the mouth until the cheek expands to look like a ball of different sizes from person to another. Many adverse health changes were reported in the literature. For example, adverse effects of this habit on various human body systems such as liver, central nervous system, and digestive system were extensively investigated. Furthermore, the association of Khat use with oral and dental diseases has been reported, with particular emphasis on its link with oral keratotic white lesions and oral cancer. In the present study, we examined the association of Khat chewing with arthritis and hematological parameters changes.

The current study suggests for the first time, using a case-control study design, that high prevalence of arthritis and increased uric acid levels were seen in long-term Khat chewing at the population level. There was no statistical significance in the percentages of using meat-containing meal among the study groups. In both study groups, 70.8% had once a week animal food meal and 11.7% had 2-4 times per week. Therefore, the effect of animal food on the accumulation of uric acid in the joints was excluded by analysis.

Our results also revealed a higher prevalence of kidney disease due to Khat chewing. The concurrent increase in uric acids with kidney disease has been recently investigated in patients with diabetes. The investigators observed that patients with hyperuricemia and diabetes had a higher systolic blood pressure and higher BMI levels. Our study found that most of the study population had normal systolic blood pressure and
similar BMI values with a high prevalence of normal weight individuals. Therefore, association of increased uric acid values and kidney diseases in Khat chewers compared to Khat non-chewers suggests that chronic use of Khat may have a more pronounced impact and not other confounding factors. Our results are not in agreement with the previous study that exclude the occurrence of kidney damage among Khat chewers. In addition, the findings of this study revealed normal and insignificant difference in diastolic blood pressure between the study groups. The findings in the present study contradict the earlier study of Getahun and colleagues, which showed a correlation between Khat chewing and elevated diastolic blood pressure.

Besides, we examined the effect of daily Khat chewing on hematological parameters. There was no significant differences in the studied red blood cells indices. However, lymphocytes and platelets count were significantly different and it is suggested to be due to Khat chewing. In addition, our results also revealed that WBCs count was significantly higher in Khat chewers than non-chewers. These results can be explained for different reasons, such as psychological stress or poisoning that may explain the increased leukocytes seen in Khat chewers. A potential synergistic association between Khat use and stress disorders was previously documented. Some other health problems include sleeping problems, feeling tired and/or depressed in the morning after a Khat-chewing session, loss of appetite, and feeling the need to chew Khat again.

In order to make them grow more and rapidly, Yemeni farmers usually apply unauthorized chemical pesticides on Khat bids. Since the use of unapproved chemical pesticides for Khat is uncontrolled, consumers started getting affected by these harmful chemicals and thus face several health problems. The poisoning that happens with the use of Khat may therefore not be due to Khat itself, but rather to the increased risk of these toxic pesticides being swallowed, which may be the cause of the increased leukocytes observed in individuals chewing Khat. It has also been shown that the lymphocytes count was lower in Khat chewers compared to Khat non-chewers. Earlier studies found that Ethiopians have lower lymphocyte counts compared to Dutch.

To our knowledge, this is the first study to report the association of low lymphocytes with Khat chewing in Yemeni population. The first explanation for these findings is that low lymphocytes counts in Yemeni Khat chewing individuals could be related to loss of appetite following Khat chewing or poor nutritional status. In fact, malnutrition depresses immune functions and malnutrition is prevalent in Yemeni population because of lack of appetite or poverty. Cathine is an alkaloid isolated from Khat with similar amphetamine-like effects on the central nervous system. It has been reported by Connor that amphetamines may have an immunosuppressive role. These findings indicate that actually has the ability to dramatically alter the immune response.

**Conclusion**

Our study revealed that Khat chewing may contribute to arthritis as confirmed by increased uric acid levels. A considerably lower proportion of animal food among Khat chewers suggests that the accumulation of uric acid in the joint was not due to massive protein metabolism, rather may be due to the way the chewers sit during Khat use. The findings also showed that frequent Khat chewing and increased WBCs and decreased lymphocytes counts are associated, indicating that Khat has an adverse effect on the function of the immune system. The effect of Khat on WBCs and lymphocytes counts, however, is intriguing and deserves further investigations. Having recognized Khat chewing problems and their adverse effects on health and the socio-economic development of the country, educational programs for the prevention and control of these adverse effects in the population need to be started before implementing legislative measures or issuing laws to prohibit Khat use in the community of Yemen.

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**Ethical Clearance:** The study was approved by Ibb University, Ibb, Yemen.

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COVID-2019: Digital Norm-Making

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Abstract

This article analyzes digital norm-setting activities, the introduction of digital technologies into norm-setting, norm-setting platforms, norm-setting modernization issues, and digitalization during a pandemic to prevent the spread of viruses along with health care for both the legislature and the local population. The article examines the scientific works of legal scholars in the field of norm-setting and, based on these sources, covers the topic and outlines several problems in the field of digital norm-setting in a pandemic. The article develops the author’s proposals on the development, discussion, examination, and legal examination of normative legal documents using information technology, facilitation of their adoption and delivery to the public, and health. Based on these recommendations, the author argues that the Pandemic should prevent COVID-19 and other emergencies in the protection of the health and time of professionals working in law enforcement agencies.

Keywords: Digital norms, norm-making, technology, acts, health, coronavirus pandemic, COVID-19.

Introduction

The COVID-19 pandemic is the current global pandemic of the COVID-19 coronavirus infection caused by the SARS-CoV-2 coronavirus. The outbreak was first reported in Wuhan, China in December 2019. The outbreak was declared a public health emergency of international concern by the World Health Organization on January 30, 2020, and a pandemic on March 11. As of December 9, 2020, the pandemic had more than 69.1 million cases worldwide; more than 1.573 million people died and more than 47.8 million recovered.

According to health organizations, a person infected with the coronavirus can be infected by any object or object that is likely to contain a hand, door handles, money, table-chair surfaces, paper, windows, stairs, bars, and other viruses.

A take, given that COVID-2019 is transmitted through documents and other things, the use of digital technologies during a pandemic, i.e. working with electronic materials, is beneficial to humans.

The global trend is that digital technologies are somewhat advanced in all developed countries. Indeed, the development of a society in which globalization has changed (transformed, updated) and introduced the latest technologies in the process of integration with the world community is important.

To achieve development, we must first acquire digital knowledge and modern information technology. Digital technology increases public and public administration, productivity in the social sphere, improve people’s lifestyles.

At the same time, the modernization of normative creativity, in particular digitalization, also prevents the spread of viruses, mainly in conjunction with health care, not only for the legislature but also for the population during a pandemic.

Indeed, the development, discussion, expertise and legal expertise of normative and legal documents using information technology, as well as facilitating their adoption and dissemination to the public, is also important in health care.

Material and Methods

In the field of norm-making based on the following...
methods:

1. The Concrete-sociological method often turns out to be the only correct one when studying various spheres of activity of legal and state institutions, when it is necessary to assess the effectiveness of decisions made, the timeliness and effectiveness of legal regulation or legal protection.

2. The Comparative legal method is no less important in the methodology of state and legal studies than the specific sociological method. The comparative method involves comparing concepts, phenomena and processes and finding out the similarities and differences between them. As a result of the comparison, the qualitative state of the legal system, the state structure as a whole, or individual, for example, legal institutions and norms are established.

However, it is important to take into account one condition: the objects to be compared must be comparable. Let’s explain with examples. You can compare legal systems, state structures, and similar legal institutions and norms. But you cannot compare, for example, the legal system in General and individual legal norm of These objects is incomparable for the level, scope, contents and grounds.

3. Specifics and main functions of the legal method. Formal-legal (normative-dogmatic) can be rightly called traditional, characteristic of legal science, resulting from its nature. Its essence is that the law is studied as such: it is not compared to anything, it is not linked to the economy, politics, morality, or other social phenomena.

Findings

During this article, the scientific works and research works of legal scholars in the field of norm-setting were studied. The relevance of the topic was highlighted based on the collected sources on norm creation, and several problems in the field of digital norm creation in the context of a pandemic were highlighted in the article.

Lawyer scientist M.K.Najimov described the concept of legal expertise as the activity of legal entities and individuals to conclude the point of view of their compliance with the accepted legal document or its draft constitution and legislation, as well as the established rules of legal technology.

The legal expert of the draft law is to assess the compliance of the draft law with the RF Constitution and its position in the system of current legislation and international treaties, as well as to check its quality and effectiveness of the rules of Legislative technique.

Also, the lawyer scientist X.Haitov said that the result of the expert or group of experts with special knowledge and skills on the concept of the expert of the draft laws based on draft laws will be formalized in the form of a conclusion, identifying and eliminating the various shortcomings allowed in them, it has been described as an activity aimed at developing recommendations based on the evaluation of compliance of the draft laws with the legislative system, norms of international law, legislative techniques, the extent to which reforms are carried out in our country.

In particular, E.V.Razd’yakonova and E.D.Tretyakova divided the following types of expertise:

— depending on the subjects carrying out expert activities: State, Public, International;

— by the stage of complexity:

a) Essex (if a normative legal act or project relates to several areas of Legal Regulation);

b) specialized (if the draft normative legal act relates to some sphere of regulated social relations).

Engagement speaks to an evolving critical agenda in norm research, recognizing developing states as norm-makers rather than norm-takers and thereby counteracting a long-standing hierarchical depiction of norm promotion, development, and diffusion.

Discussion

The following scientific approaches of scientists on the concepts of "law-making", "rule-making", "law-making" and their differences can be shown in scientific-theoretical sources and research works.

In our opinion, based on the theory of law, it is expedient to describe the concepts of "lawmaking",...
"rulemaking" and "lawmaking" in terms of direct sources of law.

The activity aimed at creating, changing and repealing the rules of conduct, the implementation of which is mandatory, is "law-making", and only the development, amendment and repeal of normative legal acts should be understood as "norm-making". At the same time, it is appropriate to understand the concept of "lawmaking" only in the activities of the state legislature to create, amend and repeal laws governing social relations.

One of the manifestations of law-making is the issuance of individual, formal, authoritative and binding orders by the head of a particular organization or institution.

Based on the above, in terms of the creation, modification and repeal of universally binding rules of conduct, “lawmaking” is a broader category that encompasses the concepts of “rule-making” and “law-making.

![The sources of digital norm-making](image)

**Figure 1.**

Although there are theoretical approaches to the concept of norm-setting in the scientific literature, it can be shown that our national legislation has not developed a clear legal definition of the concept of “norm-creation initiative”, “norm-creation activity”, “subjects of norm-creation”.

Due to the organizational and legal nature of the norm, it should be noted that this activity has the following characteristics:

First, that this activity covers the stages of preparation of the draft normative legal acts, which are one of the direct sources of law, their legal examination and coordination, discussion, adoption (issuance) with interested bodies and organizations;

Second, its adoption by a person or body authorized to adopt an official document aimed at establishing, amending or repealing legal norms as general mandatory state instructions;

Third, the existence of special procedures for the implementation of legislative activity, which is one of the main areas of this activity, in the manner prescribed by law;
Fourth, the participation of the local population in these activities.

Normative activity is carried out by the principles of man, his rights and freedoms and legitimate interests, legality, democracy, transparency, agreement, logical consistency, expediency, scientific validity. It is expedient to define the concept of “norm-making technique”, which applies to all types of normative legal acts, as a set of rules, methods and tools used in the development, legal and technical drafting, adoption of the draft normative legal acts.

The current state of the lawmaking sphere makes it possible to use digital technologies not as a means that can replace a person or significantly simplify his work, but as a means that accumulates the results of work and allows for operational interaction and information retrieval. At the present stage, the task of scientists and practitioners is to form the basic principles and directions of digitalization of law-making activity, to determine the limits and possibilities of its implementation in the law-making process.

According to Mark D. Ryan and Gurchetan S. Grewa, digital technologies are applicable at the following stages of legislative activity:

- collecting public opinion through online forums;
- development of the draft laws using online mechanisms;
- Coordination of online consultations on draft laws;
- online voting on proposed bills;
- providing online access to current legislation and ensuring the interpretation of current legislation.

According to V. Zikeev, the key issue of digitalization of the legislative process is the depth of implementation and the scope of digital technologies. It should be added that artificial intelligence is already capable of detecting defects in regulatory requirements, as well as ensuring the unification of legal terminology. The same can be said about some constructors of regulatory legal acts (by analogy with constructors of contracts), the creation of which will become a feasible task for developers of professional software. In this sense, the time for artificial intelligence in rulemaking has come.

State bodies should arm themselves with technological tools that allow them to reduce costs, free up human intellectual resources for solving non-routine tasks. However, this is a matter of serious managerial, in a sense, political will, because the delegation of even an insignificant amount of functions of the state apparatus to artificial intelligence can be associated with decision-making to optimize labor resources. Although the number of routine tasks is growing disproportionately with the growth in the number of management units, therefore, the priority in this regard is the reorientation of human resources to solve tasks that are not related to the performance of typical or routine work.

Technological solutions in the field of lawmaking will make it possible, among other things, to remove some procedural barriers (first of all, concerning numerous internal approvals at the stage of preparing documents). Thus, some experts believe that artificial intelligence can be delegated the functions of checking compliance with the procedure for submitting legislative initiative, selecting regulations and norms to be recognized as invalid as a result of the adoption of a new law, analyzing regulations for duplication of regulation at the stage of legislative initiative.

Neural networks could also be used to assess the regulatory impact of the planned draft law. In this regard, I am in solidarity with those who assign technology the function of a faithful and unpretentious helper. Despite the futuristic views of many representatives of the legal profession, I still do not see it possible to replace professional lawyers working in the state apparatus with robots. Experts note that the legislative initiative as a mechanism for putting into effect legislative activity contains elements of the will, the need for subjects of the right of a legislative initiative to respond to changing legal relations, socio-economic and other conditions, to suggest how such legal relations can change in the future. In the course of work on rule-making initiatives, analytical expertise is required, taking into account many social, economic, political, and historical factors. In every management decision, the “social context” is almost more important than the accuracy and clarity of
regulatory prescriptions. Also, when making managerial, including legislative decisions, the issue of subjectivity comes to the fore. And in this sense, we are certainly far from the all-encompassing delegation of legislative functions to artificial intelligence. Therefore, undoubtedly digital products can significantly simplify the work of lawmakers and legislative bodies, as is done today by legal reference systems, but so far no more.

Figure 2.

In Uzbekistan, among the main events in the rule-making activity was the launch on the Internet of the Unified Electronic System for the Development and Approval of the draft Normative Legal Acts. It should be noted that only in a few countries of the world, in particular Belarus, Kazakhstan, Korea, Russia, Singapore, Japan, and now in Uzbekistan, systems of this kind are functioning, allowing to carry out law-making activities in an electronic format. Automation of the procedure for approval (approval) of the draft regulatory legal acts made it possible to significantly optimize and simplify the rule-making process.

The electronic format of work allows you to quickly and conveniently coordinates drafts of normative legal acts. Due to the availability of the system via the Internet, non-compliance with the established deadlines for approval of the draft regulatory legal acts, red tape and bureaucracy in law-making activities are excluded. More than 200 different organizations are connected to the system, in particular, all government bodies, including khokimiyats. This year, the Unified Electronic System for the Development and Approval of the draft Normative Legal Acts (project.gov.uz), as well as the System for Assessing the Impact of Legislative Acts (regulation.gov.uz), were transferred to the Ministry of Justice, which is the body authorized to implement the unified state legal policy, coordination and enhancement of the effectiveness of lawmaking. The Ministry of Justice carried out a legal examination in electronic format and endorsed about 1400 projects of normative legal acts.

In our view, the institute of legal experiment and its structure, function, limits of its implementation and the legal status and guarantees of the participants of the experiment are not sufficiently developed. No specific criteria have been considered in which cases it is useful or necessary to carry out legal experiments. There is no normative legal document defining the procedure for organizing and conducting a legal experiment, recommendations and guidelines for their scientific organization, and regulating the objective examination of the results.
**Recommendation**

The impact of digital technologies on the law is directly manifested in lawmaking, which, under the influence of the new reality, may well change a number of its key parameters. The study of this impact and its main directions today is largely predictive in nature. Nevertheless, it seems possible to identify the main vectors of such an impact, to suggest possible solutions to emerging problems.

In our opinion, in order to further develop the creative activity of the digital norm and expand its position in the field of legal technology, the following author’s suggestions are given:

**First**, Mutual integration of Parliament, Presidential Administration, ministries and government into a single legislative platform. Through this platform, the bodies of the state engaged in norm-setting activities carry out the tasks of the drafting and reviewing, discussing and approving normative legal acts.

**Second**, complete abandonment of paper forms of normative legal acts and full transfer of documents to electronic form.

**Third**, the development of Q-codes of normative-legal documents. At the same time, it is important that Q-codes, which basically contain all the information about the product, also apply to the legal framework. In our opinion, the following positive results can be achieved through the introduction of Q-codes in the normative legal acts, in particular, it is expedient to publish the normative legal acts with the Q-code after approval, which includes the stages from drafting to signing and discussion. Include information on the acceptance or rejection of proposals and recommendations submitted by the population and government agencies. Therefore, it is expedient to develop a separate electronic database of the Q-code of the regulatory legal document on the website www.lex.uz (National Database of Legislation of the Republic of Uzbekistan). The electronic database of the Q-code contains information about the proposals that are the basis for the development of legislation and their authors, which in turn prevents the issuance of previously made and repeated proposals to improve the legislation and serves to provide quality and new proposals.

**Fourth**, the legislative initiative and the process of submission to the Legislative Chamber of the Parliament should be transferred to the online system.

These proposals will be taken into account during the pandemic and in other cases in the protection of the health and time of specialists working in law enforcement agencies.

**Conclusion**

In conclusion, it should be noted that, given the students of today, the activity of norm-making is aimed at breaking the law, so this activity should be further improved. At the same time, the digitization of normative activity and the use of digital normative activity during the “Pandemic COVID-19” directly contribute to the protection of human health.

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**Source of Funding:** Self

**Ethical Approval:** No ethical approval is needed.

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Artificial Neural Networks in Forensic Medicine (review)

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Abstract

The article deals with the possibilities and limitations of the use of artificial neural networks in forensic medical practice. It is known that in the work of forensic medicine experts have to process and evaluate a large amount of information, which may belong to different types of data - the site inspection protocols, photographic materials, macroscopic data obtained during the autopsy of the corpse, the results of laboratory tests, medical records etc. All the received data should be studied, categorized and evaluated according to international standards. Modern computer technologies of artificial intelligence (artificial neural networks) can help in the handling of forensic medicine data, which, in turn, will reduce to a minimum the probability of mistakes in preparation of expert conclusions. The algorithms used in artificial neural networks, as a result of processing different types of input data, can direct them to the resulting categorized outputs and structure them.

Keywords: artificial neural networks, artificial intelligence, forensic medicine, identification of a person.

Introduction

Recently, more and more researchers are using artificial intelligence elements in their practice. [1, 2] There are discussions whether the machine intelligence can replace doctors. [3] The scientific community converges in opinion, that in the nearest future this will not happen, but artificial intelligence could help doctors to make better decisions or even partially displace human judgment in certain narrow areas. The growing amount of data that can be used in medical practice, as well as the analytical methods used in their processing, allow us to give successful examples of the use of artificial intelligence in medicine. [4,5,6] These algorithms are used in such areas like cardiology, dermatology, immunology, oncology, dentistry, genetics and so on. [1-8] Elements of artificial intelligence begin to apply in forensic medicine. [9-12]

The purpose of this work is to analyze the possibilities and limitations of the use of artificial neural networks in forensic medical practice (Fig. 1).

Fig. 1. The fields of possible application of ANN in forensic medicine.

Artificial neural networks.

Artificial neural network (ANN) - is a mathematical model, which in its structure is similar to the human nervous system. In the same way as the human being, ANN can learn and generalize knowledge. That is why ANN is refers to artificial intelligence. ANN is widely used in all fields of science and technology, and you
even use it every day entering Facebook or looking for information in Google. There are many different types of ANN, which are concentrated on solving of the certain types of problems.\textsuperscript{13}

In general, ANN is a system of connected and interacting processors (neurons). A neuron (the base element of ANN) is a simple computing processor that can receive, process and transmit the information. By combining a large number of neurons into a single network, the system can solve non-trivial tasks.

Neurons in ANN are combined in layers (Fig. 2) - the input layer (a set of neurons that receive information), $n$-hidden layers (the set of neurons, which will process the information), and the output layer (neurons which outputs the result).

During the operation, neurons operate with numbers. Usually these numbers are in the range [0,1] or [1,1]. Each neuron has two parameters: input data and output data. The field of input data contains the summary information from all the neurons of the previous layer. After receiving the information, it is normalized by the activation function $f(x)$, after which it falls into the field of output data. It should be noted, that for the input layer of neurons input information is equal to the output information (input = output).

All the neurons are integrated into the network with the help of synapses (Fig. 2, $W_i$, $W_j$). A synapse is a connection between two neurons that is characterized by the weight of the synapse.\textsuperscript{14} Due to the weight of the synapse, the input information changes during the transmission from one neuron to another. In Fig. 3 it is showed how the synapse weight can change the data in colors. During processing of the input data will be obtained the result in which the most important role will play the synapse with the most weight. The combination of all the weights of the synapse neurons allows the system to make the decisions. Depending on the complexity of the task, the number of neurons and layers can change a lot.

Another important element of the neural network is a function of activation (activation functions\textsuperscript{15}) - the function which normalizes the input data (the function which allows you to interpret data in the form of numbers, belonging to the range [0,1]). In this activation function for determination of the output data, the total sum of input data and weight coefficients are compared with some threshold. If the sum is greater than the threshold, the processing element generates a signal, otherwise the signal is not generated (or a brake signal is generated).\textsuperscript{16} The most common practice is the using of the sigmoid function (Fig. 4). An important feature of sigmoid is the continuity of functions and their derivatis.
In order the ANN could work, it must first be trained. Training is usually conducted on the databases with relevant input and output data. The data basis consists of already known cases and conclusions to them. Data can be both numeric and non-numeric. In the case of non-numerical data, they need to be structured by certain categories.

**Table 1.** The example of the input data table for teaching ANN. The order number corresponds to a certain person. $Data_{ji}$ - data, fixed in a specific case and grouped into appropriate categories.

<table>
<thead>
<tr>
<th>N</th>
<th>Data 1 1</th>
<th>Data 12</th>
<th>…</th>
<th>Data 1i</th>
<th>Result 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data 21</td>
<td>Data 22</td>
<td>…</td>
<td>Data 2i</td>
<td>Result 1</td>
</tr>
<tr>
<td>2</td>
<td>Data 31</td>
<td>Data 32</td>
<td>…</td>
<td>Data 3i</td>
<td>Result 2</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>j</td>
<td>Data j1</td>
<td>Data j2</td>
<td>…</td>
<td>Data ji</td>
<td>Result 1</td>
</tr>
</tbody>
</table>

The filling of the table can be illustrated by identifying racial affiliation of unknown male person. **Table 2.**

<table>
<thead>
<tr>
<th>N</th>
<th>Skin color</th>
<th>Eye color</th>
<th>HairColor</th>
<th>…</th>
<th>Growth</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow</td>
<td>Hazel</td>
<td>Black</td>
<td>…</td>
<td>167</td>
<td>Asian</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Blue</td>
<td>Blond</td>
<td>…</td>
<td>178</td>
<td>Europeoid</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>Hazel</td>
<td>Black</td>
<td>…</td>
<td>175</td>
<td>Asian</td>
</tr>
<tr>
<td>4</td>
<td>White</td>
<td>Hazel</td>
<td>Black</td>
<td>…</td>
<td>180</td>
<td>Europeoid</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>j</td>
<td>Yellow</td>
<td>Hazel</td>
<td>Black</td>
<td>…</td>
<td>174</td>
<td>Asian</td>
</tr>
</tbody>
</table>
Software for ANN building

The power of modern computers allows to process rather difficult tasks even on the non-specialized devices. Experts can create and train ANN on conventional computers, using common software. There are many software packages available to work with ANN. Most of them are focused on the experienced user, who has programming skills.

Among the software with the low entering barrier can be noted the Statistica. This program allows you quickly build ANNs of different architecture and complexity. It is also important that after teaching ANN in this software, you can immediately conduct researches on new data and instantly get results.

The practical use of ANN

In its practice, forensic expert faces with many challenges of different complexity. Some of these tasks can be facilitated by the use of artificial intelligence.

DNA studies

Genetic identification is one of the main modern methods of analysis in forensic medicine. Thus, the researches of electropherograms are held in a huge quantity in forensic DNA laboratories. Genetic experts should be involved in the correct interpretation of the obtained data.

In the work, we can see data concerning the using of ANN for the identification and classification of peaks in the electropherogram. The authors note that the process of interpretation of the electropherogram can be time consuming and depends on the subjective evaluation of the analyst. These works show the possibility of using artificial neural networks for reading complex and mixed electrophoretic data. Thus, the use of ANN can simplify processing and improve the accuracy of DNA testing.

Authors showed the possibility to determine the age of the donor with the restored biological material, using the methods of DNA analysis and ANN. This information can be of considerable value for forensic investigations. The authors claim that aging is a complex process, associated with different molecular modifications in cells that are accumulated throughout the life, caused by genetic and epigenetic factors. In order to generate the accurate model for predicting chronological age, the authors used age-specific DNA methylation models from the data of whole blood. Because of data processing using ANN, authors achieved a good prediction result with a 4-year error on the blind test.

Firearms

Another possible application of ANN in forensic medicine is to establish the similarity of the balls, fired from the firearms. Thus, in the work it is showed, how ANN can be used in the study of bullet tracks. The above-mentioned work ANN studied on the well-known data bases, and then made the processing of unknowns balls. As a result, the network showed very good results of comparison on the test sample.

Causes of death

Often in practice, we have cases when it is quite difficult to establish direct relationships between diseases and death, especially in the partial or complete absence of medical records of a person. The authors use an ANN for classifying cause of death from verbal autopsy. The efficiency of ANN models was compared with two other classification methods (physician examination and logistic regression) that were tested on the same sample with the same verbal autopsy data. As a result, the comparisons of ANN models were as accurate as the other methods used.

Pharmaceutical fingerprinting

ANN can be also successfully applied in laboratory analyzes of chemical substances. Work shows the possibility of ANN application in forensic toxicology. Thus, authors made chromatogram medicines investigations in biological fluids and compared them with the reference samples. The result shows that the received ANN can provide fast, accurate and consecutive technique, applied for searching of the chemical agents in biological fluids.

In the work of Zhu H., the potential possibilities of ANN application for drugs investigation are showed. It is noted that artificial intelligence is a promising method to greatly reduce the cost and time of drug discovery.
by providing evaluations of drug molecules in the early stages of development.\[^{[25]}\]

**Investigation of bones and teeth**

ANNs can be successfully used in identifying an unknown person on cystic fragments. Thus, in the work \[^{[26]}\] the authors use ANN during the determination of the gender and age of the unknown person according to the odontological parameters of the jaws. They point out that the use of ANN is promising because it automates and simplifies the method of sex and age installation with minimal errors. In the works \[^{[27,28]}\] the possibility of using ANN in the teeth and bones research is explored.

**Fingerprints**

The research of the fingerprints is one of the basic identification methods in forensic medicine. In the works \[^{[29-30]}\] the possibility of classifying fingerprints with the help of ANN is investigated. Built ANN allowed to reduce the time of image processing. The authors \[^{[31]}\] proposed the method of comparing fingerprints, including partial (incomplete) images. In the works \[^{[32,33]}\] authors use fingerprints for predicting sexual identity. The ANNs made it possible to classify gender with a probability of 97%.

Of course, the practical application of ANN is not limited to these examples. Currently, there are prerequisites for the application of ANN in practically every field of forensic medicine. The main problem, which may face a forensic expert in choosing this method of research is the content of database for network training. It is also required that expert should understand fundamental statistical and mathematical methods.

**Conclusions**

As noted earlier, ANN can be applied practically in any section of forensic medicine. Their advantages are the ability to process large amounts of data, less likely missing of critically important data, and reducing decision time. Yet, at this stage we cannot do without human control. ANN is necessary, first of all, as a helper or tool, which is designed to help in making difficult decisions. But in any case, it does not diminish the potential benefit, which can provide the skillful use of elements of artificial intelligence.

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**Ethical Clearance:** It was obtained from Ethics Committee of the Ivano-Frankivsk National Medical University before starting the study.

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Family Characteristics and Parenting Quality in Relation to at Home Secondhand Smoking Exposure on Infants

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Abstract

Secondhand Smoking (SHS) exposure had a great impact on health, especially among a vulnerable group like breastfeeding mothers and infants. No previous research was found on the risk of lower parenting quality with the risk of SHS exposure among infants. This research aimed to analyze the prevalence of SHS exposure at home in infants with family characteristics and parenting quality. A cross-sectional study was conducted in Magelang with 216 households that had an infant as a household member. SHS exposure at home and family characteristics assessed with a questionnaire and parenting quality assessed with HOME-SF, divided into emotional support and cognitive stimulation. The prevalence of SHS at home was 81%. Family characteristics related were higher means of sum of children (t= -2.494; p=0.013), shorter birth spacing (t= -3.146; p=0.002), younger age of mother (t= -3.798; p=0.000) and father (t= -3.766; p=0.000), and shorter years of father education (t= -2.933; p=0.004) were significantly related to higher prevalence of SHS exposure at home and also lower cognitive stimulation (F=2.705- p=0.046). Several family characteristics and also the quality of parenting identified as factors associated with infant SHS exposure at home. The high prevalence needs attention for intensive health promotion and consistent implementation of smoke-free legislation to protect infant and breastfeeding mothers from SHS exposure at home.

Keywords: secondhand smoking; infants; breastfeeding mother; parenting quality

Introduction

Exposure to secondhand smoke (SHS) responsible for estimated 600,000 death per year worldwide. Children make up over a quarter of all deaths and half of all disability-adjusted life years associated with SHS exposure. Exposure to SHS, also known as passive smoking or environmental tobacco smoke, is the unintentional inhalation of cigarette smoke from other person. Secondhand smoke exposure has been proved to be associated with health risks and death. Exposure to cigarette smoke in pregnant women is associated with an increased risk of miscarriage, LBW, and asthma in babies.

There is still limited scientific literature at SHS articles focusing on younger children, most were done in older children or adolescents. Infants can be more vulnerable to the exposure risks, especially SHS exposure at home, the place where infants are more exposed to SHS than in other places because they spend more time at home. The relation between parenting and the risk for SHS exposure were not clearly described, and no previous study among infant was found. Previous researches on parenting concerning SHS were mostly focused on parenting style and smoking behavior of their children. To fill this gap, this research aimed to analyze the prevalence of SHS exposure at home in breastfeeding mothers and their infants with family characteristics and parenting quality.

Method

This paper is part of a study on the growth and development of children in replete and non-replete areas of IDD in Magelang Central Java, the main topic was presented in the 2019 Asian Congress of Nutrition analyzing the relation between breastmilk iodine level and infant development in replete and non-replete areas. This article focused on the problem of at home
secondhand smoke exposure on infants and breastfeeding mothers.

This was a cross-sectional study conducted in Magelang, Central Java, with 213 households which had infants and breastfeeding mothers as a household member. Breastfeeding mothers who participate in this study were the same as the study on iodine sufficiency among pregnant women in the previous years. Simple random sampling was used to determine the participants of the research. The sampling frame for this study was 244 mothers which complete the earlier year study and complete the pregnancy until having babies, and 213 of them complete this study.

SHS exposure at home and family characteristics assessed with questionnaire and parenting quality assessed with HOME-SF. Interviews were conducted with the mothers. Demographic data had collected on paternal and maternal age and education years, length of the marriage, a sum of children, and child’s birth order. SHS questionnaire including a question about the presence of at home SHS exposure, and the frequency of SHS exposure at home.

The quality of the caregiving environment was measured using the HOME Inventory Short Form (HOME-SF) model consisting of 20 items. Data obtained using interviews and direct observation of the interaction between mother and child. The parenting quality refers to the extent to which the environment provides physical stimulation through sensory input, and emotional stimulation provided through the bond of affection between caregivers and children. The HOME-SF scale has two answer choices, yes (score 1) and no (score 0). Measurement of the quality of the caregiving environment is done by adding up the scores contained in the HOME-SF questionnaire. In this study, we further analyzed the quality of parenting, adopted the analysis from the NLSY79 child study, which further explore HOME-SF into two subscales of cognitive stimulation and emotional support.

Data analysis was performed with an independent t-test and oneway Anova to explore the relation between family characteristics, parenting quality.

**Result**

**Table 1. Family Characteristics Based on at Home SHS Exposure**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Non-Exposure n= 41(19.0%) Means (SD)</th>
<th>At home SHS Exposure n=175(81.0%) Means (SD)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of children</td>
<td>2.22(0.91)</td>
<td>1.87(0.77)</td>
<td>-2.494</td>
<td>0.013*</td>
</tr>
<tr>
<td>Child birth’s spacing</td>
<td>6.50(5.07)</td>
<td>4.18(3.76)</td>
<td>-3.146</td>
<td>0.002*</td>
</tr>
<tr>
<td>Paternal age</td>
<td>37.05(6.27)</td>
<td>32.95(6.26)</td>
<td>-3.766</td>
<td>0.000*</td>
</tr>
<tr>
<td>Maternal age</td>
<td>32.24(5.21)</td>
<td>28.41(5.94)</td>
<td>-3.798</td>
<td>0.000*</td>
</tr>
<tr>
<td>Paternal length of education</td>
<td>10.80(3.44)</td>
<td>9.31(2.80)</td>
<td>-2.933</td>
<td>0.004*</td>
</tr>
<tr>
<td>Maternal length of education</td>
<td>10.63(3.85)</td>
<td>9.87(2.64)</td>
<td>-1.513</td>
<td>0.132</td>
</tr>
<tr>
<td>Paternal age when married</td>
<td>27.74(4.21)</td>
<td>26.58(5.19)</td>
<td>-3.766</td>
<td>0.185</td>
</tr>
<tr>
<td>Maternal age when married</td>
<td>22.94(3.82)</td>
<td>21.99(4.82)</td>
<td>-3.798</td>
<td>0.244</td>
</tr>
<tr>
<td>Length of marriage</td>
<td>9.30(5.71)</td>
<td>6.53(4.67)</td>
<td>-3.257</td>
<td>0.001*</td>
</tr>
</tbody>
</table>
This research found a very high prevalence among SHS exposure at home for infant (81%), and most of them with daily (62%) or weekly (12.9%) exposure. This research also found several family characteristics related to the higher prevalence of SHS exposure at home (Table 1). Higher means of sum of children ($t=-2.494; p=0.013$), shorter birth spacing ($t=-3.146; p=0.002$), younger age of mother ($t=-3.798; p=0.000$) and father ($t=-3.766; p=0.000$), and shorter years of father education ($t=-2.933; p=0.004$) were significantly related to higher prevalence of SHS exposure at home. Maternal length of education and parental age when married did not significantly relate to SHS exposure at home.

### Table 2. Parenting Quality-Based at Home SHS Exposure Frequency

<table>
<thead>
<tr>
<th>Variables</th>
<th>At Home SHS Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never (n=40)</td>
</tr>
<tr>
<td></td>
<td>Monthly (n=13)</td>
</tr>
<tr>
<td></td>
<td>Weekly (n=28)</td>
</tr>
<tr>
<td></td>
<td>Daily (n=134)</td>
</tr>
<tr>
<td>Emotional support</td>
<td>7.00 (1.07)</td>
</tr>
<tr>
<td></td>
<td>6.77 (1.53)</td>
</tr>
<tr>
<td></td>
<td>6.53 (1.07)</td>
</tr>
<tr>
<td></td>
<td>6.69 (1.15)</td>
</tr>
<tr>
<td>Cognitive stimulation</td>
<td>5.76 (1.28)</td>
</tr>
<tr>
<td></td>
<td>6.15 (1.68)</td>
</tr>
<tr>
<td></td>
<td>5.59 (1.22)</td>
</tr>
<tr>
<td></td>
<td>5.29 (1.31)</td>
</tr>
<tr>
<td>F</td>
<td>2.705</td>
</tr>
<tr>
<td>P</td>
<td>0.366</td>
</tr>
</tbody>
</table>
| a                          | significantly different with daily at-home SHS exposure

Parenting quality in this research was represented by emotional support and cognitive stimulation. We analyze the difference in parenting quality with the level of SHS exposure at-home frequency, from daily, weekly, monthly, and no exposure (table 2). This research found no significant difference in emotional support with the frequency of SHS exposure at home ($F=1.061; p=0.37$). On the other hand, cognitive stimulation, particularly daily and weekly exposure, related to significantly lower
quality of cognitive stimulation at home (F=2.705; p=0.046), and not significantly related to emotional support.

![Graph](image)

**Figure 2. Relations between the frequency of at-home SHS and cognitive stimulation**

**Discussion**

This research revealed a very high prevalence of at home SHS exposure in infants and breastfeeding mothers (80.1%), with 63% of them being exposed daily to SHS at home. Studies in several countries showed a much lower prevalence. Research in Aleta Wondo, Ethiopia reported 22% daily smoking exposure at home\(^\text{13}\). SHS prevalence in this research was similar to nationally representative data of a higher age population in Indonesia. The SHS exposure prevalence among Indonesian adolescents (12-15 years old) was 85.4%, also represented the world’s highest prevalence\(^\text{14}\). This fact proved that an infant presence in a household in Indonesia did not modify at home smoking behavior. The man smokers prevalence above 15 years old in Indonesia also high, 62.9% in 2018, which also recorded as the highest prevalence for men smokers in the world\(^\text{15}\).

The high prevalence of infant exposure towards at-home SHS is similar to a research result in China, which revealed the highest prevalence of SHS exposure experienced by women and infants, where girls are at risk of being exposed to secondhand smoke 10 percent higher than boys\(^\text{16}\). Similar to the results of this study, several other studies have also shown mother education level as a significant factor affecting cigarette smoke exposure at home. Research in China shows higher maternal education, related to a lower risk of SHS exposure at home\(^\text{16}\). Research in Iran also shows similar results. Maternal and paternal education in the non-exposure SHS group was higher than in the exposure group. Exposure to cigarette smoke in nursing mothers is related to the duration of exclusive breastfeeding. Breastfeeding mothers exposed to cigarette smoke tend to stop giving exclusive breastfeeding earlier than SHS non-exposure to breastfeeding mothers. The proportion of infants exclusively breastfed in families with smoking family members was 27 percent less than families without smoking family members\(^\text{17}\). In adults, women experienced more exposure to SHS at home (57.8 percent) than men (52%).
This research revealed some family characteristics related significantly to a higher prevalence of SHS exposure at home. Besides women, the younger age group also more had a higher level of SHS exposure. A study in Myanmar showed, younger ages group also show higher exposure to SHS, probably because they are less concerned about health problems\textsuperscript{18}. This research found, the younger the parents, both mother, and father, the higher SHS exposure probabilities. A study in Spain revealed parents age 18-30 were more likely to report SHS exposure at home\textsuperscript{19}. In the future, this SHS exposure will also affect whether or not a person will decide to quit smoking easily. Research conducted in South Korea revealed that adolescents exposed to SHS every day find it more difficult to quit smoking compared with adolescents who are less or not exposed to SHS at all in the home environment\textsuperscript{20}. In this study, 63% of infants exposed daily, make them at higher risk for developing smoking habit later in life.

Lower paternal education is related to a higher prevalence of SHS at home, but not maternal education. This finding is similar to a systematic review article that found a significant association between low education and increased risk of SHS exposure at home\textsuperscript{21}. It is slightly different from a study in Iran, which showed that parents’ education (mother and father) was higher in the non-SHS exposure group than parents’ education in the SHS exposure group\textsuperscript{17}. Another research from China showed maternal education played a significant factor that affected SHS exposure at home. Higher maternal education, related significantly to a lower risk of SHS exposure in children\textsuperscript{16}.

This research found a higher risk of SHS related to a lower social status like parental education. SHS exposure at home also higher in the more vulnerable family. The characteristics are family with a higher sum of children, a shorter birth spacing, and also a lower cognitive stimulation. A higher SHS level at home in younger maternal and paternal age also reflected still lack of awareness among younger people about the hazard in SHS at home exposure. It more prevalent specifically among susceptible persons like infants and breastfeeding mothers. It also reflects the tendency to increase the numbers of smokers and SHS in Indonesia. Successful experience from many countries in decreasing prevalence of SHS due to strengthening the comprehensive smoke-free policy regulations\textsuperscript{22–24}. Findings from this research strengthen the urge to protect vulnerable groups from exposure to cigarette smoke as early as possible. It could be achieved, by taking into account the characteristics of families with social vulnerabilities.

**Conclusion**

Several conditions representing the more vulnerable family, like more children, shorter birth spacing, younger age of mother and father, and shorter years of father education. Those related to higher at home SHS exposure for infants. Lower cognitive stimulation was found as a factor associated with higher infants’ SHS exposure at home, specifically daily and weekly exposure. The high prevalence for infant to exposed with daily SHS exposure need urgent attention for intensive health promotion and consistent implementation of smoke-free legislation to protect infant and breastfeeding mothers from SHS exposure in private space like home. It is recommended to include the message for protecting infants and breastfeeding mothers from SHS exposure at home. Future research is needed to develop a health promotion model to prevent infant SHS exposure at home, such as couple counseling during pregnancy.

**Acknowledgment**

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**Conflict of Interest:** The authors confirm that there are no conflicts of interest.
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Development of Nurse-led Navigation Program for Gastric Cancer Patients with Gastrectomy: Exploring the Effectiveness

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Abstract

Background: This study aimed to evaluate the effects of a nurse-led navigation program for gastric cancer patients with gastrectomy.

Method: The experimental group consisted of 23 patients and the control group consisted of 22 patients with gastric cancer after gastrectomy in K University hospital in Korea. A quasi-experimental study with a nonequivalent control group was used. This study consists of two phases: a methodological study to develop a navigation program for gastric cancer patients and a quasi-experimental study to verify the effects of the navigation program. The navigation program was administered to the experimental group over 3 months with a total of 8 sessions.

Result: The experimental group had lower distress than the control group (F = 5.298, p = 0.004). The experimental group had less weight changes than the control group (F = 4.390, p = 0.019), and the healthcare service satisfaction with regard to nurses was high (Z = 2.932, p = 0.003). However, the quality of life was not significantly different (F = 5.905, p = 0.707).

Conclusion: The nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services. It is suggested to conduct long-term follow-up research to measure quality of life changes from the navigation program.

Keywords: gastric cancer; navigation program; distress; nutritional status; healthcare service; satisfaction

Introduction

According to the annual report of cancer statistics, the most common cancer in Korea was gastric cancer[1]. This is expected to increase the number of gastric cancer patients, as the incidence rate is the highest compared to other countries such as the United States and Europe. The survival rate after treatment is increased due to early screening, diagnosis and treatment technology development[2]. The improvement of cancer patients’ survival rate led them to recognize cancer as a concept of chronic disease requiring long-term management[3,4].

Recently, due to the change of medical environment, the overall number of days of hospitalization for cancer patients has been shortened and the responsibility for health care has been added to clients and their families[5,6]. Patients with gastrectomy experience physiological changes such as malnutrition, dumping syndrome, intestinal obstruction, and psychological changes such as fear, anxiety, depression, and distress due to uncertain prognosis of disease[7-9].

In Korea, nursing intervention for gastric cancer patients was applied to fragmentary intervention i.e., diet
education and exercise education\cite{10,11}. Since systematic, integrated and continuous approach is very important for gastric cancer patients and their families, it is necessary to integrate nutrition education and emotional support for gastric cancer patients.

For the first times, in the 1990s, Dr. Harold Freeman conducted patient navigation program at the Harlem Hospital in United States, lowering barriers to cancer diagnosis and management for the poor\cite{12}. According to a 2001 report from the National Cancer Institute, the barriers to cancer treatment were not confined to the poor so that they could be applied to many Americans over all socio-economic levels\cite{13}. In 2005, President George W. Bush approved federally funded legislation for patient navigation projects under the Patient Navigator Activity and Chronic Disease Act(H. R. 1812, 2005). In 2012, a new standard was contributed by the American College Board of Cancer Professionals that should be put into practice for cancer programs requiring certification by 2015\cite{14}.

Patient navigation is an intervention to overcome the obstacles that appear in the process of health care needs and treatment\cite{15}. The navigation program is designed to enhance the accessibility of treatment by supporting cancer patients. It focuses on meeting the needs of patients, not uniform and unilateral education by healthcare professionals. Navigators provide timely and qualitative nursing to affect treatment outcomes\cite{16,17}.

The navigation program has been applied to patients with various cancer types such as breast cancer, thyroid cancer, and prostate cancer\cite{18-20}. Nurse-led navigation programs reported to affect the emotional aspects of the subjects such as uncertainty, pain, fatigue and depression, ultimately enhancing the quality of life\cite{21-23}. Nursing services by professional nurses had positive effects on patient satisfaction, compliance with treatment plans, reduction of length of hospital stay and de-hospitalization\cite{24}.

The gastric cancer patients were experienced physical and psychological problems and these symptoms have a significant impact on the quality of life\cite{25}. Hong and colleagues\cite{26} developed navigation program for newly diagnosed gastric cancer. This program composed of 3 sessions, each of 30 minutes. This navigator focused on nursing interventions that would be provided to patients at pre-treatment period. There was no navigation program for gastric cancer patients who complained of various physical and psychological symptoms after gastric cancer surgery. Therefore, it is necessary to provide integrated nursing interventions for patients diagnosed with gastric cancer appropriate at each time point throughout the treatment process, which will affect physical and psychological adaptation and recovery.

The purpose of this study was to develop and apply a nurse-led navigation program to patients diagnosed with gastric cancer and were admitted to surgery. The hypothesis of this study is that the experimental group that applied the navigation program will have lower distress, better nutrition status, higher quality of life, and higher satisfaction with medical services than the control group.

### Methods

#### Sample and Setting

This study consists of two phases: a methodological study to develop a navigation program for gastric cancer patients and a quasi-experimental study with a nonequivalent control group to verify the effects of the navigation program. Convenience samples were confirmed and recruited at K University Hospitals in Korea.

The study was approved (accreditation no.: KYUH 2015-09-004-002) by the Institutional Review Board (IRB) of the K University hospital. Patients signed a written consent form before participating in the study. Each twenty-five patients were assigned to the experimental group and control group. The inclusion criteria as follows; (a) patients who had a performance level of 0 or 1 in the Eastern Cooperative Oncology Group performance status (ECOG); (b) patients with an American Society of Anesthesiology (ASA) score of class I to III; (c) no cognitive impairment and able to communicate; (d) patients who are known to have been diagnosed with gastric cancer. The control group data were collected from Oct 2015 to April 2016, and the experimental group were from February to August 2016.
Patients with distant metastasis, significant complications after gastric cancer surgery, active concurrent multiple cancer were excluded. In the experimental group, 2 subjects were withdrawn due to reoperation and complications, while 3 subjects were dropped from complications in the control group. Finally, a total of 45 subjects participated in this study (Experimental group=22, Control group=23) (Fig. 1).

After the pre-test, the experimental group received a navigation program for 3 months. The intervention was performed by a researcher with 8 years of experience as a nurse practitioner specializing in gastric cancer. The intervention program effectiveness evaluation was examined at the ward and outpatient counseling room at 7 days after surgery, 1 month after surgery, and 3 months after surgery.

**Conceptual framework**

The conceptual framework of this study was based on transition theory proposed by Meleis and colleagues\(^{[27]}\). Transition theory consists of the essence of transition i.e., types, patterns and properties, transition condition, response patterns and nursing therapeutics. The transition care refers to nursing activities that help clients or their families who faced with new environment and situation. Through transition, they accept new changes and adjust the condition\(^{[27]}\).

This study was designed to enhance the continuity of nursing care and to promote the empowerment of patients with gastric cancer. The ‘Professional Navigation Framework’ proposed by Fillion et al\(^{[28]}\) guided an interventional component. This framework was used to enhance continuity of cancer care and the empowerment of patients. Fillion et al\(^{[28]}\) suggested the three concept of continuity care; informational, management and relational. In addition, active coping, cancer related self-management and support care were proposed for the patients and caregiver empowerment. Thus, this navigator program provided the information about the gastric cancer and coping strategies.

**Navigation program for gastric cancers with gastrectomy**

The first step of designing navigation program was reviewing relevant literatures on gastric cancer interventional studies and nurse-led navigation program for cancer patients. As a result, 16 articles were selected for program development.

Second, focus group interview (FGI) was conducted for gastric cancer patients and healthcare professionals to understand surgical experience and to organize intervention strategies. The 7 gastric cancer surgery clients and 6 healthcare professionals participated. From
an analysis of FGI interviews with clients who underwent surgery for gastric cancer, 7 themes were derived: post-surgery adjustment period during admission, gastric cancer surgery, discharge, and post discharge; dumping syndrome; satisfying curiosity; diet management; psychological disorder; needs for timely education; and support from healthcare professionals.

An analysis of the FGI with healthcare professionals revealed the following 7 themes: difficulties of gastrectomy patient experiences; nutritional status improvement; patient curiosity after surgery, post-operative care; continuity of care; educational methods and contents. Based on the reviews and interview results, the intervention contents were composed of 38 items.

Third, a preliminary draft of the navigation program was verified by 6 experts. The content validity index was over 0.80 in each of the 38 items. All items were satisfied the content validity index.

The intervention program was conducted 8 times for 3 months. The 6 times were face-to-face interventions and 2 were telephone consultations (Table 1). Patients were provided with tablet PC containing educational contents and booklets.

### Table 1. Composition of the navigation program

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Themes</th>
<th>Contents</th>
<th>Length (min)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilitating continuity of care</td>
<td>Informational continuity</td>
<td>Providing educational information package (booklets and tablet PC)</td>
<td>3</td>
<td>Satisfaction of Medical Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-surgery patient education</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>post-surgery patient education</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge education</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management continuity</td>
<td>Review of test results</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordination with the involved departments and confirmation of the outpatient schedule</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relational continuity</td>
<td>Program orientation with the nurse in charge (provide contact information)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Answering the phone (if necessary)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancer self-management</td>
<td>Educating on gastrointestinal symptoms and how to manage them</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Diet education</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education on chemotherapy side effects and how to manage them (if necessary)</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Active coping</td>
<td>Providing a self-management journal</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Need evaluation and symptom management</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discussion of cancer</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coping with stress</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coping with changes in family and other interpersonal relationships</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coping with potential fear</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maintaining changes</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supportive care</td>
<td>Introducing a support group</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listening, concern, contact, and encouragement</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quality of Life</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Distress</td>
<td></td>
</tr>
</tbody>
</table>
Instruments

The distress screening instrument developed by the NCCN(2007) was translated into Korean [29] was used. The instrument comprises of a distress thermometer and distress problem items. Cronbach’s α was .80 in the present study. The nutritional status was measured by the Patient-Generated Subjective Global Assessment (PG-SGA) [30]. In this study, Cronbach’s α was .78. Nutrition status, hemoglobin, albumin, and total protein used to verify the biochemical testing. Additionally, weight was measured as an anthropometric index. To evaluate the quality of life of patients with gastric cancer, the general quality of life of patients with cancer (QLQ-30) and the gastric cancer module, the site-specific quality of life for patients with gastric cancer (QLQ-STO22), which were originally developed by European Organization for Research and Treatment of Cancer (EORTC) were used [31]. Cronbach’s α was .85 in this study. The cancer inpatient satisfaction (IN-PATSAT32) developed by EORTC was used [32] as well. In this study, Cronbach’s α values ranged from .79 to .93.

Data Analysis

The general characteristics of the experimental and control groups were examined by computing frequencies, percentages, means, and standard deviations. Homogeneity between the groups was tested with descriptive statistics, chi-square test, Fisher’s exact test, and Mann-Whitney U test. To examine differences in distress, nutritional status, and quality of life across time, Mauchly’s sphericity test was performed, and, then, repeated measures ANOVA was used. The Bonferroni test was used for post-hoc testing. In case of Mauchly’s sphericity test showed the homoscedasticity assumption violation, the findings were interpreted using the results of Wilk’s lambda of multivariate ANOVA. Difference in satisfaction with healthcare services after the navigation program was completed using a Mann-Whitney U test. The data were analyzed according to per protocol analysis (PPA) principle except for five dropouts.

Results

General characteristics

The general characteristics of participants are represented as Table 2. The homogeneity test showed no significant differences in general characteristics and dependent variables between two groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental (n=23)</th>
<th>Control (n=22)</th>
<th>χ² or Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤64</td>
<td>13(56.6)</td>
<td>7(31.8)</td>
<td>2.883</td>
<td>0.279</td>
</tr>
<tr>
<td>65-74</td>
<td>6(26.1)</td>
<td>8(36.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥75</td>
<td>4(17.4)</td>
<td>7(31.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>63.00±10.78</td>
<td>66.95±9.82</td>
<td>1.284</td>
<td>0.206</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16(69.6)</td>
<td>16(72.7)</td>
<td>0.055</td>
<td>1.000</td>
</tr>
<tr>
<td>Female</td>
<td>7(30.4)</td>
<td>6(27.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unmarried</td>
<td>2(8.7)</td>
<td>1(4.5)</td>
<td>1.350a</td>
<td>1.000</td>
</tr>
<tr>
<td>Married</td>
<td>20(87.0)</td>
<td>21(95.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bereaved</td>
<td>1(4.3)</td>
<td>0(0.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Test of between-group homogeneity (general characteristics) (n=45)
### Table 2. Test of between-group homogeneity (general characteristics) (n=45)

<table>
<thead>
<tr>
<th>Religion</th>
<th>Yes</th>
<th>11(47.8)</th>
<th>14(63.8)</th>
<th>1.138</th>
<th>0.373</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>12(52.2)</td>
<td>8(36.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Education | Uneducated | 5(31.7) | 1(4.5) | 2.767<sup>a</sup> | 0.297 |
|           | Elementary - middle school | 10(43.5) | 11(50.0) |        |        |
|           | ≥ High school | 8(34.8) | 10(45.5) |        |        |

| Employment | Yes | 8(34.8) | 5(22.7) | 0.795 | 0.514 |
|            | No  | 15(65.2) | 17(77.3) |        |        |

| Economic status | High | 5(21.7) | 5(22.6) | 0.491<sup>a</sup> | 0.920 |
|                 | Middle | 12(52.2) | 13(59.1) |        |        |
|                 | Low | 6(26.1) | 4(18.1) |        |        |

| Stage | Early | 16(69.3) | 11(50.0) | 1.793 | 0.231 |
|       | Advanced | 7(30.4) | 15(6) |        |        |

| Surgery method | Laparoscopic assisted distal gastrectomy | 15(65.2) | 13(59.1) | 0.370<sup>a</sup> | 0.914 |
|                | Subtotal gastrectomy | 5(21.7) | 5(22.7) |        |        |
|                | Total gastrectomy | 3(13.0) | 4(18.2) |        |        |

| Length of hospital stay(days) | 8.08±1.83 | 9.04±2.49 | -1.236 | 0.221 | 0.297 |

<sup>a</sup> Fisher’s exact test

### Distress

The degree of stress was correlated between two groups according to the measurement time ($F=5.298$, $p=0.004$). In the follow-up analysis, there was a statistically significant difference at 1 month after surgery ($Z=-2.158$, $p=0.031$) and 3 months after surgery ($Z=-3.196$, $p=0.001$)(Table 3).

### Nutrition Status

The change of weight was significantly correlated with the experimental group and the control group according to the measurement time ($F=4.390$, $p=0.019$). The follow-up analysis showed a statistically significant difference in the postoperative 1 month ($Z=-2.158$, $p=0.031$) and the postoperative 3 months ($Z=-2.193$, $p=0.028$). The PG-SGA score and biochemical values were not identified by the interaction between the groups at the time interval for measurement (Table 3).

### Quality of Life

The overall quality of life ($F=5.905$, $p=0.707$) score of functional area ($F=0.613$, $p=0.547$) was not significantly correlated with the experimental group and the control group according to time interval for measurement(Table 3).
Table 3. The effect of navigation program for gastric cancer patients with gastrectomy on distress, nutritional status, quality of life (n=45)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>Preop. M±SD</th>
<th>Postop. 7-day M±SD</th>
<th>Postop. 1-month M±SD</th>
<th>Postop. 3-month M±SD</th>
<th>F</th>
<th>p</th>
<th>group<em>time group</em>time group<em>time group</em>time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distress</td>
<td>Experimental</td>
<td>3.70±1.14</td>
<td>4.22±1.44</td>
<td>4.70±0.82</td>
<td>2.96±0.97</td>
<td>3.351</td>
<td>&lt;0.001</td>
<td>62.852 &lt;0.001 5.298 0.004</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>4.00±1.41</td>
<td>4.09±1.57</td>
<td>5.59±0.95</td>
<td>4.00±9.26</td>
<td>62.852</td>
<td>&lt;0.001</td>
<td>5.298 0.004</td>
</tr>
<tr>
<td>PG-SGA</td>
<td>Experimental</td>
<td>3.35±0.48</td>
<td>4.96±1.02</td>
<td>7.04±1.18</td>
<td>4.35±1.22</td>
<td>1.756</td>
<td>&lt;0.001</td>
<td>244.877 &lt;0.001 2.778 0.053</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.32±0.47</td>
<td>5.05±1.21</td>
<td>7.86±1.28</td>
<td>4.95±1.64</td>
<td>244.877</td>
<td>&lt;0.001</td>
<td>2.778 0.053</td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>Experimental</td>
<td>66.84±11.19</td>
<td>64.23±11.02</td>
<td>62.20±8.49</td>
<td>4.461</td>
<td>0.041</td>
<td>&lt;0.001</td>
<td>39.026 &lt;0.001 4.390 0.019</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>62.44±9.03</td>
<td>57.35±7.05</td>
<td>56.44±8.18</td>
<td></td>
<td>39.026</td>
<td>&lt;0.001</td>
<td>4.390 0.019</td>
</tr>
<tr>
<td>Hemoglobin (g/dL)</td>
<td>Experimental</td>
<td>13.19±1.68</td>
<td>11.63±1.17</td>
<td>12.63±1.11</td>
<td>12.64±1.34</td>
<td>0.901</td>
<td>&lt;0.001</td>
<td>38.218 &lt;0.001 1.681 0.186</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>12.94±1.64</td>
<td>10.84±1.43</td>
<td>12.30±1.34</td>
<td>12.67±1.35</td>
<td>38.218</td>
<td>&lt;0.001</td>
<td>1.681 0.186</td>
</tr>
<tr>
<td>Albumin (g/dL)</td>
<td>Experimental</td>
<td>4.13±0.27</td>
<td>3.36±0.29</td>
<td>3.97±0.31</td>
<td>4.11±0.25</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>42.036 &lt;0.001 1.406 0.255</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>4.22±0.36</td>
<td>3.26±0.78</td>
<td>3.89±0.47</td>
<td>4.20±1.05</td>
<td>42.036</td>
<td>&lt;0.001</td>
<td>1.406 0.255</td>
</tr>
<tr>
<td>Protein (g/dL)</td>
<td>Experimental</td>
<td>7.03±0.52</td>
<td>6.12±0.59</td>
<td>7.15±0.62</td>
<td>7.04±0.50</td>
<td>2.003</td>
<td>0.164</td>
<td>64.961 &lt;0.001 0.813 0.494</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>6.94±0.33</td>
<td>5.84±0.66</td>
<td>6.94±0.47</td>
<td>6.88±0.48</td>
<td>64.961</td>
<td>&lt;0.001</td>
<td>0.813 0.494</td>
</tr>
<tr>
<td>Global health status/QoL</td>
<td>Experimental</td>
<td>62.68±6.08</td>
<td>55.40±6.01</td>
<td>52.17±9.13</td>
<td></td>
<td>0.098</td>
<td>&lt;0.001</td>
<td>43.258 &lt;0.001 5.905 0.707</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>62.12±6.15</td>
<td>55.12±6.15</td>
<td>49.62±9.78</td>
<td></td>
<td>43.258</td>
<td>&lt;0.001</td>
<td>5.905 0.707</td>
</tr>
</tbody>
</table>
Satisfaction of Medical Services

There was no difference in the medical service satisfaction for doctors between groups (Z=-1.064, p=0.293), while there was a significant difference in the satisfaction of medical service for nurses between groups (Z=-2.932, p=0.003). Satisfaction in service area showed statistically significant difference (Z=-2.651, p=0.007), and there was also significant difference in overall satisfaction with hospital between the experimental group and the control group (Z=-1.775, p=0.043) (Table 4).

Table 4. The effect of navigation program for gastric cancer patients with gastrectomy on satisfaction of medical service (n=45)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Experimental (n=23)</th>
<th>Control (n=22)</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M±SD</td>
<td>M±SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>71.05±3.51</td>
<td>70.21±3.54</td>
<td>-1.064</td>
<td>0.293</td>
</tr>
<tr>
<td>Technical skill</td>
<td>73.26±8.96</td>
<td>71.13±10.38</td>
<td>-0.864</td>
<td>0.395</td>
</tr>
<tr>
<td>Information provisions</td>
<td>70.00±8.90</td>
<td>70.360±8.51</td>
<td>-0.073</td>
<td>0.955</td>
</tr>
<tr>
<td>Availability</td>
<td>61.84±6.08</td>
<td>60.34±8.56</td>
<td>-0.481</td>
<td>0.620</td>
</tr>
<tr>
<td>Nurses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>85.94±11.32</td>
<td>78.18±8.48</td>
<td>-2.462</td>
<td>0.013</td>
</tr>
<tr>
<td>Technical skill</td>
<td>79.78±9.28</td>
<td>79.46±9.01</td>
<td>-0.238</td>
<td>0.823</td>
</tr>
<tr>
<td>Information provisions</td>
<td>90.57±10.86</td>
<td>79.84±10.80</td>
<td>-3.227</td>
<td>0.001</td>
</tr>
<tr>
<td>Availability</td>
<td>81.08±10.54</td>
<td>77.95±8.22</td>
<td>-0.956</td>
<td>0.374</td>
</tr>
<tr>
<td>Service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other personnel</td>
<td>83.40±9.96</td>
<td>80.98±7.87</td>
<td>-1.075</td>
<td>0.283</td>
</tr>
<tr>
<td>Waiting time</td>
<td>75.76±14.01</td>
<td>70.00±12.19</td>
<td>-1.322</td>
<td>0.196</td>
</tr>
<tr>
<td>Access</td>
<td>74.34±13.90</td>
<td>67.72±11.97</td>
<td>-1.671</td>
<td>0.098</td>
</tr>
<tr>
<td>Other items</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exchange of information</td>
<td>73.69±9.79</td>
<td>70.00±10.91</td>
<td>-1.152</td>
<td>0.274</td>
</tr>
<tr>
<td>Comfort/cleaness</td>
<td>71.08±5.21</td>
<td>72.27±7.35</td>
<td>-0.630</td>
<td>0.608</td>
</tr>
<tr>
<td>General satisfaction</td>
<td>86.30±12.17</td>
<td>75.68±18.79</td>
<td>-1.975</td>
<td>0.043</td>
</tr>
</tbody>
</table>
Discussion

The navigation program for gastric cancer patients developed in this study was based on the theory of transition\(^\text{[27]}\). This study was conducted in two stages. First, methodological study to develop a navigation program for gastric cancer patients by literature review and focus interview. Second, a quasi-experimental study was conducted to verify the effects of the navigation program. As a result of study, the nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services.

The distress significantly decreased to the experimental group than the control group. It was consistent with previous studies\(^\text{[33,34]}\). These results represented that the intervention of various information, telephone counseling and support in this navigation program helped to reduce patient’s distress. The distress of cancer patients might have a negative effect on the systemic condition, pain, medical service costs, treatment effects, satisfaction with medical care, quality of life, and even survival rates associated with cancer treatment. The stress intervention strategy might be contributed to improving patient satisfaction.

The change of the subjects’ weight among the nutritional status was found to have significant interactions between two groups according to the measurement time. Similarly, Jung & Lee\(^\text{[35]}\)’s study reported that experimental group who received nutritional education reported a lower weight loss than the control group. The experimental group gained confidence in food choice and showed significant difference in weight loss with the increase in intake. Weight loss is the most commonly recognized indicator of malnutrition, especially weight loss after gastrectomy\(^\text{[36]}\). The gastrectomy patients have various gastrointestinal symptoms. These symptoms eventually lead to weight loss. In addition, the weight of the subjects gradually decreased in experimental group until 3 months after surgery. It represented the continuous nutrition management needs after discharge. The results of previous study supported that intensive nutrition supply would be needed within 3 months after surgery\(^\text{[38]}\). Considering this result, the postoperative changes in gastric cancer can be predicted and explained to patients. Clinicians should provide care more effectively toward coping with malnutrition.

Although the PG-SGA score, biochemical tests i.e., serum hemoglobin, albumin, and protein levels were recovered by the time of measurement, however, these were not statistically significant. This was consistent with the previous gastric cancer studies\(^\text{[39]}\). Considering that the weight was continuously decreased for 3 months after surgery, it is necessary to avoid serious weight loss immediately after surgery. In addition, gastric cancer patients should take enough calorie intake to maintain the nutritional status. In future studies, it is necessary to understand the degree of postoperative eating habits and intake.

There were no significant differences in quality of life between two groups which is similar to previous navigation program for first diagnose with cancer\(^\text{[18,22]}\). However, other nurse-led navigation program showed positive effect to quality of life.\(^\text{[40]}\) The gastric cancer quality of life had the lowest within 3 months after surgery, and they recovered continuously within 1 year after surgery.\(^\text{[6,36,41]}\) The gastric cancer navigation program performed last intervention at 3 months after operation therefore, there should be caution in interpreting this study results. Future studies are needed to provide sufficient evidence to examine the impact of quality of life in long-term period including appropriate nursing care.

The result of verifying the effect of the navigation program on the satisfaction of medical services, the experimental group showed a significant difference for nurses. The interpersonal skills and information provision of subdomain of medical service for nurses were significant. This navigation program was designed for nurse-led intervention. The advanced nurses for gastric cancer provided the individual education, interest and support to patients. It might be the affirmative effect to increase the satisfaction level. This result was consistent with many navigation programs in enhancing the satisfaction of cancer patients\(^\text{[20,31,38,42]}\).

Limitation

The effect of navigation program was measured after...
3 months, when gastrointestinal symptoms of gastric cancer patients improved. The long-term effect of the quality of life changes after surgery was not verified. Therefore, it is necessary to conduct a follow-up study to measure the effect of the long-term period in order to evaluate the objective effect of the intervention program.

Implications for Nursing

Previous gastric cancer studies focused specific characteristics such as risk factor, cancer stage or setting i.e., community care[43,44]. Gastric cancer patients suffered diverse symptoms from diagnosis to discharge. This study focused on improving the outcome the patients by organizing individual nursing interventions systematically according to the step of each transition. This study tried to promote the attributes and conditions of the transition and to improve the result such as stress, nutrition status, quality of life and satisfaction through nursing care. The interventional framework of nursing treatment was Professional Navigation Framework by Fillion et al[28], which allowed the elements of intervention to have theoretical basis. Through literature review and focus group interviews with patients and medical professionals, the program was induced to satisfy the needs of patients. A timely approach at each time of patient transition provided individual and ongoing integrated interventions to the clients.

Conclusion

Gastric cancer is the most common cancer in Korea. The improvement of cancer patients’ survival rate led them to recognize a concept of chronic disease requiring long-term management. This study was to evaluate the effectiveness of navigation program for gastric cancer. The nurse-led navigation program for gastric cancer patients was positive effect to reduce the distress of the subjects, promoting the nutritional status, and enhance the satisfaction of medical services. This study contributed to gastric cancer patients’ quality of life improvement. It is suggested to conduct long-term follow-up research to measure quality of life changes due to the navigation program. Furthermore, it is necessary to continuously pay attention to the quality of life of vulnerable population such as elderly gastric cancer patients.

Knowledge Translation

- This study focused on improving the outcome the patients by organizing individual nursing interventions systematically based on the theory of transition.
- The nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services.
- The nurse-led navigator program provided individual education, attention, and support to gastric cancer patients to increase satisfaction, which had a positive effect.

Source Funding: This work was supported by the National Research Foundation of Korea(NRF) grant funded by the Korea government(MSIT) (No 2019R1G1A1100444)

Conflict of Interest: None

Ethical Clearance: This research has ethical clearance from the Institutional Review Board of Konyang University Hospital(KYUH 2015-09-004-002)

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Introduction

The World Health Organization (WHO) determined the status of Corona Virus Disease 2019 (Covid-19) as a Pandemic on March 11th, 2020 at the WHO office, Geneva, Switzerland. The latest data announced by WHO as of March 8th, 2020, the number of cases globally there were 105,586 confirmed cases, in China 80,859 confirmed with 3,100 deaths. For areas outside China there were 24,727 confirmations and 484 deaths spread across 101 countries. On December 31st, 2019, WHO China Country Office reported a case of pneumonia of unknown etiology in Wuhan City, Hubei Province, China. Corona viruses are a large family of viruses that cause illness ranging from mild to severe symptoms. There are at least two types of coronavirus that are known to cause illnesses that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS)1.

The families of Suspect/Probable Covid-19 patients often doubt the corpse management procedure of Covid-19 PDP patients is in accordance with religious law (Islam). It makes the families of Suspect/Probable Covid-19 Patients often want the corpse management of Suspect/Probable Covid-19 patients to be done alone, where the corpse management of Suspect/Probable Covid-19 by the family will endanger the people who carry out the corpse management. There is still the Covid-19 virus attached to the corpse, which is basically the same in all other infectious diseases.

There have been so many cases of forcibly taking the corpse of Suspect/Probable Covid-19 patients that have occurred in Indonesia, but not a single legal action has been taken by law enforcement officials to take action against and detain the perpetrators of forcibly taking the corpse of Suspect/Probable Covid-19 patients. This caused the absence of legal certainty, both legal protections for the Hospital and for the patient’s family.

Keywords: Criminal law aspects, forced taking, corpse of suspect/probable Covid-19 patients
Discussion

Covid-19

Coronavirus Disease 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). SARS-CoV-2 is a new type of coronavirus that has never been previously identified in humans. There are at least two types of coronavirus that are known to cause diseases that can cause severe symptoms such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Common signs and symptoms of COVID-19 infection include acute respiratory symptoms such as fever, cough and shortness of breath. The average incubation period is 5-6 days with the longest incubation period of 14 days. Severe cases of COVID-19 can cause pneumonia, acute respiratory syndrome, kidney failure and even death.

The cause of COVID-19 is a virus that classified to the coronavirus family. Coronavirus is a positive single-stranded RNA virus, encapsulated and unsegmented. There are 4 main protein structures in Coronavirus, namely: protein N (nucleocapsid), glycoprotein M (membrane), spike glycoprotein S (spike), protein E (sheath). Coronavirus classifies to the order Nidovirales, Coronaviridae family. This coronavirus can cause disease in animals or humans. There are 4 genus, namely alphacoronavirus, betacoronavirus, gammacoronavirus, and deltacoronavirus. Before COVID-19, there were 6 types of coronavirus that could infect humans, namely HCoV-229E (alphacoronavirus), HcoV OC43 (betacoronavirus), HCoVNL63 (alphacoronavirus) HCoV-HKU1 (betacoronavirus), SARS-CoV (betacoronavirus), and MERS- CoV (betacoronavirus).

The operational definition of the division of the Covid-19 patient group

a. Suspect Case, A person who has one of the following criteria:

People with Acute Respiratory Infections (ARI) and in the last 14 days before symptoms appeared had a history of travel or live in countries/regions of Indonesia that report local transmission.

b. Probable Case

Suspect cases with severe ARD/ARDS/died with a convincing clinical description of COVID-19 and no RT-PCR laboratory examination results.

If you find a probable case, public health management will be carried out including:

a. Isolation of probable cases is carried out as long as the isolation is not completed in accordance with the discussion in clinical management

b. Monitoring of probable cases is carried out periodically as long as isolation has not been declared. Monitoring is carried out by FKRTL officers. If you have finished it, isolation/monitoring can be given a letter

c. If a probable case dies, the corpse management is in accordance with the protocol for corpse management for the confirmed COVID-19 case.

d. Epidemiological investigation. Epidemiological investigation is still carried out mainly to identify close contacts.

e. Risk communication

Health workers provide risk communication to close contact cases in the form of information about COVID-19, prevention of transmission, monitoring the development of symptoms, and others.

Patients with Suspect or Probable status who are suspected as Covid-19 with the criteria of mild illness, moderate illness, severe illness or critical conditions are treated like patients confirmed as Covid-19 until proven not Covid-19.

Corpse of Suspect/Probable Covid-19 Patient

Biologically, death is the cessation of activity in the biological body of an individual which is marked by loss
of brain function, cessation of heartbeat, cessation of blood pressure and cessation of the respiratory process.

Death can be divided into two phases, namely: somatic death and biological death. Somatic death is a phase of death where there are no signs of life anymore, such as heart rate and breathing movements, decreased body temperature, and no brain electrical activity on the EEG record. After two hours, somatic death will be followed by biological death marked by cell death.

Pandemic condition resulted in many deaths and it cannot be determined with certainty whether the corpse or death is died because of Covid-19. This requires specific management steps to prevent the occurrence of spread to medical and corpse management personnel, as well as to families and the general public.

The corpses of patients with COVID-19 need to be managed ethically and properly in accordance with religion, values, norms and culture. The main principle in providing this service is that all officers are required to carry out standard precautions and be supported by adequate infrastructure. Criteria for the corpse of patient:

1. Suspected corpse from inside the hospital before the result of the swab is released.

The corpse of patient from inside the hospital that has been determined as a probable/confirmed case of COVID-19.

A corpse from outside the hospital, with a history that meets the probable/confirmation criteria for COVID-19. This includes DOA (Death on Arrival) patients referred from other hospitals.

Hospital

A hospital is one type of health service facility, whose main task is to serve individual health in addition to other service tasks. The definition of a hospital is formulated in Article 1 point 1 of the Law concerning Hospitals that: “A hospital is a health service facility that organizing health services providing inpatient, outpatient and emergency services”

Law of the Republic of Indonesia Number 44 of 2009 Article 24 states that in the Organization of tiered health services and referral functions, General Hospitals and Special Hospitals are classified based on the facilities and capabilities of Hospital services. The General Hospitals classification consists of:

- Type A hospital
- Type B hospital
- Type C hospital
- Type D hospital

Hospital as an organization of business entities in the health sector has an important role in realizing the optimal degree of public health. Article 1 Paragraph 1 of the Hospital Law explains that a hospital is a health service institution that organizing complete individual health services that provide inpatient, outpatient and emergency services. The hospital is a work place for professionals who carry out their activities based on their oath pronunciation and professional code of ethics. Therefore, hospitals are required to be able to manage their activities, by prioritizing the responsibilities of professionals in the health sector, especially medical and nursing personnel in carrying out their duties and authorities.

Hospital as one of the health service facilities is part of health resources which are indispensable in supporting the organization of health efforts. The organization of health services in hospitals has very complex characteristics and organizations. The statutory regulations that are used as the basis for the organization of hospitals, namely Law Number 44 of 2009 concerning Hospital. The existence of this law is intended to provide legal certainty and protection to improve, direct and provide a basis for hospital management.

Infection Prevention and Control for Corpse Management of Covid-19 patients need to be managed ethically and properly in accordance with religion, values, norms and culture. The main principle in providing this service is that all officers are required to carry out standard precautions and be supported by adequate infrastructure. Criteria for corpse of patient:

1. Corpse of the suspect from inside the hospital before the result of the swab is released.
2. Corpse of patient from inside the hospital that has been determined as a probable/confirmed case of Covid-19

3. A corpse from outside the hospital, with a history that meets the probable/confirmation criteria of Covid-19. This includes DOA (Death on Arrival) patients referred from other hospitals.

Precautions when receiving corpse from rooms with suspected/probable/confirmed (+) Covid-19 cases include:

1. Using appropriate PPE during contact with the corpse.
2. Hand hygiene before and after contact with the corpse.
3. Decontamination of the environment, including all surfaces of objects and tools with disinfectants.
4. Precautions for transmission should be carried out against procedures that generate aerosols.
5. Prepare plastic wraps or corpse bags that are watertight for transferring the corpse.

If a corpse has been confirmed positive for Covid-19, the funeral procedure must be carried out according to the Covid-19 procedure. Swab tests are mandatory so that the patient’s family can find out positive or negative of Covid-19 infection, so there will be no doubt from the family to the hospital in the process of handling the patient. The requirements for taking the corpse of the Covid-19 PDP are the existence of a Polymerase Chain Reaction (PCR) examination certificate which is declared negative. After being declared dead, the family of the corpse has to wait around 4-5 hours to be examined first.

The thing that must be considered in handling the Covid-19 PDP corpse is that if the corpse in question has been confirmed to be positive for Covid-19, then the funeral process must be carried out according to the Covid-19 procedure. However, if the corpse is proven negative for Covid-19, then the funeral process can be carried out in accordance with the Sharia or the provisions of their respective religions. However, there is an appeal to the family so that the burial and funeral processes continue to apply health protocols, from wearing masks to maintaining distance.

This procedure is stipulated as a guideline for handling the corpses of infectious patients in health services, preventing transmission of disease from the corpse to the mortuary clerk and preventing disease transmission from the corpse to the environment and visitors. The scope of the protocol, starting from the room, transferring to the mortuary, managing the corpse in the mortuary, handing over to the family to corpse management. Based on Law

1. Law Number 24 of 2007 concerning Disaster Management
2. Presidential Regulation Number 17 of 2018 Organization of disaster management in certain circumstances
3. Decree of the Head of BNPB Number 9.A. of 2020 concerning Determination of the Status of Certain Circumstances of Disaster Emergencies for Disease Outbreaks due to Corona Virus in Indonesia
4. Decree of the Head of BNPB Number 13.A of 2020 concerning the Extension of the Status of Certain Circumstances of Disaster Emergencies for Disaster Outbreaks due to Corona Virus in Indonesia
5. MUI Fatwa Number 14 of 2020 concerning the Organization of worship in a situation of the Covid 19 outbreak.

**Criminal Law**

The term of criminal law is a translation of the Dutch term *strafrecht*, *Straf* means criminal, and *recht* means law. The definition of criminal law has been stated by many legal scholars, including Soedarto, which defined that: *Criminal law contains legal rules that bind to actions that fulfill certain conditions of a result in the
Furthermore, Moeljatno explained that from the definition of criminal law as mentioned above, then what is referred to in 1st) is to recognize a “criminal act”. While what is mentioned in the 2nd) is about “criminal liability” (criminal liability or criminal responsibility). What is mentioned in the 1st and 2nd) is the “substantive criminal law”, because it concerns the contents of the criminal law itself. What is mentioned in the 3rd) is the method or procedure for prosecuting people suspected of having committed a criminal act, therefore the criminal procedure law. Usually what is referred to as criminal law is substantive criminal law.

Criminal law based on the material it regulates consists of substantive criminal law and formal criminal law. Tirtamidjaja explained substantive criminal law and formal criminal law as follows:

a. Substantive criminal law is a collection of legal rules that determine criminal offenses, establish conditions for criminal offenders to be punished, indicates a person is punishable and can establish a penalty for a criminal offense.

b. Formal criminal law is a collection of legal rules that regulate how to defend substantive criminal law against offenses committed by certain people, or in other words regulate how substantive criminal law is realized so as to obtain a judge’s decision and regulate how to implement a judge’s decision.

The characteristic of law is force accompanied by threats and sanctions. But the law is not forced to justify wrong issues, or to force those who are not hold the position and not have money. In order for the rules of social life to be strictly obeyed so that they become the rule of law, then these social regulations must be equipped with an element of force. Thus, the law has the nature of regulating and forcing everyone to obey the order in society and to provide strict sanctions (in the form of punishment) for anyone who does not want to comply.

In Law Number 4 of 1984, article 5 paragraph (1) Efforts to countermeasures the outbreak include:

a) Epidemiological investigation;
b) Examination, treatment, care and isolation of patients, including quarantine measures;
c) Prevention and immunization;
d) Destruction of disease causes;
e) Handling of corpse due to the outbreak;
f) Counseling to the community;
g) Other countermeasures.

One of the regulations that has been made is the DKI Regional Regulation regarding Corona. This regulation covers a broad range of issues ranging from regulating the rights and obligations as well as responsibilities of the government to the implementation of Large-Scale Social Restrictions (PSBB). Meanwhile, imprisonment sanctions for offenders of the DKI Corona Regional Regulation have been removed and replaced with fines such as fines for forcibly taking the corpse of Covid-19. Based on Article 31 paragraph 1 of the Regional Regulation, the act of forcibly taking the corpse of Covid-19 is also classified as a criminal act. However, if the taking the corpse of Covid-19 is accompanied by threats, then the value of the fine will increase to IDR 7.5 million.

The Police of the Republic of Indonesia have stated that the forcibly taking the corpses that have tested positive for Covid-19 is an act of violating the applicable statutory regulations because it will cause harm to various parties and this is also a criminal act.

Many parties have become suspects by the Indonesian National Police. The Police of the Republic of Indonesia have also compiled regulations or instructions to resolve cases of forcibly taking the corpse of Covid-19 patients, namely by issuing a telegram letter from the Chief of the Indonesian National Police Number ST/1618/VI/Ops.2/2020. Firm action is needed against those who are still forcibly taking the corpse of Covid-19 patients. So it also requires the involvement of religious leaders, the community, humanists, sociologists, anthropologists, to communicate and provide understanding to the community so that there should be no more cases of
forcibly taking the corpse of Covid-19.

With the telegram letter from the Chief of the Indonesian National Police, if there are still parties who take the corpse of a Covid-19 PDP patient forcibly, they can be subject to criminal sanctions. The basis is Article 5 of Law Number 4 of 1984 concerning Infectious Disease Outbreaks with the threat of one year in prison or a fine of up to IDR 100,000,000 (One Hundred Million Rupiahs) as regulated in Article 93 of Law Number 6 of 2018 concerning Health Quarantine. In addition, parties who forcibly taking the corps of PDP patients with Covid-19 may also be subject to layered articles, namely Article 211 of the Criminal Code in conjunction with Article 335 of the Criminal Code in conjunction with Article 336 of the Criminal Code in conjunction with Article 93 of Law Number 6 of 2018, with a penalty of up to 7 (seven) years.

As for article 211 of the Criminal Code states “Whoever with violence or threat of violence forces an official to carry out an official act or not to carry out an act of lawful position, shall be punished by a maximum imprisonment of four years”. And article 335 of the Criminal Code

(1) Punished with a maximum imprisonment of one year or a maximum fine of five hundred rupiahs:

6. Whoever against the law forces other people to do, not do or allow something, by using violence, any other act or unpleasant treatment, both to that person and others.

7. Whoever forces other people to do, not do or allow something under the threat of defamation or defamation in writing

(2) In as formulated in point 2, a crime is only prosecuted upon the complaint of the person affected.

Article 14 of Law 4/1984 has threatened that:

1. Whoever obstructs deliberately the implementation of the outbreak countermeasures as regulated in this Law, shall be punished with a maximum imprisonment of 1 (one) year and/or a maximum fine of IDR 1,000,000 (one million rupiah).

2. Whoever due to his/her negligence obstructs the implementation of outbreak countermeasures as regulated in this Law, shall be punished with imprisonment for a maximum of 6 (six) months and/or a maximum fine of IDR 500,000 (five hundred thousand rupiah).

3. Criminal acts as intended in paragraph (1) are crimes and criminal acts as referred to in paragraph (2) are violations.

In addition, Article 93 of Law 6/2018 on Health Quarantine states that:

Every person who does not comply with the organization of Health Quarantine as referred to in Article 9 paragraph (1) and/or obstructs the organization of Health Quarantine so as to cause a Public Health Emergency will be sentenced to a maximum imprisonment of up to 1 (one) year and/or a maximum fine of IDR 100,000,000 (one hundred million rupiah).

Whoever by force or threats of violence against a civil servant who performs his/her legitimate job, or against a person who while helping that civil servant because of his/her obligations under the law or at the request of the civil servant, is punished for resistance, with a maximum imprisonment of one year and four months or a maximum fine of IDR 4,500.

An action that is prohibited by law which, if violated, will be subject to criminal sanctions. In statutory regulations, there are many terms used where these terms have the same meaning as criminal acts, including criminal events, punishable acts, offenses, criminal offenses, and others. Forcibly taking the corpse is an act against the law. Actions prohibited by law which, if violated, will receive sanctions.

Forcibly taking the corpse of Suspect/Probable Covid-19 patients often occurs, one of which is for reasons of families who are afraid to be considered as people who have the potential to spread the Covid-19 outbreak in neighborhoods. In addition, the family of a corpse suspected/probably Covid-19 patients if they are proven positive for Covid-19, then the funeral process will be carried out in accordance with the Covid-19 countermeasures protocol. This causes the surrounding
community or neighbors to know that the patient is a Covid-19 patient. Communities who do not understand information about Covid-19 transmission will try to refuse the funeral because the funeral was carried out in that community environment. The community is afraid if the corpse of a Covid-19 patient can transmit the Covid-19 outbreak in their environment even though the corpse has been managed according to the Covid-19 protocol.

As for the content of Article 178 of the Criminal Code, namely: “Whoever blocks deliberately or obstructs the entrance or transportation of a corpse to the grave is permitted, shall be punished by a maximum imprisonment of one month and two weeks or a maximum fine of one thousand eight hundred rupiahs”. This article is under the chapter on crimes against public order. This formula has its equivalent in Nederland Wetboek van Strafrecht, namely Article 148. This criminal threat is addressed (normaddressat) to “whoever”, or “anyone”. The core parts of the offense were “deliberately”, “blocking or obstructing”, and “permitted entry or transport of the corpse to the grave”.

This action has to be done deliberately to ‘block’, meaning to obstruct, so that the carrying of the corpse cannot take place (verhideren). “Troubling” means disturbing, so that although the carrying of the corpse can take place, it is with difficulty (belemmeren). The carrying of a corpse should not be prohibited, which means that carrying is proper, has been given permission by the government officials, not illegal burial9.

Conclusion

Forcibly taking the corpse of Suspect/Probable Covid-19 patient if not subject to sanctions, there will be not deterrent effect for preperator but will also have a social impact. If the corpse of Suspect/Probable Covid-19 patient is not performed corpse management in accordance with the Covid-19 protocol, this will lead to the potential for Covid-19 transmission to those who mourn at the funeral home and the person who bathes the corpse. Without realizing it, the corpse management and funeral for the corpse created a new cluster of Covid-19. The rapid and more widespread spread of Covid-19 has had a social impact in the form of increasingly stringent PSBB (Large-Scale Social Restrictions) regulations, so that economic activity is hampered and there are more open unemployment.

Forcibly taking the corpse of Suspect/Probable Covid-19 patients often occurs, one of which is for reasons of families who are afraid to be considered as people who have the potential to spread the Covid-19 outbreak in neighborhoods. In addition, the family of a suspected/probable Covid-19 patient if it is proven positive for Covid-19, then a funeral process will be carried out in accordance with the Covid-19 countermeasures protocol. This causes the surrounding community or neighbors to know that the patient is a Covid-19 patient. Communities who do not understand information about Covid-19 transmission will try to refuse the funeral because the funeral was carried out in that community environment. The community is afraid that the corpse of a Covid-19 patient can transmit the Covid-19 outbreak in their environment even though the corpse has been performed a corpse management according to the Covid-19 protocol.

Obstruct officers from conducting official funeral is legally punishable. Law enforcement officials can use Article 178 of the Criminal Code. The act of forcibly taking the corpse of Suspect/Probable Covid-19 patients by parties who do not have the authority is an act against the law. This is contrary to the procedures for handling the corpse of Covid-19. This can be seen in each of the articles in the existing, namely the 1945 Constitution, Law Number 4 of 1984 article 5 and article 214 Criminal Code in conjunction with Article 211 Criminal Code, Article 335 Criminal Code in conjunction with Article 336 Criminal Code in conjunction with Article 93 Criminal Code Law Number 6/2018.

Ethical Clearance : Nil

Conflict of Interest : Nil

Source of Funding : Self Founding

Acknowledgement : Nil

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The Prioritization of Outpatients by Nurses Using the Manchester Triage System: A Case Analysis in An Austrian Accident Hospital

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Abstract

Background: Increasing workload in hospitals calls for professional prioritization regarding treatment urgency. The introduction of a triage system can offer assistance but requires experience and training.

Objective: This study investigates whether, in the initial assessment procedure in an emergency department for trauma surgery, nurses (a) assess urgency following the triage systems’ rules and (b) apply these correctly so subsequent medical diagnoses can be adequately performed.

Methods: We evaluated 5,975 patient data records regarding urgency ratings given in initial nursing assessments and respective waiting times. Data was analyzed using descriptive statistics and nonparametric test procedures to investigate significant differences.

Results: The results show that in 91% of cases, the waiting times reflect the urgency ratings given by the first-assessing nurses. In addition, ratings of 5,863 cases (98%) corresponded to later medical diagnoses.

Conclusions: Initial assessments using the Manchester triage system is done very accurately and supports the treatment process structure. In addition, it can increase patient satisfaction and safety.

Keywords: Triage, Primary assessment, Outpatient management, Emergency service

Introduction

Emergency rooms are intended for urgent cases requiring immediate non-elective treatment. Accordingly, they are regarded as the interface between the emergency services and hospitals. In many places, the practice looks different. For various reasons, hospital outpatient departments also have a high and increasing popularity among patients without pressing treatment needs, resulting in excess demand that needs to be managed.

With increasing numbers of patients, the need to professionally systematize admission is evident. The accident hospital (Unfallkrankenhaus UKH) Linz, Austria, which is investigated for this case analysis, has over 130 patients per day. In similar settings, patients are often treated in the order of appearance and thus, registration. Moreover, it is not uncommon for the registering administrative staff to decide on the degree of urgency at their own discretion. However, it is essential that those with life-threatening issues are identified and
treated as quickly as possible. With a triage system, the severity of the case and thus the urgency of medical care can be defined within a short time, which is why the hospital studied opted for an implementation of the Manchester triage system (MTS).

**Problem definition**

Without a triage system, prioritization is usually carried out by administrative personnel. In MTS conditions, patients are prioritized by a specially trained nurse, who uses a specific presentation chart and associated indicators to assign a priority level of between 1 and 5. The patient is referred to an internal contact person from the beginning and is informed about the further procedure plus expected waiting. Using the MTS is known to increase patient satisfaction and safety.

Various triage systems are in use in emergency rooms worldwide. Four leading systems are considered internationally established: the Australasian Triage Scale (ATS), the Canadian Triage and Acuity Scale (CTAS), the MTS, and the Emergency Severity Index (ESI). AT UKH Linz, the MTS was implemented in November 2018 following a detailed evaluation. It was chosen for a number of reasons, including the availability of an authorized German translation and training, as well as the system being well suited for all patients and groups.

However, there is a lack of evaluations of triage systems. In particular, the correct utilization by the nursing personnel, which is critical for the further treatment process, needs to be investigated. In the present study, the topic is examined in the Austrian inpatient context.

**Objectives and questions**

The goals of the present study are to determine whether the initial assessment by the nursing staff at UKH Linz (a) is consistent with the specifications of the triage system, (b) correspond to the waiting times specified by the priority levels (= categories) and (c) are in line with the subsequent medical diagnoses.

The questions derived from the objectives are as follows:

- **Do the actual waiting times correspond to the target values of the initial assessment and the specifications of the triage system?**

- **How do the initial assessments by the nursing staff differ from the later medical diagnoses?**

**Setting: The initial assessment process after the MTS and its application in the pilot hospital**

The classification of patients is based on symptoms as subsequent diagnoses are specified by medical personnel. The MTS works with predefined symptom presentation diagrams. Priority classification is based on indicators, of which there are approximately 200, summarised in 50 presentation diagrams for different complaint complexes (symptoms).

Indicators are factors that make it possible to distinguish between patients and classify them into one of five levels of clinical urgency. A distinction is made between general and specific indicators: general indicators apply to all patients, regardless of their symptoms, and can, therefore, be found throughout all presentation diagrams. The six general indicators are life-threatening issues, pain, blood loss, (degree of) consciousness, temperature, and duration of illness. Specific indicators are available for individual symptoms, cover the key features of these particular complaints and align to complex symptoms, such as chest pain, headache, head injury, and abdominal pain.

The presentation charts are designed for quick assessment. Therefore, the urgency of symptoms decreases from top to bottom (Table 1), saving time for filtering out and assessing severely ill or injured persons. As soon as the appropriate indicator is defined, basic triage is complete. The second step is the classification according to the five levels of urgency. The MTS does not provide a defined time for a new initial assessment after the patient’s waiting period has expired but assumes that an adequate slot is assigned.
Table 1: Categories and maximum waiting times, according to the Manchester triage system (MTS)\textsuperscript{11}

<table>
<thead>
<tr>
<th>Category</th>
<th>Colour</th>
<th>Urgency</th>
<th>Maximum waiting time (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
<td>Immediately</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Orange</td>
<td>Very urgent</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
<td>Urgent</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>Green</td>
<td>Normal</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>Blue</td>
<td>Not urgent</td>
<td>120</td>
</tr>
</tbody>
</table>

Since November 2018, the initial assessment at UKH Linz has been carried out by professionally experienced, qualified nursing staff that passed the ‘MTS basic course for users’ (Austrian reference group for the initial assessment, www.klinikum-graz.at). After this, the nurses make their own decisions based on their training. As documentary assistance, they use the German translation of the initial assessment manual by Kevin Mackway-Jones, Janet Marsden, and Jill Windle\textsuperscript{11}. This manual lists all presentation charts alphabetically, with the respective general and specific indicators detailed and explained.

Method

Design, setting, and sampling

The study was conducted using a retrospective and quantitative design. Figure 1 gives an overview.

The investigation was based on data from the period of January 1\textsuperscript{st}, 2019, to February 28\textsuperscript{th}, 2019. A total of 7,978 patients were registered at UKH Linz during this period. During the study, 5,975 data sets were collected and analyzed with regard to the research questions. The other patients were not triaged because they either arrived outside of the triage times (generally done weekdays from 07:00 to 21:00, and on weekends and during holidays from 10:00 to 20:00) or were delivered directly to the shock room as emergency patients. To assess the waiting times, the registration time of the patients in the emergency outpatient department, the first contact with the nurse in the first assessment bunk and the first medical contact in the examination bunk were documented. Approximately 8,000 patients visited the emergency outpatient clinic in the two months under investigation.
Survey procedure and data analysis

The extent to which the initial assessment of the nursing staff corresponds to the medical diagnosis was determined in two steps. In the first step, the indicator used in the presentation chart relevant for the patient is compared to the category (= urgency level) and checked for agreement. Each presentation chart has general and specific indicators assigned to categories 1-5. This reveals all matches and mismatches in the respective presentation diagrams, indicators, and categories. In the second step, the correspondence between the results of the nurses’ assessment based on the presentation chart and the initial medical diagnosis is checked using the respective ICD-10 coding. Changes of diagnosis during the course of treatment, as well as secondary diagnoses, are ignored. In the statistical analysis, the frequencies and percentage shares are determined and compared in tabular form.

Results

The research questions can be answered based on assessment of the 5,975 cases surveyed (Table 2), of which 76% are assigned to urgency categories 4 or 5, thus the lower ones.

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>66</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>1342</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>3665</td>
<td>61</td>
</tr>
<tr>
<td>5</td>
<td>902</td>
<td>15</td>
</tr>
<tr>
<td>total</td>
<td>5975</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Distribution between categories 1-5

In 91% of cases (n=5,418), the actual waiting times correspond to the target values set by the MTS (Table 3).

<table>
<thead>
<tr>
<th>Category</th>
<th>Waiting time observed</th>
<th>Percent</th>
<th>Waiting time not observed (longer waiting times)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>47</td>
<td>71</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>1120</td>
<td>83</td>
<td>222</td>
</tr>
<tr>
<td>4</td>
<td>3465</td>
<td>95</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>786</td>
<td>87</td>
<td>116</td>
</tr>
<tr>
<td>total</td>
<td>5418</td>
<td>91</td>
<td>557</td>
</tr>
</tbody>
</table>

Table 3: Waiting times observed/not observed

The highest deviation is in category 2, with 19 cases (29%).

To answer the second research question, the assigned indicator was first compared with the urgency level entered in the respective presentation diagram (Table 4). In categories 2-4, correct evaluations were given to between 88% and 92% of patients. For category 5, the agreement is 67% (n=604). In category 5, the most common error is the indicators of the recent problem and recent pain being entered at this priority level. In this...
category, however, the indicator of ‘not urgent’ is correctly entered in all presentation diagrams. Therefore, there is a deviation of 38% of the 604 cases in category 5.

<table>
<thead>
<tr>
<th>Category</th>
<th>Correct</th>
<th>Correct percentage</th>
<th>Not correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>58</td>
<td>88</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>1216</td>
<td>91</td>
<td>126</td>
</tr>
<tr>
<td>4</td>
<td>3359</td>
<td>92</td>
<td>306</td>
</tr>
<tr>
<td>5</td>
<td>604</td>
<td>67</td>
<td>298</td>
</tr>
<tr>
<td>Total</td>
<td>5237</td>
<td>88</td>
<td>738</td>
</tr>
</tbody>
</table>

Furthermore, the presentation diagram used by the nurse during the initial assessment was compared with the (later) medical diagnoses (Table 5), revealing a 98% (n=5863) agreement rate.

<table>
<thead>
<tr>
<th>Category</th>
<th>Correct</th>
<th>Correct percentage</th>
<th>Not correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5</td>
<td>5863</td>
<td>98</td>
<td>112</td>
</tr>
</tbody>
</table>

**Discussion**

The investigation of the emergency outpatient department of UKH Linz found that the vast majority (91%) of initial assessments by nurses, which are structured using the MTS, correspond to the standardized requirements and waiting times. The medical indicators are correctly defined in 88% of cases, and the initial assessments align with the medical diagnoses in 98% of cases. This highlights the professionalism of the nursing staff with regard to their initial assessments. Urgent cases need and typically receive quick treatment, while for less urgent cases, the outpatient clinic is also less attractive due to the long waiting times. That this is highly important is revealed by the immense number of patients coded as not urgent.

It can be assumed that routine work in the initial assessment will also increase the quality of triage by nurses, as they gain experience in working with the system and its tools. However, due to staff turnover, new personnel must be trained. Compliance with waiting times and degree of accordance of diagnoses and assessments should, therefore, be evaluated quarterly. The audit protocol is suitable for detecting sources of error, including checks of whether the correct presentation diagram, indicator, and level of urgency were used. This enables the assessment of the accuracy and completeness of the initial assessments.

However, it is also evident that the initial assessment in an accident surgery emergency room is simple compared to that in the medical outpatient department due to the more apparent symptoms.

**Conclusions**

The results of this study show that the nurses are very well qualified to correctly assess the degree of urgency in the emergency outpatient clinic in terms of subsequent medical diagnoses. The triage carried out in
the process enables the efficient and symptom-oriented ranking and organization of medical indications. This has a positive effect on the quality of treatment, patient care, and patient flow management: urgent care is provided quickly, and less urgent patients wait longer than others. This is of great value for emergency departments, especially when they are working at capacity. Based on this evaluation, the introduction of a triage system in emergency outpatient departments is recommended.

**Ethical Clearance:** Not applicable.

**Source of Funding:** This research received no external funding.

**Conflicts of Interest:** The authors declare no conflict of interest.

**References**

The Symptoms of Impaired Lung Function and Its Determinants Analysis on Garment Workers at UD. Surabaya Jember Region

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2Medical Doctor, Philosophy of Doctor, Faculty of Medicine, Jember University, East Java (Indonesia),
3Lecturer at Faculty of Social Science and Political Science, Jember University, East Java (Indonesia)

Abstract

Lung disease due to work is a disease or disorder that occurs due to the inhalation of dangerous particles, mists, vapors or gases while someone is working. UD. Surabaya is an informal garment industry making apparel in the city of Jember which has several processes including cutting, sewing, and finishing. As many as 5 out of 10 workers who were randomly interviewed said that they experienced respiratory problems such as shortness of time at work, and 3 workers suffered from symptoms of lung function disorders after 10 years of work. The aim of research was to analyze symptoms of impaired lung function on garment workers at UD. Surabaya Jember District. The data used in this research were primary data which have been collected from questionnaire to 108 worker respondents. The analysis instrument was technique of regression of weight through AMOS software. The result of instrument testing concluded that all variables were valid and reliable as the instruments of data collection. The result of data analysis referred that: 1) the individual characteristics have positive effect to the symptoms of impaired lung function, 2) the amount of exposure contact have positive effect to the symptoms of impaired lung function on garment workers, 3) the indicators of individual characteristic which affected to the symptoms of impaired lung functions were smoking habit and nutritional status, and 4) the indicators of exposure contact amount which affected to the symptoms of impaired lung function were length of exposure and year of service. As a discussion, The longer the working period, the longer the worker is exposed to dust. The more exposure to dust that accumulates in the lungs which will later affect the capacity of lung function. A clinical manifestation disorder of decreased respiratory function will begin to appear and become permanent after exposure to dust between 10 years of work then one of the factors that can accelerate the decline in lung function is smoking. The results of this study indicate that individual characteristics and the number of exposure contacts have a positive effect on symptoms of impaired lung function, so it is necessary to conduct an evaluation regarding the risks experienced by workers. As a conclusion the symptom of impaired lung function on workers was caused by several factors as individual characteristic and amount of exposure contact.

Keywords: Impaired Lung Function, Exposure Contact, Individual Characteristic, Amount of Exposure Contact

Introduction

The industrial development in Indonesia is lately grown rapidly along with the increase of working population number in either formal or informal sector. The informal sector has a great role in developing countries, as Indonesia (1). The success of industry must be supported by an occupational health which can overcome many kinds of disease problem that are caused by occupational aspect, which aims to increase the work welfare and productivity. This consideration is in line with the Law of Occupational Health and Safety

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1st in 1970 and it has been approved by the Law 26th in 2009 about occupational health, 164-165th article which have asserted that all workplaces must implement a good occupational health in either formal or informal sector. The worker will be at a high risk of many kinds of health problem which caused by work process, work environment, and work behavior, then it is potential to rise any occupational diseases or work-related disease. The occupational disease is a kind of disease caused by the worker’s occupation or work environment. The less health work environment which is often filled with dust, steam, gas, chemicals, and other can cause productivity inconvenience or distraction and also interrupt the system of respiratory as symptom of impaired lung function (2).

There are several researches which relate to the issue of occupational disease, is related to health problem and risk factor that occur to garment workers which shows the result that the respiratory disorder is most disease which occurs with percentage about 31,3%, it is caused by neglected fiber, excessive inhalation of dust particle number which makes the workers to be more prone over lung disease(3). The symptoms contain phlegmy cough with the most prevalent symptom about 17,1%, followed by cough 15,8%, asphyxia 11,6%, and wheezing 7,8%

The majority of workers, 66,7%-76,9% have complained for phlegmy cough along four days or more. Based on the above description, the purpose of this study was to analyze the symptoms of pulmonary function disorders and the factors that affect garment workers. UD. surabaya Jember region

### Methods

This research was included into quantitative research, while the research design was analytic survey which referred to a type of research which was done without doing any intervention to the subject or non-experimental research which aimed to explain a condition or situation through cross-sectional design, which the independent variable and dependent variables that occurred on basic research object would be measured and collected on the same time. The location of research was at UD. Surabaya Rambipuji Sub-district, Jember District. The population of research were all garment workers with total sample of 108 respondents. Moreover, this research exerted primary data that were derived from the respondents who filled questionnaires that have been spread by the researchers. This research used regression of weight technique and AMOS software to analyze the data, it was aimed to examine how great the effect of two independent variable to the dependent one if it was due to the determinent coefficient value or estimate value.

### Research Findings

The impaired lung function often indicated many kinds of symptom, the lung disease which caused by work was obviously the main cause of incapability, disability, lose, workday and death on the workers. The description of impaired lung function symptoms which suffered by the workers at UD. Surabaya Jember District would be presented below:

<table>
<thead>
<tr>
<th>No</th>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Productive Age (17-47)</td>
<td>100</td>
<td>92,6</td>
</tr>
<tr>
<td></td>
<td>Unproductive Age (&lt;17 &amp;&gt;47)</td>
<td>8</td>
<td>7,4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>47</td>
<td>43,5</td>
</tr>
<tr>
<td></td>
<td>Woman</td>
<td>61</td>
<td>56,5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
</tbody>
</table>
Based on the table 1, the majority of garment workers at UD. Surabaya were in productive age (17-47 years old) as many as 100 workers with percentage of 92.6%, gender of woman/female as many as 66 workers with percentage of 63.0%, have no smoking habit as many as 68 workers with percentage of 61.1%, and malnutrition status as many as 63 workers with percentage of 58.3%.

**Table 2: Distribution of Exposure Contact Amount on UD. Surabaya’s Workers**

<table>
<thead>
<tr>
<th>No</th>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length of Exposure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Less than 8 Hours</td>
<td>12</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>More than 8 Hours</td>
<td>96</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Year of Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Less than 5 Years</td>
<td>25</td>
<td>23.1</td>
</tr>
<tr>
<td></td>
<td>More than 5 Years</td>
<td>83</td>
<td>76.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on the table 2, it showed that the majority of workers at UD. Surabaya have contact of exposure in more than 8 hours and most of them have year of service along 5 years.

**Table 3: Frequency Distribution of Impaired Lung Function Symptoms on UD. Surabaya’s Garment Workers**

<table>
<thead>
<tr>
<th>No</th>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cough</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>No</td>
<td>53</td>
<td>49.1</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>55</td>
<td>50.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
</tr>
</tbody>
</table>
Based on the table 3, the most dominant symptom felt by garment workers at UD. Surabaya was asphyxia in approximately 72 workers with percentage of 66.7%.

<table>
<thead>
<tr>
<th></th>
<th>Phlegmy</th>
<th></th>
<th>Phlegmy Cough</th>
<th></th>
<th>Asphyxia</th>
<th></th>
<th>Record of Chest Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>No</td>
<td>69</td>
<td>63,9</td>
<td>No</td>
<td>89</td>
<td>82,4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>39</td>
<td>36,1</td>
<td>Yes</td>
<td>19</td>
<td>17,6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>36</td>
<td>33,3</td>
<td>No</td>
<td>72</td>
<td>66,7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>72</td>
<td></td>
<td>Yes</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>103</td>
<td>95,4</td>
<td>No</td>
<td>103</td>
<td>95,4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>4,6</td>
<td>Yes</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td>Total</td>
<td>108</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1 Analysis Using AMOS 23**
<table>
<thead>
<tr>
<th>No.</th>
<th>Variabel</th>
<th>Koefisien R Square</th>
<th>Koefisien exp β</th>
<th>Signifikansi α</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unstandardized Regression Weight</td>
<td>Standardized Regression Weight</td>
<td>P-Value</td>
</tr>
<tr>
<td>1.</td>
<td>KI à GFP</td>
<td>0,019</td>
<td>0,015</td>
<td>0,913</td>
</tr>
<tr>
<td>2.</td>
<td>JKP \ GFP</td>
<td>1,189</td>
<td>1,084</td>
<td>***</td>
</tr>
</tbody>
</table>

NB: *** : The probability of getting a critical ratio as large as 4.166 in absolute value is less than 0.001. In other words, the regression weight for JKP in the prediction of GFP is significantly different from zero at the 0.001 level (two-tailed).

**Discussion**

There were a number of factors that affected the symptoms of impaired lung function, one of them was symptom of impaired lung function because of dust and chemicals factor. The indoor air pollution was harmful for the workers’ health. The other factors which affected the symptom of impaired lung function were individual characteristic and exposure contact [5]. A factor that was able to speed the decline of lung function was smoking habit. The smoking habit affected to rise impairment on lung function. The individual who were smoking for more than 10 years and got used to smoke with the amount of 1-10 cigarette stick per day would tend to suffer degradation of lung function [6]. Epidemiologically, the nutritional status and food intake which were related to individual need of energy would related to anatomical growth and body physiology, particularly for respiratory tract, which then affected the muscle mass strength to pump oxygen maximally to whole body, control respiratory rate, and form immunology mechanism within the body as a prevention of other lung disease attacks [7]. The gender also determined different lung capacity. The lung volume and capacity on woman was approximately 20-25% smaller than on man. The average of lung vital capacity on adult man was approximately 4,8 liter and on adult woman was approximately 3,1 liter [8].

A damage that caused by dust factor was the consequence of exposure length or contact with dust [9]. The majority of workers who have complaint of impaired lung function were the workers who have exposure length in more than 8 hours. The longer the workers worked in that workplace, it would enable the workers to get the longer exposure time than the workers who worked for relatively shorter exposure time. There was a relation found between year of service and lung function disorder. The workers who had year of service for more than 5 years would have risk 13,5 times bigger to suffer lung function impairment than those who worked for less than 5 years of service [10].

The figure 1 illustrated that the path coefficient value could affect the individual to get symptoms of impaired lung function in approximately 0,07 (positive). Thus, it could be summed up that H1 was approved with a statement that the individual characteristic could deliver positive effect to the symptom of lung function disorder on garment workers at UD. Surabaya Jember District. Next, the figure 4.1 also showed that the path coefficient value could affect the amount of exposure contact to cause symptom of impaired lung function in approximately 0,15 (positive). In short, it was concluded that H1 was approved with a statement that the amount of exposure contact could have positive effect to cause symptom of impaired lung function on garment workers at UD. Surabaya Jember. Furthermore, the indicators of individual characteristic which affected to the symptom of lung function disorder were smoking habit and nutritional status. While, the indicators of exposure contact amount which affected to the symptom of lung function disorder were exposure time and year of service.

The results of this study indicate that individual characteristics and the number of exposure contacts have a positive effect on symptoms of impaired lung function, so it is necessary to conduct an evaluation regarding the risks experienced by workers. It is necessary to take
measures to reduce the risk of exposure by preparing personal protective equipment for workers.

**Conclusion**

The symptom of impaired lung function on workers was caused by several factors as individual characteristic and amount of exposure contact. The most influential variable which affected to the symptom of impaired lung function on workers was the amount of exposure contact.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** This research has undergone an ethical test in ethics commission of health research of Dentistry Faculty, Jember University with this following registration number 852/UN25.8/KEPK/DL/20120.

**References**


The Effectiveness of Relapse Prevention Intervention on the Ability of Patients and Their Families to Prevent Psychotic symptoms of Relapse among Patients with Schizophrenia: Systematic Literature Review

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Abstract

Background: Most patients with schizophrenia have family support. The role of a family as a care partner has the capability of expanding the patient’s recovery and solving the family’s need for awareness, encouragement, and improves skills. Objective: Assessing the effectiveness of relapse prevention intervention on the ability of patients and their families that are reported to prevent psychotic symptoms of relapse among patients with schizophrenia. Method: A systematic review was conducted following Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines for the studies published between 2010 and 2020. Results: Twelve retrieved studies were shown the relapse prevention intervention increases the ability of patients and their families to minimize and prevent psychotic symptoms. The relapse prevention interventions in this review including; optimal case management, multifamily group psycho-education, integrated psychological intervention, psychosocial treatment, Information Technology Aided Schizophrenia Relapse Prevention, family-focused therapy, and Family psycho-education programs. Conclusion: Various relapse prevention interventions have been reported to reduce the risk of relapse rate, prevent psychotic symptoms, and sustain remission by incorporating and emphasize the importance of effective cooperation families with patients with psychotic relapse.

Keywords: Early warning sign, family intervention, psychosocial intervention, psychotic relapse, relapse prevention intervention, and schizophrenia.

Introduction

Schizophrenia affects 20 million people worldwide and is a chronic and severe mental disorder¹. It is one of the most common and troubling signs of mental illness that leads to psychosocial difficulties that are destructive in life, as well as a major burden on patients, families, social, and clinical is correlated with psychotic relapse outcomes ²-³. Schizophrenia is a mental illness that involves, first of all, positive signs like; delusions, interruption of the thinking process, and hallucinations. Secondly, negative symptoms like; diminished emotional expression, social relationship problems, and motor weakness. Last, cognitive symptoms like; misunderstanding, memory loss, impaired judgment⁴.

Psychotic relapse is a reoccurrence episode and devastating consequences in schizophrenia patients, including worsening symptoms and decreased quality of life ⁵. Furthermore, there is always a span of 1-4 weeks with signs of early warnings that precede relapse ⁶. Therefore, appropriate steps to promote early intervention should be taken when early warning signs (prodromal symptoms) of psychosis occur and are reported ⁷. Consequently, relapse prevention intervention is a strategy to minimize the risk and intensity of relapse following the cessation or decrease of problematic habits.

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and is a step towards sustained healing and remission; one of the most important measures to be taken to ensure that a client lives a stable recovery life.

In Jordan, most studies are focusing on general sociocultural factors while addressing mental health rather than interventional ones. Unfortunately, the very few studies examined effectiveness of CBT has focused on university students and abused women. While studies examined relapse in general focused on individuals with substance use problems. Moreover, patients with schizophrenia have been addressed from general perspective such quality of life. However, investigating relapse intervention have not been addressed before in Jordan and neighboring countries. Therefore, relapse prevention intervention need to be investigated for its promising benefits.

**Objective**

The aim of this review was to assess the effectiveness of relapse prevention intervention on the ability of patients and their families to prevent psychotic symptoms of relapse among patients with schizophrenia.

**Methods**

**Searching Strategy**

The literature searching period covered published papers from 2010 until 2020. The search of the appropriate databases was carried out to evaluate the current evidence for the proposed research aims of this study. In order to begin a literature search, it was important to suggest definitive search terms to support the overall literature search limit. The terms used included: *relapse prevention intervention, psychotic relapse, schizophrenia, psychosocial intervention, early warning sign (prodromal symptoms), and family intervention.*

**Information Sources**

An extensive and comprehensive review of the literature by conducted a various database that has been actively used including; Medline, EBSCO, PubMed, Google Scholar, and Wiley Online Library databases, CINAHL Plus, and ProQuest databases.

**Eligibility criteria**

The requirements for inclusion were: 1) English language publications; 2) the studies that were reviewed focused on relapse prevention intervention that prevent psychotic symptoms of relapse; 3) design of the study, qualitative, quantitative, and mixed methods; 4) published between 2010 - 2020. The articles were excluded if they were: (1) publication are reviews, editorials, letters, and reports; (2) not relevant to the terminology and understanding of relapse prevention intervention; (3) studies that had been published in different languages other than English; (4) studies published prior to the year 2010. In order to exclude the redundant and duplicated articles, filtration was performed on all articles.

**Study selection**

Initially, the combination of these keywords, as mentioned above was searched using the electronic databases selected. The following results were produced by this search: relapse prevention intervention (173 records), psychotic relapse (109 records), schizophrenia (30,680 records), psychosocial intervention (4,704 records), early warning sign (prodromal symptoms) (1,934 records), and family intervention (7,643). Then, 49 articles came back looking for the combination of these keywords using the same electronic databases as well as additional records identified through other sources are (n= 17) articles. then removing duplicates resulted in (n=14) articles. After that, Records excluded; Title or abstract indicated that the study is irrelevant to relapse prevention intervention on the ability of patients and their families to prevent psychotic symptoms of relapse, or not written in English, or not within specified timeframe (n = 16) of articles. only, after full-text articles excluded; were not eligible according to eligibility criteria: the papers were not research (publications are reviews, editorials, letters, and reports), or did not address nursing interventions (n = 24). Finally, the total articles included in this study (n=12) of article.

**Data collection process**

All team members revised every article to recognize the relevant points. Discussions between team members have overcome the discrepancy about the eligibility of
studies. The researchers discussed their findings and patterns, and inferences were identified from those trends.

**Data items**

The researchers conducted an in-depth evaluation of the findings of the included study that were outlined in a review matrix.

**Risk of bias in individual studies**

The researchers analyzed the probability of bias separately in all studies. Using the Critical Appraisal Skills Programme (CASP) Qualitative Research Checklist was evaluated\(^{17}\). While the quantitative studies were evaluated using the Quality Evaluation Tool (QAT) checklist derived from the Successful Public Health Practice Project (EPHPP)\(^{18}\).

**Synthesis of Results**

Reviewers completed the synthesized and analyzed data; any gaps between them were set by consensus. Synthesis of the evidence was made, including continuity of findings and key findings, in addition to tables, across studies.

**Result**

**Study Characteristics**

The 12 articles reviewed for this study were published between 2011 and 2019. All of them include relapse prevention intervention method (strategies) on the ability of patients and their families to prevent psychotic symptoms of relapse among patients with schizophrenia. 11 of 12 articles were quantitative studies and the only one article is a qualitative study. The majority of the studies were published in 2011, 2013, 2014, 2015, and 2016 with a percent of (2/12, 15.66%), two articles for each year, and there was just one article was published in 2012, and 2019 with a percent of (1/12, 8.3%) for each year. A summary of studies characteristics is shown in *table 1*. Show the number of sample size, study design, and country of study with percentage.

**Table 1: Characteristics of the study included in the review (N = 12)**

<table>
<thead>
<tr>
<th>Sample size</th>
<th>N (%)</th>
<th>References (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>3 (25%)</td>
<td>Breitborde et al., 2011; Komatsu et al., 2013; Eisner et al., 2014</td>
</tr>
<tr>
<td>50-200</td>
<td>5 (41.7%)</td>
<td>Sungur et al., 2011; Bechdolf et al., 2012; Weisman de Mamani et al., 2014; Mayoral et al., 2015; Marvin et al., 2016</td>
</tr>
<tr>
<td>200-400</td>
<td>3 (25%)</td>
<td>Gleeson et al., 2013; Ran et al., 2015; Fikreyesus et al., 2016</td>
</tr>
<tr>
<td>≥ 400</td>
<td>1 (8.3%)</td>
<td>Niksalehi et al., 2019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study design</th>
<th>N (%)</th>
<th>References (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative (RCT design)</td>
<td>9 (75%)</td>
<td>Sungur et al., 2011; Breitborde et al., 2011; Bechdolf et al., 2012; Gleeson et al., 2013; Komatsu et al., 2013; Weisman de Mamani et al., 2014; Mayoral et al., 2015; Ran et al., 2015; Marvin et al., 2016</td>
</tr>
<tr>
<td>Quantitative (quasi-experimental design)</td>
<td>1 (8.33%)</td>
<td>Niksalehi et al., 2019</td>
</tr>
<tr>
<td>Quantitative (a cross-sectional study)</td>
<td>1 (8.33%)</td>
<td>Fikreyesus et al., 2016</td>
</tr>
</tbody>
</table>
Qualitative (A thematic approach in-depth interviews) 1 (8.33%) Eisner et al., 2014

<table>
<thead>
<tr>
<th>Country</th>
<th>1 (8.33%)</th>
<th>Sungur et al., 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>3 (25%)</td>
<td>Breitborde et al., 2011; Weisman de Mamani et al., 2014; Marvin et al., 2016</td>
</tr>
<tr>
<td>UK</td>
<td>1(8.33%)</td>
<td>Eisner et al., 2014</td>
</tr>
<tr>
<td>German</td>
<td>1 (8.33%)</td>
<td>Bechdolf et al., 2012</td>
</tr>
<tr>
<td>Australia</td>
<td>1 (8.33%)</td>
<td>Gleeson et al., 2013</td>
</tr>
<tr>
<td>Japan</td>
<td>1(8.33%)</td>
<td>Komatsu et al., 2013</td>
</tr>
<tr>
<td>Spain</td>
<td>1(8.33%)</td>
<td>Mayoral et al., 2015</td>
</tr>
<tr>
<td>Chinese</td>
<td>1(8.33%)</td>
<td>Ran et al., 2015</td>
</tr>
<tr>
<td>Iran</td>
<td>1(8.33%)</td>
<td>Niksalehi et al., 2019</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>1(8.33%)</td>
<td>Fikreyesus et al., 2016</td>
</tr>
</tbody>
</table>

Risk of Bias within Studies

The quality of the chosen quantitative studies was evaluated by using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool. In general, study reports show 9 studies out of eleven with good enough quality ratings. Only two studies out of eleven were rated between good and fair on controlling for the selection bias. Moreover, the studies that were included in the study notify very important outcomes. In order to assess the quality of qualitative research, the Critical Appraisal Skills Program (CASP) Qualitative Research Checklist was evaluated. The research report reveals, in total, one study out of one with good quality ratings. Shown in Table 2

Table 2: Risk of Bias within Studies

<table>
<thead>
<tr>
<th>Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for quantitative studies (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of items</td>
</tr>
<tr>
<td>1. Selection Bias</td>
</tr>
<tr>
<td>2. Study Design</td>
</tr>
</tbody>
</table>
Results of Individual Studies

Identification of commonly relapse prevention intervention on ability of patients and their families to prevent psychotic symptoms of relapse.

Research validates a range of relapse prevention interventions for early psychotic symptoms. Several trials have been performed on new combination between pharmacological (medication treatment) and non-pharmacological treatments (psychosocial intervention) that are effective for people with schizophrenia, and housing facilitation supported by assisted living and supported employment are productive coping mechanisms\(^1\). The twelve reviewed studies were conducted to describe the most commonly the effectiveness of relapse prevention intervention on the ability of patients and their families to prevent psychotic symptoms of relapse among patients with schizophrenia. All of these studies targeted nurses, clinicians, patients, and their families in inpatients and outpatients’ schizophrenia.

The first study was performed at Psychiatric hospital in Ankara (turkey). For one hundred patients diagnosed with schizophrenia, it uses either routine case management (RCM) or optimal case management (OCM) randomly assigned to 24 months. During the first three months, both patients with schizophrenia and their families attended 120-minute training sessions at the patient’s home every 2 weeks; 45-minute weekly sessions were held at the outpatient setting for the rest of the 24-month study duration to support patients and their family deal with early psychotic symptoms\(^20\).

The second study was conducted at the Intervention Centers for Early Psychosis. Forty first-episode psychosis patients who enroll simultaneously in multifamily group psycho-education (MFG) and cognitive remediation may be less likely to relapse and enhance cognitive functioning\(^2\). The third study was carried out in German at the center of intervention and early detection. Integrated psychological intervention (IPI) Over a 12-month timeframe, treatments were administered to 128 outpatients, then follow-up was carried out for up to 24 months in an early initial prodromal state (EIPS) to a psychotic reduction\(^21\).

The fourth study was carried out in Australia at Prevention and intervention Centre. First-episode psychosis (FEP) programs have evaluated the efficacy of a new seven-month psychosocial therapy intended to minimize the second episode of psychosis and minimize hospital readmissions. Forty patients with first-episode psychosis were randomly chosen to receive specialist FEP care. Baseline, 7, 12, 18, 24 and 30 months follow-up patients are measured\(^22\). The fifth study was performed at four hospital institutions in Japan. The Information Technology Aided Relapse Prevention Program for Schizophrenia (ITAREPS) and control group have been randomized to 45 outpatients with schizophrenia and have been monitored for 12 months. It has been implemented as a relapse prevention program\(^23\).

Sixthly, while Focusing on psycho-educational family intervention program and family-focused therapy. Five studies emphasized the impact, efficacy, and effectiveness of these intervention programs on the ability of patients with their families to prevent and minimize psychotic relapse. The first study explored that family interventions can help schizophrenia patients by created a culturally aware, family-focused treatment.
for schizophrenia patients (CIT-S). Sixty-nine families were randomized to 15 CIT-S sessions or to a 3-session screening condition for psycho-education (PSY-ED). Conducted on Miami’s at different institution (hospital and mental health center). The second study was executed in Spain at a clinic for mental health. It is recognized to be one of the most valuable psychosocial interventions for patients with schizophrenia and family psycho-educational programs. This randomized 88 families into two categories. 12 months of psycho-educational intervention were obtained by the family intervention group and the other group sought regular routine care. follow up were performed at baseline, 12 months, and 18 months.

The third study was conducted in China. In a facility for mental wellbeing. 326 schizophrenia patients are randomized into three classes and psycho-educational family intervention is extended to schizophrenia patients to examine the 14-year influence of psycho-educational family intervention on schizophrenia patients. The fourth study was performed in a mental health facility in North America. 103 patents for positive psychosis. Families are interested in two randomized psychosocial approaches: family-focused therapy for patients at psychiatric higher possibility for psychosis (FFT-CHR) (18 sessions over 6 months) and enhancement of care (EC) (three sessions over 1 month). It is used to support family members during psycho-education to determine sources of symptoms and useful coping strategies. Similarly, the last study performed at a psychiatric hospital in Iran clarifies that family psycho-education is used as an intervention for patients with a mental illness by strengthening the awareness of the situation, risk factors, and recovery strategies for reducing relapse by the caregiver and families. 4049 participants were committed to a one-session individual family psycho-educational intervention directly after discharge.

The seventh study was done in England at a mental health clinic. A thematic approach was used in a qualitative study to analyze data from in-depth interviews with psychosis patients (20-25 participants) and to improved understand the early relapse phase, the willingness of patients and their families to recognize early signs and any possible barriers and facilitators to early sign interviewing. The final study was performed in Southwestern Ethiopia at a special hospital. Data were obtained in this cross-sectional study using an interviewer-administered questionnaire for 386 psychotic relapse patients and offering treatment, psycho-education, and psychosocial assistance to help patients improve compliance with treatment and reduce psychotic relapse.

Evaluation of the effect of used relapse prevention intervention on ability of patients and their families to prevent psychotic symptoms of relapse

Overall, the twelve studies were conducted to appraise the effectiveness of relapse prevention intervention on the ability of patients and their families to prevent psychotic symptoms of relapse among patients with schizophrenia. All of the studies showed there is a strong relationship between effective uses of relapse prevention intervention strategies and the ability of patients and their families to dealing with psychotic symptoms to prevent psychotic relapse.

First of all, the result of the study conducted by Sungur et al. showed optimal case management (OCM) is statistically and clinically significant benefits. as well as OCM is focusing and helping patients and their families by training theme different relapse prevention intervention strategies to relieve stress that is lead to psychotic relapse such as social skills, work support, cognitive-behavioral interventions for psychotic symptoms, and anger control. Secondly, Breitborde et al revealed two key findings; patients with first-episode psychosis and their families can be hired to participate, and the main outcome of this research is a relief relapse of psychotic symptoms. The secondary results for enhancing the capacity of psychotic patients and their families to understand and cope with psychotic symptoms. Thirdly, a study undertaken by Bechdolf et al assures that at 12, 24-month follow-up, integrated psychological intervention was better to supportive treatment in preventing psychosis relapse and finding patients to be safe, well-accepted, and tolerated.

Fourthly, a study revealed by Gleeson et al showed that the relapse rate in the treatment state was significantly lower at 12-month follow-up relative to
advanced treatment alone. The reported relapse rate of around 35% in excess of 2-year follow-up in specialist FEP care is beneficial compared to previously reported relapse rates of 55%-70%. Fifthly, a study held out by Komatsu et al\textsuperscript{23} ensures that ITAREPS is extremely effective. However, the efficacy was influenced by user compliance to the program protocol, the accurate efficiency and function of ITAREPS was partly unknown. For all patients and their families to identify the early warning signs, ITAREPS uses EWSQ (early warning sign questionnaires) via weekly phone calls. The willingness of patients and their families to track and stop psychotic symptoms is also effective.

Sixthly, the finding and evaluation of five studies that are focusing on psycho-educational family intervention programs and family-focused therapy. Five studies show the significant and positive effects of these intervention programs on the ability of patients with their families to prevent and minimize psychotic relapse as the following: The first study performed by Weisman de Mamani et al\textsuperscript{24} found that CIT-S at the end of treatment had significantly fewer debilitating health issues than patients referred to PSY-ED. The patient’s race and the racial match of the patient-therapist did not contribute to the success of treatment or the satisfaction of intervention. The second research conducted by Mayoral et al\textsuperscript{32} identified that the risk of hospitalization of patients undergoing family intervention was lowered by 40%. Psychotic symptoms significantly reduced at 12 months, rather than at 18 months. At 12 months and 18 months, social impairment in the family intervention group was dramatically diminished, and conformity increased by the introduction of practical role-playing and exercises on coping skills and problem-solving strategies by participants and their families.

The third study was done by Ran et al\textsuperscript{33} showed that psycho-educational family intervention can still be effectual in 14-year follow-up, particularly in adherence with therapy and patients social functioning. In addition, the family psycho-educational intervention group showed a slightly higher incidence of antipsychotic treatment and a higher workability rate than the other two groups. Marvin et al\textsuperscript{26} published the fourth study, which found that FFT-CHR concentrated more on teamwork and problem-solving skills training than EC. In addition, FFT-CHR provides a three-module module that focuses on the ability of patients and their families to cope with psychotic symptoms. The last study was carried out by Niksalehi et al\textsuperscript{27}. The results showed that family psycho-education can have a major impact on the risk of readmission and the period of hospital stay.

Seventhly, a study undertaken by Eisner et al\textsuperscript{28} guarantees that the study culminated in three major themes: firstly, recognizing relapse risk factors; secondly, early signs detection; thirdly, reacting properly to deterioration. Finally, the Fikreyesus et al\textsuperscript{29} study reported several findings: first, psychotic relapse in family patients was 72% less than in patients living alone; second, psychotic relapse in patients who comply with the treatment was 69% lower than in patients that refused to comply; third, in patients with high social support levels, the development of psychotic relapse was 48% lower than in patients without social support; last, in those who indicated religious support, the psychotic relapse was 45% lower than those in patients without religious support.

Discussion

Summary of evidence

Schizophrenia patients usually have a regular familial touch. The family should also be interested in treating and caring for their patient as much as possible, so it can acknowledge the rehabilitation of that patient and meet the need of the family to seek knowledge, care, and treatment. Thus, different relapse prevention intervention strategies emphasize the ability of the patient and their families’ interrelationship to minimize or prevent psychotic symptoms. The literature reviewed for this study apparently illustrates the extent of the work carried out in this field. Much study has highlighted the main approaches of the reciprocal intervention of preventive patients and families of psychotic relapse. However, research focused mostly on developing approaches to relapse prevention. Efforts also propose and test the policy efficacy and effect of those interventions on the well-being of psychotic patients to prevent psychotic symptoms.
The study has shown the benefits of psychosocial therapy by preparing patients and families with various psychosocial intervention methods in both clinical and societal aspects. The other study proves the Cognitive remediation capability to reduce such psychotic symptomatic and reduce the number of deficits that combined with health benefits to the Multi-family psycho-education group (MFG). A further study revealed the Efficient preparation of patients and their families to utilize and cope with Integrated Psychological Intervention (IPI) and incorporation of patients with the other intervention strategies such as cognitive-behavioral intervention, and cognitive remediation, multifamily psycho-education, and group skills training, lead to reduction the early prodromal psychotic state (EIPS). One Study has shown that the second episode of psychosis can be stopped with new psycho-social therapy for seven months. Together, this research will change the handling of and prevention of psychotic relapses, with emphasis on both patients and their families. However, relapse rates were lower and incidence was delayed at the completion of treatment (7 months) and 12 months with the RPT group contrast with the traditional treatment. However, at 18, 24, and 30 months, these disparities were not sustained. In addition, one study focusing on integrated the technology with relapse prevention by creat ITAREPS as a relapse prevention program. The effectiveness of ITAREPS for the prevention of relapses was high and we reported that ITAREPS is a successful tool during the early stages of relapses through the identification of symptoms of relapse and the increase of dosage during the warning state by using EWSQ (early warning sign questionnaires) through phone calls weekly for both patients and their families to detect the early warning signs. thus, the ability of patients and their families to monitor and prevent psychotic symptom is effective.

Over a third of the studies (n=5, 42 %) reported that improving outcomes including lower risk of relapse, and decreased severity of symptoms as well as improved medication compliance, is a consequence of the efficacy and effectiveness of family intervention programs. Moreover, family-focused intervention and culturally awareness aspects have moderately high and significant beneficial impacts on psychotic symptoms. Furthermore, applying constructive role-playing and activities to coping skills and problem-solving strategies by both patients and their families decreases hospitalization complications and increases the social functioning and condition of mental health for Schizophrenic patients. In addition, motivation for improved medication adherence is a highly important aim for a psycho-educational family intervention in environments where family members have actively engaged in patient care, suggesting a link between the risk of relapse and non-adherence. As well, family-focused therapy for patients at clinical high risk for relapse including three-module; all of these modules focusing the ability of patients and their families to deal with psychotic symptoms. Thus, family education will strengthen their effective interactions with patients, but it can also be seen as one of the biggest obstacles in the implementation of preparatory service for severe disease patients and has to be managed and evaluated in a continuous phase.

As the qualitative study found during a deep, participants spoke very reflectively about their experiences before a relapse. Pre-relapse symptoms, the degree to which they could recall them and their answers to them is significantly different from those of the main participants. A successful supporting source was therefore an allocated family or friend, although it was not always possible to support important others. The last study found that patient-family relationships, religious support, high level of social support, and drug adherence were independently related to a decreased risk of psychotic relapse.

Implications for future practice, policy, and research

The results of this review highlight the importance of reporting the ability of the patients and their families to minimize and preventing psychotic relapse by using different relapse prevention intervention approaches. Various relapse prevention intervention approaches are recommended in clinical practice for psychotic patients. This would help clinicians, nurses, and families to practice effectively to reduce the relapse rate among patients suffering from schizophrenia. So that,
these recommendations and needs pull the clinician and psychiatric nurse to do massive comprehensive researches to offering preliminary evidence that supports practice about the implementation of relapse prevention intervention and affect future research.

Conclusions

Many patients diagnosed with schizophrenia have family support. The role of the family as partners in treatment has the ability to increase the recovery of the patient and resolve the need for awareness, help, and improved expertise of the family for its care. In this sense, there is clear proof that patients and their families benefit from involvement in reciprocal preventive programs. This review gives an overview of relapse prevention intervention approaches to reduce the readmission rate, prevent psychotic symptoms, and sustain remission by incorporating families to support patients with psychotic relapse. Our review revealed that many strategies based on evidence indicate the significance of family intervention in therapy and emphasize the importance of effective cooperation with patients. Moreover, the outcomes have been impacted by improved treatment strategies over the last decade, including different approaches of relapse prevention intervention such as more effective psychosocial approaches, family-focused therapy, and family psycho-education therapy that have been developed to help patients and their families to prevent psychotic symptoms. Therefore, the relapse prevention interventions help to improve awareness and commitment to schizophrenia patients’ care by families. On the other hand, relapse prevention interventions are not commonly available and it is a vital but not enough step to take learning practitioners to this technique. It is becoming increasingly evident that structural and multilevel approaches to transform practice with a strong focus on corporate help are required. Future innovations to strengthen family engagement in the implementation of care include studies to improve families’ engagement, including through less costly approaches and improved awareness of how and to whom relapse prevention offers benefits.

Ethical Statement: Ethical permissions were not necessary

Funding statement: No particular grant has been given to this research by any public, private or non-profit funding organization.

Conflict of Interest Statement: No conflicts of interest.

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Correlation between HS-CRP in Serum with Neurological Deficit Measured by NIHSS in Acute Ischemic Stroke

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Abstract

Background: CRP can increase the regulation of adhesion receptors on endothelial cells which can lead to infiltration of neutrophil and monocyte cells to endothelial cells. This causes endothelial cell damage and blood brain barrier dysfunction eventually leading to brain cell death. This brain cell death will result in impaired brain function and affect the severity of the stroke. The problem that arises is whether there is a correlation between CRP levels in serum and the severity of acute ischemic stroke as measured by NIHSS.

Method: Sixty patients with acute thrombotic stroke who were treated at the neurology ward of Dr.Soetomo General Hospital (a Teaching Hospital of Faculty of Medicine, Universitas Airlangga) during June-September 2019 had serum levels of CRP measured with sandwich ELISA method using high sensitivity CRP (hs-CRP) and neurological deficit was assessed using the NIHSS.

Result: Mean age of subjects was 57.45±8.89 years. The study subjects consisted of 37 male and 23 female. The median serum levels of hs-CRP is 0.4 mg/dL with a range of 0.1-15.1 mg/dL. Median NIHSS is 5 with a range of 2-15. There is a positive correlation with moderate correlation strength between serum levels of hs-CRP and the NIHSS value in patients with acute thrombotic stroke and statistically significant (p=0.000, r=0.454).

Conclusion: There is a moderate positive correlation between serum levels of hs-CRP and neurological deficit measured by NIHSS.

Keywords: CRP, hs-CRP, NIHSS, acute ischemic stroke.

Introduction

Stroke is a condition resulting from impaired blood flow to the brain characterized by a focal or global neurological deficit that occurs more than 24 hours or dies before 24 hours with other causes excluded.1

Currently, stroke is the second leading cause of death worldwide. In the first 1 year after stroke, about 20% of sufferers die. Stroke also causes the highest disability in the world. Stroke is the leading cause of serious long-term disability.2 Stroke is a disease of critical public health with serious economic and social consequences.3

The number of ischemic stroke patients is more than the haemorrhagic stroke. In western countries, the number of ischemic stroke sufferers is around 80-85% of all stroke sufferers. Ischemic stroke is caused by a decrease in cerebral blood flow which results in brain cell death and dysfunction.4

Ischemia in the brain activates microglia releasing proinflammatory products such as IL-1β, IL-6 and TNF-α. Several other inflammatory mediators such as
lymphocytes and leukocytes also rise in acute ischemic stroke. These proinflammatory cytokines can induce hepatocyte and neuronal cells to synthesize CRP.\textsuperscript{8,9}

CRP increases the regulation of adhesion receptors on endothelial cells. The two main adhesion receptors, namely ICAM-1 and VCAM-1, cause infiltration of neutrophil and monocyte cells to endothelial cells.\textsuperscript{9,10} This causes endothelial cell damage and blood brain barrier dysfunction resulting in vasogenic oedema and ultimately leading to brain cell death.\textsuperscript{6} This brain cell death will result in impaired brain function and affect the severity of the stroke.

The problem that arises is whether there is a correlation between CRP levels in serum and the severity of acute ischemic stroke as measured by NIHSS.

**Method**

This research is an analytical study with a cross sectional design. Inclusion criteria included: onset <72 hours, first stroke of attack, NIHSS score 5-15 and willingness to attend the study (signed informed consent). Exclusion criteria included: Infection on admission, acute heart disease, history of malignancy, and liver disease (hepatic failure). Based on the formula for calculating the sample size of the correlation research, the minimum sample size is 60 people.

All study subjects underwent the same clinical and laboratory examinations. The serum levels of hs-CRP measured with sandwich ELISA method using HS (High Sensitivity) CRP. The normality of the data distribution was checked by the Kolmogorov Smirnov test. The Spearman statistical test was used to determine the correlation between the two variables with an abnormal distribution.

**Results**

This study involved a total sample of 60 acute thrombotic ischemic stroke patients who came to the emergency department of Dr.Soetomo who met the inclusion criteria and did not meet the exclusion criteria. General characteristics and laboratory tests are shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1 General Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Onset of attack (hours)</td>
</tr>
</tbody>
</table>

Serum hs-CRP levels in study subjects

The median value of serum hs-CRP levels in the study subjects was 0.4 mg / dL with a range of 0.1-15.1. This data can be seen in table 2.

<table>
<thead>
<tr>
<th>Table 2 Median serum hs-CRP levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>hs-CRP</td>
</tr>
</tbody>
</table>
The results of the NIHSS examination on research subjects

The results of the NIHSS examination carried out when the research subjects had their blood samples taken at the Dr. Soetomo Hospital showed the median NIHSS value was 5 with a range of 2-15, this data can be seen in table 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIHSS</td>
<td>5</td>
<td>2–15</td>
</tr>
</tbody>
</table>

**Table 3 Average NIHSS values**

CORRELATION BETWEEN Hs-CRP SERUM LEVELS WITH NIHSS VALUE

There was a positive correlation with moderate correlation strength between the hs-CRP level and the NIHSS value and statistically significant with \( p<0.05 \) and a correlation coefficient of 0.454. This can be seen in table 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation coefficient</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>hs-CRP levels vs NIHSS value</td>
<td>0.454</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Table 5.5 Correlation between the hs-CRP level and the NIHSS value**

**Discussion**

The research design was cross sectional. The selection of consecutive sampling as a method for selecting research subjects because this method is the best and easy non-probability sampling method.11

For approximately 3 months of the study, it was found that 60 subjects met the research criteria. Of the 60 subjects, 37 subjects (61.7%) were male and 23 subjects (36.3%) were female. This study shows that male experience more acute thrombotic strokes than female. It is in accordance with stroke epidemiological data that male experience more strokes than female.12 Another literature study states that the percentage of thrombotic strokes in female in India and Southeast Asia is 33% to 36%.13

Of the 60 samples, the mean age of the patients was 57.45 ± 8.89 years (table 1). In accordance with stroke epidemiological data, stroke affects many patients over 50 years of age.14 This is consistent with data from other studies that show stroke cases increase at over 55 years of age.15

The baseline data that has been collected are then tested for normality first with the Kolmogorov-Smirnov test (KS test). This test aims to determine the distribution of normal or abnormal data. Analysis using the KS test, it was found that the distribution of the research data was not normal. Therefore, the analysis to determine the correlation between CRP levels and NIHSS levels in acute ischemic stroke was performed using Spearman’s correlation analysis.

It was seen that there was a positive correlation with moderate correlation strength of 0.454 between serum CRP levels and NIHSS values in acute ischemic stroke patients, which was statistically significant (\( p<0.05 \)). This means that the higher the serum CRP level, the greater the NIHSS value.

The results of this study are supported by other research which states that the increase in CRP in the serum fluid of patients in acute stroke has a worse prognosis measured by the BI modification (Barthel Index).16 In addition, there are other studies that show a correlation between CRP and stroke outcome using the SSS (Scandinavian stroke scale) in acute ischemic stroke.17 Other studies have also shown that an increase in Crp is associated with stroke severity as measured by the Modified Rankin Scale (MRS) scale.18

**Conclusions and Suggestions**

There was a positive correlation with a correlation coefficient (\( r=0.454 \)) between CRP in serum and functional output as measured by NIHSS in acute ischemic stroke which was statistically significant (\( p<0.05 \)). Further research needs to be done, namely measuring CRP levels with the NIHSS 7 and 30 days after stroke. So that it can be seen the long-term neurologic outcome rate and with a larger sample size so as to provide more representative results.
Ethical Clearance: This study received an ethical test from Dr. Soetomo General Hospital

Source of Funding: This research was carried out through individual funding.

Conflict of Interest: There was no conflict of Interest from this study

References


Prevalence of Thyroid Defects in Diyala, Iraq

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Abstract

Thyroid disorders are associated with the abnormalities occur in thyroid hormone concentration and imbalance in their regulation may causes life threatening diseases. Thus, the present study was planned to establish the prevalence of thyroid defects in Diyala, Iraq due to paucity of information is available in our region. Total 67 subjects in the age range of 20-80 years were recruited in Al - Shafa hospital, Diyala, Iraq, suffering from thyroid disorders or suspected with the symptoms favoring thyroid diseases. Thyroid function test and physical examination were performed. Those who were found alteration in thyroid hormones and presence of nodules, further investigation like FNAC of neck was performed for the diagnosis. Once confirmation of thyroid defect, total thyroidectomy was performed as a first line of treatment and malignancy was confirmed using histopathology analysis. The incidence of thyroid diseases in female (86.57%) was found to be more than male (13.43%) and there ratio was 19.3:3. The thyroid defects incident rate was highest in mean 49 years age. Almost 61.2% patients were found affected by thyroid disorders in this age group. The largest number of patients (64.18%) had shown MNG, then other thyroid defects out of which 4 female patients presented very big thyroid multinodular goiter (MNG). Among 43 MNG patients, 86% patients were female and 4% were male. Of the 67 cytologically diagnosed cases, 79.10% cases were found benign cases which are highest among all other types, out of which 91% cases were female. Among the thyroid disorder burden of thyroid carcinoma is very high and common in the enrolled patients in Diyala, further longitudinal studies are required to explore the prognosis and causes of these thyroid defects in the Iraq.

Keywords: Prevalence, thyroid defects, thyroid stimulating hormone, carcinoma

Introduction

Thyroid diseases also called as endocrine disorders which are common worldwide. Thyroid is a butterfly shaped, small hormone secreting gland weighing approximately 20-25 gms\(^1,2\). This gland is situated near throat and regulates body metabolism. Thyroid follicles mainly synthesize and secretes about 93% of thyroxine (T4) and 7% of Triiodothyronine (T3) hormones\(^3,4\). While pituitary glands of the brain produce the thyroid stimulating hormone which is another important hormone and play crucial role in stimulation of thyroid to synthesize and release T3 and T4 into the bloodstream\(^2,5\).

Various thyroidal disorders are associated with the abnormalities occur in thyroid hormone concentration and imbalance in their regulation causes range of disorders from small goiter to life threatening diseases\(^3,6\). As these hormones play vital role in control of metabolism, growth, menstrual cycles, muscle strength, functioning of vital organs\(^7\). Overall, they play major role in human life essentially for the development, function of almost all human tissues and regulation of metabolism\(^8,9\).

Thyroid disorders are mainly caused by having deficiency in iodine. Abnormality in thyroid function and enlargement of the thyroid gland are the major features seen in these disorders\(^10\). These defects were mostly in the form of lesions which are in the form of inflammatory at origin, congenital malformations, endocrinal, benign and malignant in type\(^11\). Underactive thyroid symptoms are same in both genders, fatigue, weight gain, depression, weakness and elevated cholesterol levels\(^12\). Over secretion and under secretion of thyroid hormones are major disorders named hyperthyroidism and hypothyroidism respectively. These situation leads to thyroid defects which has different indexes and
indications.\textsuperscript{13}

Thyroid defects were reported worldwide in over 110 countries with about 1.6 billion people are at risk as they are from iodine deficient areas. These areas are mostly developing countries like Asia, Africa and Latin America.\textsuperscript{14} Earlier studies reported that prevalence of thyroid diseases throughout the world is 25% in women and 0.6% in men.\textsuperscript{15,17} Most common found thyroid cancer is multinodular goiter and papillary carcinoma. Prevalence of the thyroid defects depends on some risk factor which includes age, sex, ethnicity, geographical factors, intake of iodine and exposure to the radiations.\textsuperscript{18,20} Fine needle aspiration biopsy (FNAC) and ultrasonography are the advance tools to diagnose the cancer in any stage. Initially ultrasonography was performed to follow progression of size of the gland. If thyroid scan shows hyperfunctioning nodules or increase in size of nodule, FNAC will be performed to confirm the malignancy.\textsuperscript{21} With advent of ease of diagnosis and convenient medical treatment it offers relative visibility to treat by physician.\textsuperscript{21,22} By highlighting the earlier prevalence of thyroid defects and to the best knowledge of author, no study has been conducted in our region to highlight prevailing data on thyroid disorders. There is paucity of the information available in our region, which have looked the incidences of thyroid disorders in patients. Thus, present study was planned to establish the prevalence of thyroid defects in Diyala, Iraq.

**Methodology**

The retrospective study was conducted with the prior permission of an ethical committee of Al - Shafa hospital, Diyala, Iraq during January 2018 to January 2020. The study includes 67 patients of both sexes aged 20 to 80 years and they were divided into 6 groups according to their age. Thyroid function tests were performed to evaluate the levels of thyroid hormones before the surgery of each patient. Patients were confirmed with the findings having swelling on the neck including nodular surface or nodules using available techniques. Total thyroidectomy was performed to as a first line of treatment.

Total thyroidectomy was performed after taking written consent for excision of lymph node. All surgeries were done under general anesthesia by using an Endo tracheal tube. Reverse tredlenberg position (head up) with the extended neck position were given to the patients. The collar incision was used. Upper and lower flaps were placed to retract instead of Joll’s retractor. This was done by using cautery (coagulation diathermy). Ligations of middle thyroid veins were done by 1 vicryl or silk followed by ligations of superior thyroid artery and veins. Inferior thyroid vessels were also ligated. During the surgery, redivac drains were used and removed after 2 to 3 days. Second generation cephalosporins antibiotics were given after surgery. Stitches were removed after 5 days. After 1 week after surgery, thyroxine was given.

**Statistical Analysis**

The data were represented as the mean. The biochemical estimation was performed in triplicate.

**Results**

This paper represents and analyses the clinicopathological data to evaluate the incidence of thyroid defects in patients (n=67, 20 to 80 years) of Diyala. Patients were recruited having neck swelling, viewing values of thyroid function test and checking all clinical findings. The incidence of thyroid diseases in female was found 86.57% and 13.43% in male patients having sex ratio of female to male 19.3:3. Incident rate of thyroid cancer was found to be highest in women than in men. The minimum age of the patient found having thyroid defect is 20 years, while maximum age in men was 60 years and in female it is 78 years. Thus, total mean age was 49 years suggesting that thyroid defects were incident highest in this age range. The maximum patients were observed in the age, ranges between 31 to 50 years. Almost 61.2% of patients were found affected by thyroid disorders and female are predominates (Table 1). In the age group 31-40 years, female to male sex ratio was found to be 6:1, while in the age group 41-50 years it was found 3:1.
Table 1. Age and sex distribution of patients (n=67) having thyroid disorders

<table>
<thead>
<tr>
<th>Age group (Years)</th>
<th>Males</th>
<th>Females</th>
<th>Total cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>0</td>
<td>13</td>
<td>13</td>
<td>19.40</td>
</tr>
<tr>
<td>31-40</td>
<td>3</td>
<td>18</td>
<td>21</td>
<td>31.34</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>15</td>
<td>20</td>
<td>29.85</td>
</tr>
<tr>
<td>51-60</td>
<td>1</td>
<td>9</td>
<td>10</td>
<td>14.93</td>
</tr>
<tr>
<td>61-70</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>71-80</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>58</td>
<td>67</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study we have come across number of clinical findings associated with thyroid disorders. Some are listed in the table 2 to get tentative discrimination of type of thyroid defects in patients. These findings were carried out the fine needle aspiration biopsy technique. Among 67 patients 9 (13.43%) cases were found having diffused goiter, 7 (0.1 %) was diagnosed with single thyroid nodules and remaining patient were detected with the MNG (Table 2). Largest number of patients (64.18%) out of total had shown MNG, then other thyroid defects out of which 4 female patients presented very big thyroid multinodular goiter. Among 43 MNG patients, 86% patients were female and 4% were male with female to male sex ratio 6.2:1.

Table 2. Clinical findings of patients (n=67) having thyroid disorders

<table>
<thead>
<tr>
<th>Clinical findings</th>
<th>Males</th>
<th>Females</th>
<th>Total cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffuse goiter</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>13.43</td>
</tr>
<tr>
<td>Single thyroid nodule</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>0.10</td>
</tr>
<tr>
<td>Multiple thyroid nodule</td>
<td>6</td>
<td>37</td>
<td>43</td>
<td>64.18</td>
</tr>
<tr>
<td>Very big thyroid MNG</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0.06</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>56</td>
<td>63</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. An exposed multinodular gland
Ten cases were identified with the PTC, 53 were detected having benign nodules and 4 cases having other findings which includes auaplastic carcinoma, and lymphocytic thyroiditis (Table 3). Of the 67 cytologically diagnosed cases, 79.10% cases were found benign cases, which is highest among all other types, out of which 91% cases were female. According to our data, prevalence of thyroid carcinoma is highest in female patients than men.
Table 3. Histopathological analysis of patients having thyroid disorders

<table>
<thead>
<tr>
<th>Histology findings</th>
<th>Males</th>
<th>Females</th>
<th>Total cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papillary thyroid carcinoma (PTC)</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>14.93</td>
</tr>
<tr>
<td>Benign</td>
<td>5</td>
<td>48</td>
<td>53</td>
<td>79.10</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>0.06</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>58</td>
<td>67</td>
<td>100</td>
</tr>
</tbody>
</table>

In most of the cases, thyroid nodules were multiple and hard in texture. The nodules were variable in size.

Discussion

Thyroid defect is a silent disease in which symptoms are understated and need critical monitoring. Nowadays, thyroid swelling is the commonest clinical findings found with 4-7% prevalence in general population. It ranks second position among females in Saudi Arab. Major cause of these disorders is abnormality in the regulation of thyroid hormones. As these hormones play major roles in metabolism, mental health as well as muscle strength. Earlier clinical survey in India, reported maximum cases of thyroid defects. About 33 lakh adults diagnosed with the abnormalities in the TSH, T3 and T4 hormones, of which 68% were found normal and 32% of enrolled population was diagnosed with different kinds of thyroid disorders which includes, hyperthyroidism, thyroid nodules, thyroiditis, goiter and even thyroid cancer.

Based on the morphology, thyroid disorders are divided into tumor and non-tumor diseases. According to literature, causes of these nodule appearances are complex and still underexplored. Neoplastic and non-neoplastic lesions were detected in the diagnosis of thyroid disorder, in order to confirm the malignancy. Majority are non-neoplastic, but malignant were also non avoidable. Simple, accurate, cost effective screening techniques like FNAC or ultrasonography are quick and reliable diagnostic methods used for rapid diagnosis of thyroid defects. Due to this first line of treatment prevalence is underscored providing potential curability. After confirmation, as a first line of treatment among different type of surgeries total thyroidectomy was preferred in case of malignancy. In this technique complete malignant part of the gland was removed to reduce recurrence rate.

Earlier studies proved that age and sex are the associated factors of thyroid defects. In the survey on the diseases in the world, thyroid disorders highlighted with the highest prevalence in which 25% in females and 0.6% in males. Many studies have proved that prevalence of thyroid diseases found highest in female than in male at the middle age. This data is in accordance with our data where more female patients were diagnosed with the thyroid defects than male count with the ratio 19.3:3. This gender disparity having high prevalence in female is may be associated with estrogen and progesterone. The study carried out in Iraq concluded that female to male ratio diagnosed with hypothyroidism was 1.6:1. Similarly, In Yemen higher incidence of thyroid cancer was detected in female than in males which is 90 and 89.7%, respectively. It was reported that age advances the incidence of thyroid disorders in both genders. In our study mean age of the patient found 49 years while maximum 60 years in male and 78 years in female. However, it was mentioned in the studies that thyroid cancer is common in older patients and having significant morbidity if not treated in early stages.

Before the surgery, we must analyses the clinical findings in which FNAC or ultrasonography was used to evaluate the thyroid gland. In our study, we have found maximum patients diagnosed with the MNG. In the swollen neck we can examine the solitary or multiple
nodules. In case of MNG, among all, one nodule is clinically dominant in terms of size and functions. It results from the drastic growth and morphological or functional transformation within the thyroid tissue. Our data is well corroborated with the earlier studies which states that MNG has highest, about 4-7% prevalence worldwide than other thyroid defects. It was stated in the earlier research that according to prevalence and malignancy, patients presenting MNG must undergo surgical process. All the enrolled patients underwent to the total thyroidectomy to get rid from the malignancy found in clinical findings. Malignancy was confirmed by observing histopathology reports in the patients. Nodules can be of non-neoplastic which includes inflammatory and hyperplastic nodules and neoplastic which includes benign and malignant. Benign nodules include adenomas, while malignant includes carcinomas (papillary and follicular). It was also reported that PTC was detected mostly in patients diagnosed with benign thyroid goiter. In the present study, PTC was diagnosed in 14.9% of patients while highest (79.10%) patients were diagnosed benign in appearance. These results support the earlier studies which states that, thyroid carcinoma has highest prevalence among the malignant diseases. Among these PTC accounts highest burden, almost 80% than others. Overall, in the study highest prevalence is observed in female patients having multiple nodules and confirmed the malignancy with the benign carcinoma after histopathology study through total thyroidectomy.

**Conclusion**

According to our study, about 86.57% women suffered with various forms of thyroid defects with mean age of 49 years. Symptoms are similar in both male and female, but prevalence was found highest in females. The high incidence of thyroid disorder was found Diyala and the risk factors like gender, age and associated malignancy. Benign and papillary carcinoma were common than the non-neoplastic lesions. Present study endorsed the early detection and prevention of these diseases at its early stage by spreading awareness of the diseases and their determinants to underscore the prevalence as well as helps to avoid complications. Further, this study recommends community-based study with larger sample size. The longitudinal studies are required to explore the prognosis and causes of these thyroid defects in the Iraq.

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**Source of Funding:** Self

**Ethical Clearance:** The research work proves in novelty of the proposed work

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Model of Criminal Case Settlement of Doctor Malpractice Based on the Value of Local Wisdom

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Abstract

Introduction: Recently, the malpractice problem in medical service has been widely talked about in the society of different groups of people, which often leads to the criminalization of doctors.

Purpose of Research: This research aims to acknowledge and analyze the formulation of malpractice criminal act regulation in the criminal law system in Indonesia and the model of criminal case settlement of doctor malpractice based on the value of local wisdom in Mojokparak village.

Research Methodology: This research was conducted in Mojokparak Village with qualitative methods and research specifications on legal pluralism.

Discussion: The criminal provisions for doctor malpractice are regulated in Article 190 of Law Number 36 Year 2009 concerning Health. Articles in the Criminal Code that are relevant to criminal liability related to medical malpractice are Articles 359, 360, and 361. Mojokparak village is dependable on Islamic values that are developed through Islamic boarding school. In this regard, the normative values of religion in the Islamic boarding school community cannot be separated from the discourse and practical movements of daily life, especially in the settlement of doctor malpractice criminal cases. The settlement of that case is done by the value of deliberation and consensus to find real justice.

Keywords: Criminal Case Settlement; Malpractice; Local Wisdom

Introduction

Recently, the malpractice problem in medical service has been widely talked about in the society of different groups of people1. This matter is shown by the number of malpractice case reports that are submitted by the people towards doctors that had been considered to disadvantage the patient while getting treatment. The increasing number of complaints proves that the public is starting to become aware of their rights in the effort to protect themselves from the actions of other parties that harm them. By using the service of lawyers, the people become more daring to sue doctors that are suspectedly committed malpractice, which often leads to the criminalization of doctors.

One of the malpractice cases is the case of malpractice by Doctor Dewa Ayu Sasiary Prawani Ayu, who was still a student in the Specialist Doctor Education Program, was convicted of causing the patient, Julia Fransiska Maketey, to die. Fellow doctor colleagues did a strike to protest the act that they called the criminalization of doctors2.

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In the Criminal Code, doctor malpractice is included in the formulation of actions that cause another person to be seriously injured or die, which is carried out accidentally as regulated in Articles 359 and 360. The death was not wished by the defendant; however, the death was the result of the defendant’s carelessness or negligence (offense culpa), for example, a driver drove too fast and hit someone to death or someone plays with a gun, due to the carelessness, it is fired and shot someone to death and so on. In the doctor malpractice, for example, a doctor with negligence wrongly cut someone’s finger, wrong blood transfusion, wrong injection, and wrong diagnosis which resulted in death. With the regulation of Law Number 36 Year 2009 concerning Health, therefore, the threat of punishment for mistakes or negligence committed by the doctor which results in the patient suffering from disabilities or injuries is no longer referring to the provisions of Articles 359, 360, and 361 of the Criminal Code, because the law concerning health has formulated its punishment.

All this time, the case of doctor malpractice has only been resolved through the mechanism of formal judicial, thus causing the law to no longer be integrated with people’s lives and no longer a complete institution. This non-compliance is sometimes demonstrated by the dissatisfaction with the legal means of resolving problems, one of them is the settlement of the criminal case that is considered unable to provide justice both for the victims and perpetrators. The settlement of criminal cases in classical theory requires legal certainty that is systematically arranged and is contained in written criminal law and penalties are retributive (punishment should fit the crime) and implemented in equal justice. In determining the type and proportion of conviction, the judge’s freedom will be limited resulting in a very rigid definite sentence system.

In the context of praxis, it can be seen that the role of the criminal settlement system is not always successful and is seen as the only legal instrument that can maintain public order and security. Moreover, criminal law instruments also inflict new problems or prolonged social conflicts and not the end of legal solutions. It is not uncommon for criminal cases such as murders to occur as a result of inter-tribal conflicts in Papua, for example, are resolved properly using a customary law approach. From the weaknesses of the classic criminal system, a new model has emerged, namely restorative justice, which is a criminal case settlement that does not only refer to the law, but is also linked to the aspects of morals, society, economy, religion, and local customs, along with other considerations. Thus, based on the concept of restorative justice, there is a possibility of settlement of the criminal case of doctor malpractice based on local wisdom. Criminal case settlement based on local wisdom is an innovation in the criminal law reform because it is closely related to restorative justice.

Indonesian people, which in this case the people of Mojokparak village, still rely on local wisdoms which is core on the cultural approach that utilizes values and local culture of the community. This matter indicates that people who live together undervalues will complete their rules with several cultured local policies. The aim is certainly to anticipate various problems caused by the relationship between individuals, individuals, and community, communities in human interaction as social beings. Therefore, it is necessary to research the criminal case settlement of doctor malpractice based on local wisdom.

Based on previous problem statements, therefore the purpose of this research is to acknowledge and analyze the formulation of malpractice criminal act regulation in the Indonesian criminal law system dan the model of criminal case settlement of doctor malpractice based on the value of local wisdom in Mojokparak village.

**Research Methodology**

This research is conducted in Mojokparak village, East Java by using a qualitative method which aims to comprehend how a community or individuals accept certain legal issues, which in this case is doctor malpractice, therefore, it is important for the researchers that use the qualitative method to ensure the quality of the research process because those researchers will interpret the data obtained. Based on the problem formulation and the research purpose, therefore the approached method used in this research is the legal pluralism approach method. This approach is used to understand law in its context, namely the context of society, and also from
the aspects of natural law (moral ethics and religion). Brian Z. Tamanaha said that law in society has a frame called “The Law-society framework” which has certain relationship characteristics. This relationship is aimed at two basic components. The first component consists of two main themes, states that the law is the reflection of society and the idea that the function of law is to maintain the “social order”, the second component consists of three elements, namely: custom, morality, and positive law.

Discussion

Policy on the Formulation of Doctor Malpractice Criminal Action in the Criminal Law System in Indonesia

Talking about malpractice, the word “mal” means bad. While the word “practice” means an action or practice. Therefore, it can be defined as a bad medical action or practice done by a doctor in their relationship with a patient. In Indonesia, the term malpractice which is very well known by health workers is only a form of medical malpractice, namely medical negligence which in Indonesia is called “kelalaianmedik”. According to Gonzales in his book “Legal Medical Pathology and Toxicology” states that malpractice is the term applied to the wrongful or improper practice of medicine, which results in injury to the patient.

According to Munir Fuady, malpractice has a meaning, which is any medical action performed by a doctor or people under their supervision, or a health service provider that is carried out on their patient, both in terms of diagnosis, therapeutic and disease management which is done in violation of law, propriety, decency, and professional principles whether done intentionally or due to inadvertence that causes wrongdoing of pain, injury, disability, bodily damage, death, and other losses that cause a doctor or nurse to be responsible both administratively, civil and criminal.

Hermien Hadiati Koeswadji, quoting John D. Blum’s opinion, stated that medical malpractice is a form of professional negligence in which patients can ask for compensation if injuries or disabilities happen that are directly caused by doctors in carrying out measurable professional actions. In the Indonesian legal system where one of the components is a substantive law, among the positive laws that apply, there is no known term as malpractice, for example in Law Number 29 of 2004 concerning Medical Practice, the meaning of implied malpractice in Article 84 is said to be a violation of medical discipline.

In-Law Number 29 of 2004 concerning Medical Practice, it is known that the Indonesian Medical Discipline Honorary Council (MKDKI) accepts complaints and has the authority to examine and decide whether or not there are mistakes committed by doctors for violating the application of medical discipline and applying sanctions. If it turns out that violations of medical ethics are found, then MKDKI will forward the complaint to the Indonesian Doctors Association (IDI), then the IDI will take action against the doctor. It’s just that the sanctions given by MKDKI are only in the form of administrative sanctions such as giving written warnings, recommendations for revoking registration certificates or practice licenses, and/or the obligation to attend education or training at medical education institutions. It does not rule out the possibility of civil or criminal prosecution from the patient or the patient’s family.

Indonesian health law in this case is Law Number 36 of 2009 concerning Health, which does not mention malpractice formally. But it only mentions mistakes or negligence in carrying out the profession (listed in Articles 54 and 55). Therefore, the term malpractice is a legal term used in Articles 54 and 55 mentioned above. Mistakes or negligence in carrying out the profession is listed in Articles 54 and 55 of Law Number 36 of 2009 concerning health, that health workers who make mistakes or negligence in carrying out their profession can be the subject to disciplinary action. The determination whether or not there is a mistake or negligence will be determined by Health Personnel Disciplinary Council. The provisions concerning the formation, duties, functions, and working procedure of the Health Personnel Disciplinary Council are set by the court. For the mistakes or negligence act, therefore every patient is entitled to compensation because of the mistakes or negligence by the health workers. Compensation is carried out following the prevailing Laws and Regulations.
From the Articles 54 and 55 above, thus it can be acknowledged that the sanction towards medical malpractice is charging with disciplinary action which is determined by the Health Personnel Disciplinary Council to doctors, who according to council judgment, have performed negligence. Meanwhile, regarding the compensation that must be fulfilled by the doctor concerned, it is carried out following the prevailing laws and regulations. The applicable laws and regulations regulating compensation can refer to the Civil Code. Civil charges filed can be in the form of default claims based on contractual liability and/or illegal acts (onrechtmatigedaad). As the doctrine described above, if a doctor is an individual private practice doctor, he will be personally sued, including being responsible for the actions of medical personnel who are under his command. If working in a team, therefore the liability will be based on how big their responsibility is in the team. Likewise, a hospital can be drawn as a defendant for all actions taken by all its employees (both medical and non-medical), even against private doctors who are given a place to practice in the hospital.

Related to the provisions of criminal malpractice, Law Number 36 of 2009 concerning Health in Article 90 regulates that the Head of health service facility and/or health workers that perform the practice or work in a health service facility that deliberately fails to provide first aid to a patient in an emergency will be punished with imprisonment of up to 2 (two) years and a maximum fine of Rp.200,000,000.00 (two hundred million rupiah). If the act as referred to in paragraph (1) results in disability or death, the head of the health service facility and/or health worker shall be sentenced to imprisonment for a maximum of 10 (ten) years and a maximum fine of Rp1,000,000,000.00 (one billion rupiah). There are two kinds of criminal acts according to Article 360. From the formulation of Article 360 Paragraph (1), the elements that exist can be specified, namely: Negligence; There is a form of action; and the existence of serious injuries. The formula for paragraph (2) contains the following elements: negligence; There is a form of action; There is a result of wounds that cause illness and wounds that obstruct to perform works or finding income for a specified period; and the existence of a causal relationship between actions and consequences. According to Article 90 of the Criminal Code, serious physical injury denotes illness or injury, which does not leave any prospect for a complete recovery or through which danger of life exists; continuous incompetence for performing official and professional activities; loss of the use of a sense organ; paralysis; disturbance of the intellectual capabilities which lasted for more than four weeks; removal or death of the womb of a woman. As an alternative, a wound that causes disease is a wound that becomes an obstacle to perform official and professional
activities. The parameter of this type of injury is not in the disease, but in the difficulty of performing official and professional works. The easier parameter is the disruption of work supported by a doctor’s letter stating that the person needs to rest because of his organs function condition due to the injury he suffered. Rest is needed because of these injuries.

Even though a doctor may deliberately cause injuries, for example performing a tooth extraction and giving an injection, the regulation in Article 351 of the Criminal Code states that they cannot be convicted because there is a beroepsrecht excuse or basis of forgiveness, which is the right that comes from their occupation. This excuse or the basis for forgiveness applies not only to doctors but also to pharmacists and midwives. Article 361 of the Criminal Code states: “If the crimes described in this chapter are committed to exercising an office or profession, the sentence may be enhanced with one third, deprivation of the exercise of the profession in which the crime has been committed may be pronounced, and the judge may order the publication of his verdict.”

Article 361 of the Criminal Code is a criminal weighting article applicable to the perpetrator who performs official and professional activities commits the crime referred to in Article 359 and Article 360 of the Criminal Code. The parties that can be subject to this article are doctors, midwives, and medical experts, each of whom is deemed to have to be more careful in performing their works. For a doctor who has caused a dysfunction or death related to his work, position, or occupation, Article 361 of the Criminal Code provides a heavier punishment. Besides that, the judge can impose a sentence in the form of revocation of the right to perform the work used to commit the crime and order to announce the decision.

Model of Criminal Case Settlement of Doctor Malpractice Based on The Value of Local Wisdom in Mojokparak Village

The settlement of medical malpractice criminal cases in the future can follow the method of the people of Mojokparak Village in resolving the cases. The people of East Java, especially in Mojokparak Village, hold on tightly to the Islamic values developed through Islamic boarding schools. In this regard, in essence, the normative values of religion in the Islamic boarding school community cannot be separated from the discourse and practical actions of people’s everyday life, especially in every settlement of doctor malpractice criminal cases because the dynamics of society are inseparable from the religious dynamics it develops. The religious tradition developed by the Islamic boarding school community relies on aswaja (ahlusunnahwaljamaah). This doctrine originates from two core role models, they are Al Aryari and Al Maturidi, following one of the four schools of fiqih and following the methods set by Junaidi al Baghadi in tariqa and tasawwuf (Sufism).

The naqli law for the narrative law source reference is Al Quran and the Sunnah of the Prophet which are the references in any dispute resolution in society. The aqli law is a dispute resolution in which legal source is based on logical reasoning (ijtihad). Also, two things are considered as the legal source from the opinion of the ulama (Islamic scholars), they are ijtima ‘and qiyas after a reference is made so that an appropriate dispute resolution is obtained. Besides the four sources of law mentioned above, there are other values which are the fatwas of the ulama which refer to the main objectives of the sharia, it is the five principles of human rights that must be upheld called Uhul al Khamsah. The people of Mojokparak village hold all of these values in resolving disputes, especially those related to criminal cases.

Moreover, the people of Mojokparak Village are obedient towards the community leaders as key persons in dispute resolution, in this case, community leaders or religious leaders who are considered to have neutrality and have a major influence on dispute resolution. As it is known, Javanese culture is still heavily characterized by feudalism, which is public figures whose opinions are highly respected and obeyed. Moreover, if these community leaders come from neutral religious figures, they are highly valued by the local community because the people of Mojokparak Village characteristics are very religious. Religiosity and obedience to religious figures are internalized by local communities with certain cultures known as local wisdom.

The people of Mojokparak Village also have gotongroyong or neighborly help culture (collectivity)
which acts as tolerance in society. There is an East Javanese proverb, “Siroyoingsun, ingsunyosiro” (you are me and I am you), that acts as a form of empathy as the basis of tolerance in society. The internalized proverb in everyday life which even becomes a culture is included as a local wisdom. The three potencies of local wisdom above can be used as an alternative to solving criminal cases based on the culture of a society.

In some countries, such as Japan, the Netherlands, the United Kingdom, the United States, and Poland, a dispute between its citizens can be resolved through informal procedures. Japanese society is a society that prefers the settlement of disputes or conflicts out of court, namely through chotei (mediation) and jidan institutions. These two mediation institutions have similarities, however, by many parties, the chotei institution is viewed as more oriented towards the interests of the perpetrator and not the victim; while the jidan institution is an informal mediation institution that seeks to produce restitution agreements between victims and perpetrators of violations for material and emotional harm in both criminal and civil cases. The results of the agreement between the perpetrator and the victim can affect the formal justice process, such as stopping the case or reducing the sentence for the perpetrator, by taking into account evidence in the form of a “letter of forgiveness” from the victim to be presented in the court. From this description, in fact, in the settlement of cases in Mojokparak, the “letter of forgiveness” model can be applied, as according to Mahrus Ali the use of patterns of criminal cases settlement through peace which is achieved through deliberation in a friendly manner is seen as the right approach method in the context of cases in society. Starting from his research, the settlement of criminal cases is a requirement with the values and cultural sentiments of the community which can only be resolved effectively by a settlement pattern based on the values of local wisdom of the local community.

According to NatangsaSurbakti, by starting from the settlement of cases through peace (deliberation) in a friendly manner, it is lawful that case settlement patterns that can provide a sense of justice between victims and perpetrators can be accommodated in constitutional policies. Reforming the law and criminal justice system that is based on the socio-cultural values of Indonesian people is a necessity, which is a reflection of the values of life philosophy based on Pancasila and global development, by reflecting respect for the values of local wisdom.

The character of the Mojokparak people is a community that holds on tightly to the law of its religion (Islam) and is obedient to the four figures: father and mother, teachers, and government leaders. Culture and other characteristics that are inherent and become one with the Javanese are their Islamic soul, as expressed by “abantalsyahadat, asapoiman, apayung Allah” (in their lives they wear the creed as a head covering, their faith as the blanket, and take refuge in Allah to be saved). If the character is associated with Islamic law in imposing it on murder cases, namely: “qishaash (taking the same retaliation)” or “diat (paying a fair compensation)” as stated in the Qur’an verse (178) below.

“O you who believe (who are âmenû)! The Law of Retaliation (of Equality in punishment, Al-Qisâs) is prescribed for you in the matter of the murdered: the free for the free and the slave for the slave, and the female for the female. But if any remission is made to anyone by his (aggrieved) brother, then prosecution (for the blood wit) should be made according to custom, and payment should be made to him in fairness; this is an alleviation from your Lord and a mercy; so whoever exceeds the limit after this, then for him there is a painful torment.”

Based on the character of the community, the settlement of doctor malpractice criminal cases in Mojokprak Village is done by way of deliberation and consensus. The results of the deliberations are considered satisfactory for the parties in litigation because the results of the deliberations are true justice that can be felt by those seeking justice and not just formal justice. The main requirement for settlement through deliberation is assertion from both the perpetrator and the victim as well as the agreement of the perpetrator and his family and victims to resolve the doctor malpractice case by deliberation.

To facilitate the settlement of criminal cases in Mojokparak Village, PoskoSambung Rasa (Sambung Rasa Post) was formed. The settlement of medical
malpractice crimes in PoskoSambung Rasa must have an impact on the public order and the manifestation of the community justice value. This is the manifestation of Posner’s theory of legal efficiency. The use of sanctions in the form of additional penalties in addition to compensation for collective agreement, all can be considered effective as deterrence because of the negative stigma on the perpetrator so that socially it does not cause personal injury.

Settlement of medical malpractice criminal cases in PoskoSambung Rasa must meet these requirements:

1. Not a repeated action (the action was done for the first time);
2. The perpetrators and victims who have been injured are willing to make peace;
3. The role of paralegals and mediators can facilitate/mediate the settlement peacefully in a friendly manner and still consider the victim’s right to justice;
4. The period of reporting follow-up is determined based on an agreement between the reporter and the paralegal or mediator; and
5. All efforts or productive steps must be following the rules of criminal procedure law.

The model of case assistance gives the authorized post to provide direction for the process, both for its resolution from the level of the Investigator (Police), the Attorney General, and the Investigation at Court. If the crime is serious as stated in the Criminal Code with a sentence of more than 7 years, it cannot be resolved amicably (by mediation) because it is against the law. If the reporter is a victim, after the post receives the report, the paralegal or companion can directly accompany the reporter to the center for special services in the regional police station and strive to provide legal protection for the rights of the victim as regulated by law.

If the reporter is a perpetrator who has committed a serious crime, then after the post receives the report, the Paralegal provides directions and explanations about the investigation process from the Police to the trial at the Court and the rights of the perpetrator (defendant or suspect) and may ask for the assistance of legal advisors. Finally, all efforts or productive steps must be following the rules of criminal procedure law.

**Conclusion**

Policy on the formulation of doctor malpractice criminal action in the criminal law system in Indonesia is that any medical action performed by a doctor or people under their supervision, or a health service provider that is carried out on their patient, both in terms of diagnosis, therapeutic and disease management which is done in violation of law, propriety, decency, and professional principles whether done intentionally or due to inadvertence that causes wrongdoing of pain, injury, disability, bodily damage, death and other losses that cause a doctor or nurse to be responsible both administratively, civil and criminal. The criminal provisions for doctor malpractice are regulated in Article 190 of Law Number 36 Year 2009. Negligence that causes death is regulated in Article 359 Criminal Code, while the negligence resulting in injury is regulated in Article 360 of the Criminal Code. Crimes committed while carrying out a position or job are regulated in Article 361 of the Criminal Code.

The model of criminal case settlement of doctor malpractice based on the value of local wisdom in Mojokparak Village is that The people of Mojokparak Village hold on tightly to the Islamic values developed through Islamic boarding schools. In this regard, in essence, the normative values of religion in the Islamic boarding school community cannot be separated from the discourse and practical actions of people’s everyday life, especially in every settlement of doctor malpractice criminal cases. To facilitate the settlement of criminal cases in Mojokparak Village, PoskoSambung Rasa (Sambung Rasa Post) was formed. Settlement of medical malpractice criminal cases must meet these requirements: Not a repeated action (the action was done for the first time); The perpetrators and victims who have been injured are willing to make peace; The role of paralegals and mediators can facilitate/mediate the settlement peacefully in a friendly manner and still consider the victim’s right of justice; The period of reporting follow-up is determined based on an agreement between the reporter and the paralegal or mediator, and all efforts or productive steps must be following the rules of criminal
procedure law.

**Ethical Clearance:** Yes.

**Conflict of Interest:** No

**Source of Funding:** Authors

**References**


How to Improve Field Tennis Flat Serve Skills through Differences Training Methods, Form of Stretching, and Grip Strength?

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Abstracts

For a professional who follows tournament circuit, strong serve punches are very special capital. In reality, technically the quality of blows is often inadequate. Serve punches that are carried out are very easily returned by the opponent and also do a lot of wrong serve (fault). This experimental study aims to determine the effect of training methods, forms of exercises stretching and grip strength on the flat serve skills of tennis. This research was conducted at the Faculty of Sport of the Universitas Sebelas Maret Negeri Surakarta (UNS) in 2019. The experimental method used a 2x2x2 factorial design. The sample consisted of 80 students divided into 8 groups, each consisting of 10 students. The data analysis technique was a two-way analysis of variance (ANOVA) and continued with the Tukey test at the significance level α = 0.05. The results showed that: (1) there are significant differences between training methods overall with training methods section of the skills of serve flat tennis courts, (2) there are significant differences between the forms of exercises stretching static form exercises stretching dynamically to a skill Served flats tennis the field, (3) there is a significant difference between the grip strength above the average grip strength below the average to the flat serve skills of tennis court. It can be concluded that the two types of training methods have different effects on the flat serve skills of tennis court when it is associated with forms of exercises stretching (static and dynamic) and the use of different grip strengths that are above average and below average.

Keywords: training methods, forms of training, grip strength, flat serve, tennis

Background

Achievement of optimal achievements in sports is a dream for every athlete, but to achieve this it needs careful planning through a system of systematic and continuous integrated coaching. Along with the pace of national development that is ongoing until now, the development of the sector sports in Indonesia is directed to achieve the ideals of the nation, namely the formation of fully Indonesian people who are physically and mentally healthy, and skilled so that they are able to excel in sports in order to raise dignity, dignity and degrees nation. The attention of the government is directed at efforts to disseminate sports activities as a way of fostering physical and spiritual health for each member of the community. Observing this matter, the government has ratified the Law of the Republic of Indonesia Number 3 Year 2005 concerning the National Sports System, that the sports guidance system must be carried out through 3 (three) pillars namely: educational sports, recreational sports, and sports achievement.

In addition to systematic coaching, facilities and infrastructure as well as the environment supporting that affect the performance of sports, factors that are not

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Physical condition, mental readiness, technical preparation and mastery of playing strategies. The condition of a good physical condition will affect the psychological aspects the inform of increased work motivation, morale, self-confidence, accuracy and so forth. Psychologically, the physical condition also seems to have a profound effect on the environment of our activities, especially in socializing. There are 4 (four) aspects of exercise training that need to be considered, namely physical preparation, technical preparation, mental / psychological preparation and tactics and strategy preparation. All aspects or factors that have been mentioned are apparently not owned by all tennis players. There are players who only master technical skills, there are those who only have physical readiness, there are those who only have mental readiness and some who only have tactics and strategy readiness. To achieve maximum performance an athlete must master all aspects mentioned, therefore each of these factors requires special attention and treatment to achieve the desired goals. Peak of achievement can be achieved if the training management process is passed well starting from the stage planning to the evaluation. The management process is apart of the first very important stage of an exercise aimed to optimize the performance of athletes in accordance with the target set. The peak achievement is a result of the body’s adaptation to the type and method of training.

The game of tennis has a number of basic techniques that must be mastered by players, including: Serve punches, Volley, Lob, Smash and variations other strokes such as Approach shot, Passing shot, Drop shot and Half volley. For a professional who follows the tournament circuit, a serve stroke strong is a very special asset. In fact, according to observations in several tournaments, most Indonesian players were left out in the first round compared to international players. Serve failure can also result from injury to the player. It can also be caused by poor tennis racket. But most importantly technically the quality of the punch is inadequate, especially the lack of maximum serve punches owned. The serve punch they do is very easy to return by the opponent and also do a lot of wrong serve (fault), meaning that the serve is not right on the serve box as a target.

Various training methods have been widely applied in improving the performance of players in many sports. In learning there are several kinds of learning methods, namely the overall method, the part method, the mixed method (whole and part), and progressive method. In research proposal this writer wants to try to apply through 2 (two) training methods, that is; (1) method overall training, and (2) part training method. The overall training method is a method of providing training material from general to specific, such as: in practicing motion skills or serve skills in flat tennis court, then the whole form or done alone. Conversely, the section exercises method is also included that want to be applied in this study. Method training part or whole part methods is a combined method of the training method part one on one.

The purpose of this study is to see the difference in training methods. through the application of overall and part training methods in improving the skills serve of flat tennis court by involving factors stretching and strength grip. For this reason, a deeper study of the research problem is needed so that results or answers are more reliable.

**Method**

The method used in this study is an experimental study using a 2x2x2 factorial plan as for the design as follows:
### Table 1. Factorial Design 2x2x2

<table>
<thead>
<tr>
<th>Training Method</th>
<th>Overall (A1)</th>
<th>Section (A2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Static (B1)</td>
<td>Dynamic (B2)</td>
</tr>
<tr>
<td></td>
<td>Statc (B1)</td>
<td>Dynamic (B2)</td>
</tr>
<tr>
<td>Grip Strength</td>
<td>A1B1C1</td>
<td>A2B1C1</td>
</tr>
<tr>
<td>Above Average (C1)</td>
<td>A1B1C1</td>
<td>A2B1C1</td>
</tr>
<tr>
<td>Below Average (C2)</td>
<td>A1B1C2</td>
<td>A2B1C2</td>
</tr>
<tr>
<td>Total</td>
<td>A1</td>
<td>A2</td>
</tr>
</tbody>
</table>

**Description:**

A1B1C1 : The method of training a whole using a form of exercises stretching static groups of students who have grip strength above average.

A1B1C2 : The overall training method uses a form of exercise for stretching static groups of students who have below average grip strength.

A1B2C1 : The overall training method uses a form of exercise for stretching dynamic groups of students who have above average grip strength.

A1B2C2 : The overall training method uses a form of exercise for stretching dynamic groups of students who have below average grip strength.

A2B1C1 : The section training method uses a form of exercise for stretching static groups of students who have above average grip strength.

A2B2C2 : The section training method uses a form of exercise for stretching dynamic groups of students who have below average grip strength.

A1 : Overall training method

A2 : Part training method

B1 : Stretching Static

B2 : Stretching Dynamic

B1 : Grip strength above average

B2 : Grip strength below average

This research was carried out at the FKOR UNS Tennis Court. Data collection techniques in this study are: (1) For the dependent variable data obtained through 3 tests of the motion assessment of serve technique skills flat tennis field, (2) For data attribute variable obtained through the test of curvature and grip strength.

The sample in this study was obtained from an affordable population, that is students who have passed tennis courses as many as 200 students. The research sample was determined by the technique Randomized group design.
Tabel 2. Grouping Experiment Samples with a block system

<table>
<thead>
<tr>
<th>Stretching (B)</th>
<th>Grip Strength</th>
<th>Training Method (A)</th>
<th>Overall (A1)</th>
<th>Section (A2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Static (B1)</td>
<td>Dynamic (B2)</td>
</tr>
<tr>
<td></td>
<td>Above Average (C1)</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Below Average (C2)</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

This research plan held on the tennis court FPOK UNS for six weeks or 18 (eighteen) meetings with a frequency of training three times a week. The treatment methods given are the overall method and method training the part training based on each group.

The analysis techniques used in this study are as follows\(^1\),\(^2\):

1) To test the statistical hypothesis the two-lane Variance (ANOVA) analysis technique was used 2x2x2 at the significance level \(\alpha = 0.05\).

2) To test the normality of the data obtained from the learning outcomes of tennis serve skills Court used the Lilliefors test.

3) To test homogeneity using the Bartlett test.

4) If there is an interaction between the training methods and motivation on the learning outcomes of the tennis flat serve skills, will be followed by the Tukey Test.

Results and Discussion

Based on the experimental design in this study, there were 6 (six) groups sample that had scores on the results of a serve skills test flat on a tennis court game that needed to be described separately. The following after the presentation of table 3 is a description of scores of the serve skills test results flat in the playing field tennis of the six groups mentioned.

Table 3. Description data result test flat serve

<table>
<thead>
<tr>
<th>No.</th>
<th>KLP</th>
<th>N</th>
<th>Range</th>
<th>Min.</th>
<th>Max.</th>
<th>Sum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1</td>
<td>40</td>
<td>44.34</td>
<td>33.89</td>
<td>78.23</td>
<td>2045.34</td>
<td>51.1335</td>
<td>10.90200</td>
</tr>
<tr>
<td>2</td>
<td>A2</td>
<td>40</td>
<td>39.41</td>
<td>33.89</td>
<td>73.30</td>
<td>1973.90</td>
<td>49.3475</td>
<td>9.18314</td>
</tr>
<tr>
<td>3</td>
<td>B1</td>
<td>40</td>
<td>33.43</td>
<td>42.72</td>
<td>76.15</td>
<td>2276.97</td>
<td>56.9243</td>
<td>10.62138</td>
</tr>
<tr>
<td>4</td>
<td>B2</td>
<td>40</td>
<td>42.56</td>
<td>30.22</td>
<td>72.78</td>
<td>1846.47</td>
<td>46.1618</td>
<td>10.29003</td>
</tr>
<tr>
<td>5</td>
<td>C1</td>
<td>40</td>
<td>30.05</td>
<td>38.13</td>
<td>68.18</td>
<td>2186.09</td>
<td>54.6522</td>
<td>8.13529</td>
</tr>
</tbody>
</table>
The results of this study consisted of testing the hypothesis using a factorial design performed with variant analysis. The results of his research are as follows:

Table 4. Recapitulation of ANAVA Results in Next Stage with Tukey Test

<table>
<thead>
<tr>
<th>No</th>
<th>Hypothesis Group are Compared</th>
<th>Qcount</th>
<th>Qtable</th>
<th>Sig.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A1 dan A2</td>
<td>9,362</td>
<td>5,305</td>
<td>.000</td>
<td>There is a difference</td>
</tr>
<tr>
<td>2</td>
<td>B1 dan B2</td>
<td>9,362</td>
<td>5,305</td>
<td>.000</td>
<td>There is a difference</td>
</tr>
<tr>
<td>3</td>
<td>C1 dan C2</td>
<td>9,362</td>
<td>5,305</td>
<td>.000</td>
<td>There is a difference</td>
</tr>
</tbody>
</table>

Based on table 4, it can be concluded that the hypothesis of the eleven are overall there is a significant difference between the training methods, the form of exercises stretching and the strength of grips on serve skills flat in FKOR students UNS Surakarta both using stretching static and dynamic and using above-average grip strength and below-average grip strength. Furthermore, the results of the research can be elaborated on the discussion of each hypothesis in accordance with the theory that supports the results of this study.

After analyzing the data using the Variance Analysis approach Factorial and followed by test Tukey’s of the eleven research hypotheses submitted. Research findings are the results of statistical data analysis that need to be studied further to be able to explain why there are accepted hypotheses, hypotheses that are rejected, and why there are significant interactions between curvature and grip strength on flat serve skills.

The overall training method is better than the training method section on serve skills.

Based on the results of the analysis of the test-TUKEY (Q) data differences in the overall and training section against serve skills flat, obtained differences in
The average value or the value of $Q$-count 9.3362 and $Q$-table 5.305 significant difference $\text{sig (p)}$ is smaller than 0.05 ($0.000 < 0.05$), to be seen in the $\text{Sig column}$ table ($\text{p}$ is 0.000, or the probability is well below $\alpha$ 0.05. So that a decision can be made that reject $H_0$ and accept $H_1$. So, it can be concluded that the training method overall is better than the part training method on serve skills flat.

The results of this calculation show that overall skill scores the serve flat in the training process using the overall training method are better than the section training method, in other words the use of methods different will result serve skill score flat in a in training processes different. Therefore, according to the description and discussion of the strengths of the overall training method and the part training method, the overall training method is better than the part training method to improve serve skills flat in serve training flat in tennis court games.

The form of exercises stretching static is better than the form of exercises stretching dynamic conserve skills.

Based on the results of the analysis of the Tukey test ($Q$) data, the difference strength is in grip above average and the grip strength is below average for serve skills flat, obtained differences in the average value or $Q$-value of $Q$-count 9.362 and $Q$-table of 5.305 differences the real $\text{sig (p)}$ is smaller than 0.05 ($0.000 < 0.05$), to be seen in the column table $\text{Sig (p)}$ is 0.000, or the probability is far below $\alpha$ 0.05. So, can that a decision be made that reject $H_0$ and accept $H_1$. So, it can be concluded that there are differences serve skills flat in playing tennis between the training stretching static group and the training group stretching dynamic FKOR UNS students. This proves $H_1 : \mu_C1 > \mu_C2$, so that a decision can be made that reject $H_0$ and accept $H_1$. So, it can be concluded that the serve skills flat in a group of students with high grip strength are better than below grip strength average. This proves $H_1 : \mu_B1 > \mu_B2$, so that a decision can be made that reject $H_0$ and accept $H_1$. So, it can be concluded that the serve skills flat in playing tennis between the training stretching static and the training group stretching dynamic FKOR UNS students. This proves $H_1 : \mu_B1 > \mu_B2$, so that a decision can be made that reject $H_0$ and accept $H_1$. So, it can be concluded that the serve skills flat in a group of students with high grip strength are better than below grip strength average.

The results of this calculation show that the overall score of the serve skill flat that uses above average grip strength is better than the below average grip strength, in other words grip strength different will result serve skills flat in different. Therefore accordingly, with the description and discussion of grip strength above average and grip strength below average, then overall grip strength above average is better than grip strength below average to increase yield servicing skills Flat in playing tennis.

**Conclusion**

From the results of hypothesis testing and discussion
of the results of the study, can be drawn the following conclusions:

1. There is a significant difference between the overall method and method training the section training on the serve skills flat tennis of FKOR UNS students.

2. There is a significant difference between the forms of stretching exercises static with the form of dynamic stretching exercises for field tennis flat serve skills students FKOR UNS.

3. There is a significant difference between the grip strength above the average grip strength below the average to the serve skills flat tennis court FKOR UNS Surakarta students.

**Ethical Clearance:** This research has received approval from the Etik Health Research Commission, Universitas Negeri Semarang with Document Number: 115 / KEPK / EC / 2019. This research has met the principles stated in the Standards and Operational Guidance for Ethics Review of Health-related Research with Human Participants from WHO 2011 and the International Ethical Guidelines for Health-related Research Involving Humans from CIOMS and WHO 2016.

**Source of Funding:** This research was funded by self.

**Conflict of Interest:** The authors declare no potential conflict of interest.

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Evaluation of the Antioxidant Activity of the Polyherbal (Conocarpus lancifolius L., Capparis spinosa L. and Dodonaea viscosa) Extracts and Assessment of the Hypoglycaemia Effect in Diabetic Mice

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1M.Sc. Student, 2Assistant Professor, 3Lab. Technical, 4Assistant Lecturer, Biotechnology Dept., Genetic Engineering and Biotechnology Institute for Post Graduate Studies, University of Baghdad, Baghdad, Iraq

Abstract

Diabetes mellitus, often referred to simply as diabetes, is a chronic metabolic disorder due to the relative deficiency of insulin secretion and varying degrees of insulin resistance. It is characterised by high circulating glucose. Excessive levels of either molecular oxygen or Reactive Oxygen Species (ROS) lead to an imbalance in the body’s normal oxidative metabolism that to leads to high glucose levels in the blood (hyperglycaemia), resulting in metabolic disturbances (oxidative stress) and chronic complications in diabetes. The present study aims to estimate the antioxidant activity in diabetic mice induced via alloxan of a combination of three types of plant leaves (Conocarpus lancifolius L., Capparis spinosa L. and Dodonaea viscosa). The total phenolic content using Folin-Ciocalteu reagent and the antioxidant activity utilizing 2, 2-diphenyl-1-picrylhydrazyl (DPPH) assay were estimated. The effect of polyherbal formulation leaves extracts on serum glucose level was done on forty-two albino mice divided into six groups and treated with polyherbal extracts and metformin. The results of total phenolic content in the polyherbal leaves extracts was observed (15.52 mg/g) in the aqueous extracted samples, while the total phenolics content was (46.97mg/g) in the methanolic extract, and the antioxidant activity showed the methanolic extract was the highest free radical scavenging activity (93.28%) than the aqueous extract (86.77%) in 10 mg/ml and approach to the artificial antioxidant Butylated hydroxytoluene (BHT) which was (93.67%). This study showed both extracts of polyherbal leaves did not induce lethality in mice when administered orally at a dose of 2000 mg/kg. On the other hand, Diabetic mice treated with methanolic extract at doses 200 and 400 mg/kg showed a significant decrease (p<0.01) in serum glucose level after 35 days, which was 113.66 and 107.66 mg/dl respectively, and the aqueous extract was 124.66 and 117.00 mg/dl respectively when compared with the control positive group (324.00 mg/dl).

Keywords: polyherbal, total phenol, antioxidant, hypoglycaemia, diabetic mice.

Introduction

Diabetes mellitus is a non-infectious endocrine disorder which is characterized by the disturbance in the metabolism of carbohydrates and associated with hyperglycaemia. It is linked with the developing of various serious diseases like micro-vascular (nephropathy, retinopathy, nephropathy) and macro-vascular (peripheral vascular disease and coronary heart diseases). Diabetes mellitus is known as diabetes which was observed as diseases related to “sweet urine” and muscle loss. Glucose blood levels are maintained by insulin which is a hormone released from the pancreas. When these level increases, insulin is produced from the pancreas and maintained the level of glucose. In diabetic patients, the production of insulin is absent or less which causes hyperglycaemia.
Treatment of Diabetes mellitus without any adverse effects is still the biggest question for medical practitioners. Medicinal plants containing secondary metabolites such as phenolic, anthocyanin, and flavonoids compounds have been used as alternative therapeutic tools to treat many diseases throughout medical history. Several types of plant extracts or plant-derived molecules have been investigated for their potential as antioxidant sources against several diseases. In addition, plant-based natural antioxidants are preferred to synthetic ones due to their good safety profiles. Therefore, there is growing interest in finding natural compounds that could prevent oxidative damage underlying the pathogenesis of many diseases. The aim of the study is to assessment of the efficiency of polyherbal leaves extracts as antioxidant in diabetic mice induced via alloxan.

Materials and Methods

Chemical reagents

The chemical reagents DPPH (2,2-diphenyl-1-picrylhydrazyl), Butylated hydroxytoluene (BHT), ascorbic acid, gallic acid monohydrate (3,4,5-trihydroxybenzoic acid), sodium carbonate and metformin were purchased from Sigma aldrich chemicals (Sigma-Aldrich, Germany). Folin Ciocalteu reagent was purchased from Merck (Darmstadt, Germany), alloxan (BDH, England).

Collection of plants

Three species of plant leaves were collected from the trees in the gardens of the University of Baghdad. The plant leaves were identified as (Conocarpus lancifolius L., Capparis spinosa L. and Dodonaea viscosa) by the specialist, Department of Biology, College of Science, University of Baghdad. The plant leaves washed with water to remove the dust and soil deposits and dried at room temperature until complete removal of moisture content, each dried plants were crushed using a grinder and stored at -20°C for further analysis.

Polyherbal preparation

The polyherbal leaves extract was prepared by mixing the dried extracts of the plant leaves (Conocarpus lancifolius L., Capparis spinosa L. and Dodonaea viscosa) in the ratio of 1: 1: 1 respectively.

Preparation of aqueous extract

Water extract was prepared according to N’Guessan et al., macerated 100 grams of plant leaves residue in 700 ml of distilled water for 72 hours with continuous shaking. Then the mixture was vacuum filtered through Whitman No. 1 paper. The filtrate evaporated to dryness under vacuum at 50°C by a rotary evaporator to eliminate water. The resulting extract stored in amber glass vials at 4 °C until analyzed.

Preparation of methanolic extract

The methanolic extract was prepared according to AACC by using a Soxhlet apparatus. 100 grams of plant leaves residue was put in a thimble and 700 ml of 70% methanol was added within 40-60 °C for 6 hours. The solution was filtered through a filter paper Whitman No.1 and evaporated to dryness under vacuum at 40°C by a rotary evaporator to get rid of methanol; the extract was stored in amber glass vials at 4 °C until analyzed.

Determination of total phenolic contents

Total phenolic content of Moringa oleifera extracts were determined spectrophotometrically using the Folin-Ciocalteu method described by. 2 ml of Folin-Ciocalteu reagent (diluted 10 times) was mixed with 1.6 ml of 7.5% sodium carbonate solution and 0.4 ml of Moringa oleifera extracts. The volume was completed to 5 ml by adding distilled water. The tubes were covered with parafilm for 30 min. at room temperature, and then the absorbance was read at 760 nm spectrophotometrically.

Evaluation of the Antioxidant activity DPPH assay

According to Ogunmoyole et al., the antioxidant activity of the prepared polyherbal methanolic and aqueous leaves extracts was conducted. 5 ml of a freshly prepared 0.004 % of 2,2-diphenyl-1-picrylhydrazyl (DPPH) in methanol was mixed with 50 μl of different concentrations (0.625, 1.25, 2.5, 5 and 10) mg/ml, which were prepared by dissolving 0.1 gram of the polyherbal extract in distilled water then the volume was completed into 10 ml to make the working solution 10 mg/ml, and
serial two-fold dilutions of the polyherbal extract were prepared to make the concentrations 10-0.625 mg/ml. The absorbance of each dilution, after 30 minutes, was measured at 517 nm. Butylated hydroxytoluene (BHT) and vitamin C were used as a positive control. All tests were performed in triplicate. The percentage DPPH reduction (or DPPH radical scavenging capacity) was calculated as:

\[
\% \text{ Reduction} = \frac{(\text{Abs DPPH} - \text{Abs Dil.})}{\text{Abs DPPH}} \times 100
\]

Where:

\[\text{Abs DPPH} = \text{average absorption of the DPPH solution}\]

\[\text{Abs Dil.} = \text{average absorption of the three absorption values of each dilution}\]

With the obtained values, a graphic was made using Microsoft Excel. The EC\textsubscript{50} of each extract (concentration of extract or compound at which reduced 50% of DPPH) was taken from the graphic.

**Experimental animals**

Forty-Two male albino mice weighing 27-32 grams were obtained from Biotechnology Research Center, Al- Nahrain University. They were kept in standard conditions, the temperature about 22 °C, 12 hours light/dark cycle. They were left for two weeks for acclimatization with the experimental conditions. Standard pellet diet and water were provided daily.

**Determination of acute toxicity of polyherbal extracts**

Acute toxicity of the polyherbal preparation was carried according to the guidelines set by the Organization for Economic Co-operation and Development (OECD), revised draft guidelines 423. A group of 30 adult healthy albino mice of either sex weighing 27-32 grams was divided into five groups (six mice / group) for each extract (aqueous and methanolic). All groups were treated orally with doses of 100, 250, 500, 1000 and 2000 mg/kg of polyherbal preparation to study the acute toxicity. The animals were then observed for 3 hours for general behavioural, neurological, and autonomic profiles and every 30 min for the next 3 hours and finally for mortality after 24 hours.

**Selection of doses**

To estimation the antidiabetic activity, two-dose levels were chosen (200 and 400 mg/kg body weight) in such a way that the first dose was approximately one-tenth of the maximum dose during acute toxicity studies and the second high dose was twice of the first dose.

**Induction of experimental diabetes**

Blood glucose levels (baseline) were tested before the treatments. Diabetes was induced in all mice (except normal control group) by a single dose of alloxan monohydrate (150 mg/kg body weight) intraperitoneally to overnight fasted mice. After 1 hour of alloxan administration, the animals were fed with standard pellets and water. Seventy-two hours later of alloxan administered, blood glucose was measured by glucometer which was collected from the tail vein from the mice. Mice showing fasting blood glucose levels (>250 mg/dl) were selected for the study.

**Evaluation of the antidiabetic activity of the polyherbal extracts**

The Diabetic mice were randomly divided into seven groups with six animals in each group. The single dose of each extract and drug was administered once daily by oral for 35 days continuously as follows:

**Group 1:** This group served as a negative control in which the mice received normal feed and distilled water.

**Group 2:** This group was a positive control for alloxan (150 mg/kg BW).

**Group 3:** Diabetic mice of this group treated with standard drug metformin (150 mg/kg BW/day).

**Group 4:** Diabetic mice of this group treated with the polyherbal methanolic extract (200 mg/kg BW/day).

**Group 5:** Diabetic mice of this group treated with the polyherbal methanolic extract (400 mg/kg BW/day).

**Group 6:** Diabetic mice of this group treated with the polyherbal aqueous extract (200 mg/kg BW/day).
Group 7: Diabetic mice of this group treated with the polyherbal aqueous extract (400 mg/kg BW/day).

Collection of Blood

Every week blood glucose levels were measuring. The blood samples were collected from the tail vein of each mice of the group as a drop. The drop was then immediately placed on the strip of the glucometer to find the glucose level quickly.

Statistical Analysis

The Statistical Analysis System-SAS program \(^{16}\) was used to detect the effect of difference factors in study parameters. Least significant difference-LSD test was used to significant compare between means in this study.

Results and Discussion

Total phenolic content of polyherbal leaves extracts

The polyherbal leaves extracts were evaluated by using Folin-Ciocalteu reagent for the determination of total phenolic contents. The results showed that the methanolic extract had the highest total phenolic content than the aqueous extract as shown in Table (1). Polyphenols are known for their strong antioxidant properties, their activity is based on scavenging free radicals and reactive oxygen/nitrogen species, the reduction of oxidized intermediates, metals binding (mainly iron and copper), the inhibition of enzymes responsible for the formation of free radicals (oxidase, peroxidase), the activation of antioxidant enzymes (catalase, superoxide dismutase) and the prevention of oxidation of other antioxidants (ascorbic acid, vitamin E) \(^{17}\).

Antioxidant activity of polyherbal leaves extracts (DPPH assay)

In this study, the radical scavenging activity of each extract was compared at concentrations of (0.625, 1.25, 2.5, 5 and 10) mg/ml. BHA and vitamin C were used as references. The results showed that the free radical scavenging activity of methanolic extracts was (93.189%) in 10 mg/ml was more effective than aqueous extracts (86.77%) in the same concentration, and It was approach with the natural antioxidant (vitamin C) and artificial antioxidant (BHT) which was (96.40 % and 93.67 % ) respectively As shown in Table (2).

Furthermore, the antioxidant activity is expressed as an Effective Concentration (EC\(_{50}\)). The half maximal Effective Concentration (EC\(_{50}\)) are often refers to the concentration of a drug, toxicant or antibody which induces a response half way between the baseline and maximum after a specified exposure time, it commonly used as a measure of potency of a drug \(^{18}\).

The radical scavenging capacity (EC\(_{50}\)) of methanolic and aqueous extracts were found to be (1 and 1.35 mg/ml) respectively, and the value of BHT and V. C were found to be (0.60 and 0.47 mg/ml) respectively (Figure 1). The effectiveness of the antioxidant properties is inversely correlated with EC\(_{50}\) values. Lee
et al., 19 reported that if the EC$_{50}$ value of an extract is less than 10 mg/ml, it indicates that the extract is an effective antioxidant. The EC$_{50}$ value of polyherbal leaves extracts were less than 10 mg/ml, and this indicates that the extracts were an effective antioxidant.

**Table 2: Radical scavenging activity of polyherbal leaves extract**

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>Aqueous extract</th>
<th>Methanolic extract</th>
<th>BHT</th>
<th>Vit. C</th>
<th>LSD value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.625</td>
<td>20.86 ±0.16</td>
<td>36.31±0.12</td>
<td>60.68 ±0.26</td>
<td>90.23 ±0.19</td>
<td>0.596 **</td>
</tr>
<tr>
<td>1.25</td>
<td>51.34 ±0.05</td>
<td>68.52±0.17</td>
<td>81.42 ±0.24</td>
<td>91.54 ±0.29</td>
<td>0.698 **</td>
</tr>
<tr>
<td>2.5</td>
<td>57.92 ±0.03</td>
<td>80.17±0.03</td>
<td>91.28 ±0.04</td>
<td>95.23 ±0.16</td>
<td>0.288 **</td>
</tr>
<tr>
<td>5</td>
<td>85.48 ±0.06</td>
<td>92.27±0.02</td>
<td>93.13 ±0.01</td>
<td>96.21 ±0.16</td>
<td>0.284 **</td>
</tr>
<tr>
<td>10</td>
<td>86.77 ±0.06</td>
<td>93.28±0.02</td>
<td>93.67 ±0.01</td>
<td>96.40 ±0.27</td>
<td>0.459 **</td>
</tr>
<tr>
<td>LSD value</td>
<td>0.196 **</td>
<td>0.309 **</td>
<td>0.519 **</td>
<td>0.710 **</td>
<td>---</td>
</tr>
</tbody>
</table>

**Figure 1: EC$_{50}$ of polyherbal leaves extracts**

**Acute toxicity test**

The study of the acute toxicity of polyherbal leaves extracts shows different signs when treated with different oral doses of aqueous and methanolic extract (Table 3). The experimental mice show appreciable changes in physical activity and shown abnormal responses such as Tacky cardiac, increase breathing, sedation and animal tend to loneliness for one side in different time in dose 2000 mg/kg, but there is no mortality in mice were recorded after 24 hours post treatment. The results showed that the aqueous and methanolic extract of polyherbal leaves practically non toxic according to Hodge and Sterner 20. Accordingly, to this study, both extracts of polyherbal leaves did not induce lethality in mice when administered orally at doses of began from 100 till reach to 2000 mg/kg. This result suggests that LD$_{50}$ of the extract would be greater than 2000 mg/kg. Therefore, the plant extract can be assumed practically non-toxic.
Effect of polyherbal leaves extracts on serum glucose level

At the beginning of the experiment, the blood glucose of animals was measured as the (Baseline), after that all animal were injected with alloxan to induce Diabetes (except normal group) and then divided to seven groups and treated with polyherbal leaves extracts and metformin as shown in (Table 4). The results showed that diabetic mice treated with methanolic extract at doses 200 and 400 mg/kg (group 4 and 5) was significant gradual descent decreased (p <0.01) in the serum glucose level after 35 days, which was 113.66 and 107.66 mg/dl respectively when compared with control positive groups 324.00 (group 2). Likewise, the results showed that the serum glucose level decreased (p <0.01) in metformin treatment diabetic mice 100.66 (group 3) compared to control positive groups (group 2), which mean the methanolic extract at doses 400 mg/kg have the same effect of metformin in decrease serum glucose level. Methanolic extracts were more effective than aqueous extracts which was 124.66 and 117.00 mg/dl in concentrations 200 and 400 mg/kg (group 6 and 7) respectively.

<table>
<thead>
<tr>
<th>Dose of extract (mg/kg/ B.W)</th>
<th>No. of mice per group</th>
<th>No. of dead / No. of animal</th>
<th>Sign of animal treated with extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqueous extract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>6</td>
<td>0/6</td>
<td>Nil</td>
</tr>
<tr>
<td>250</td>
<td>6</td>
<td>0/6</td>
<td>Nil</td>
</tr>
<tr>
<td>500</td>
<td>6</td>
<td>0/6</td>
<td>Nil</td>
</tr>
<tr>
<td>1000</td>
<td>6</td>
<td>0/6</td>
<td>Tacky cardiac, increase breathing, sedation and animal tend to loneliness for one side in different time</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td>0/6</td>
<td>Tacky cardiac, increase breathing, sedation and animal tend to loneliness for one side in a different time but it takes a long time than above</td>
</tr>
<tr>
<td>Methanolic extract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>6</td>
<td>0/6</td>
<td>Nil</td>
</tr>
<tr>
<td>250</td>
<td>6</td>
<td>0/6</td>
<td>Nil</td>
</tr>
<tr>
<td>500</td>
<td>6</td>
<td>0/6</td>
<td>Interrupted sedation</td>
</tr>
<tr>
<td>1000</td>
<td>6</td>
<td>0/6</td>
<td>Tacky cardiac, titanic hair skin, animal tend to loneliness for one side in different time</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
<td>0/6</td>
<td>Tacky cardiac, titanic hair skin, animal tend to loneliness for one side in different time all these signs take a long time than above</td>
</tr>
</tbody>
</table>
In the present study, oral administration of polyherbal formulation at dose levels of 200 and 400mg/kg for 35 days enhances insulin production. This may be due to the regenerating effect of pancreatic β-Cells. The polyherbal formulation increased insulin levels in a dose dependent manner and was comparable with that of standard drug. Antidiabetic potential of phytochemicals as Alkaloids produce antihyperglycaemic action by potentiating pancreatic secretion of insulin from β-cell of islets or by enhancing transport of blood glucose to peripheral tissue. According to Ayurveda, there are several medicinal plants that have been identified to possess antidiabetic potential. Most of the herbal preparations from these medicinal plants are reported to have minimal or no side effects. Due to the antioxidant properties of polyphenols, these compounds can play an important role in antidiabetic prevention and therapy. Flavonoids might prove to be important for alternative diabetic treatment, as it helps in preventing β-cell apoptosis, promoting β-cell proliferation and insulin secretion, and enhancing insulin activity. Triterpenoid and steroidal glycosides are collectively referred to as saponins; these compounds are known to possess potent hypoglycaemic activity. The phenolic compounds may exhibit their hypoglycaemic activities by increasing the levels of serum insulin, increasing the sensitivity of tissues to insulin action, stimulating the activity of enzymes of glucose utilization and inhibiting the activity of α-amylase. Tannins also play an important role in preventing diabetic complications by reducing the formation of advanced glycation end products and oxidative stress.

### Table 4: Effect of polyherbal leaves extracts on serum glucose level

<table>
<thead>
<tr>
<th>Groups</th>
<th>Baseline</th>
<th>Day 0</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 21</th>
<th>Day 28</th>
<th>Day 35</th>
<th>LSD Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>90.66±1.76</td>
<td>91.33±1.20</td>
<td>90.00±3.60</td>
<td>95.33±0.88</td>
<td>91.33±1.20</td>
<td>92.00±3.05</td>
<td>91.33±2.08</td>
<td>92.00±2.08</td>
</tr>
<tr>
<td>Group 2</td>
<td>89.33±1.85</td>
<td>299.66±1.20</td>
<td>303.66±2.84</td>
<td>300.33±3.45</td>
<td>308.66±5.60</td>
<td>317.33±2.60</td>
<td>324.00±2.65</td>
<td>324.00±2.65</td>
</tr>
<tr>
<td>Group 3</td>
<td>89.33±2.18</td>
<td>300.00±2.51</td>
<td>227.66±1.45</td>
<td>192.00±1.75</td>
<td>140.33±3.33</td>
<td>106.66±2.18</td>
<td>109.66±0.88</td>
<td>9.53 **</td>
</tr>
<tr>
<td>Group 4</td>
<td>91.66±1.45</td>
<td>302.66±4.33</td>
<td>244.66±2.02</td>
<td>211.00±1.15</td>
<td>152.00±1.73</td>
<td>127.66±0.88</td>
<td>113.33±4.65</td>
<td>9.61 **</td>
</tr>
<tr>
<td>Group 5</td>
<td>90.33±1.20</td>
<td>300.00±6.65</td>
<td>231.66±2.02</td>
<td>201.00±1.15</td>
<td>145.00±1.15</td>
<td>120.33±1.20</td>
<td>107.66±2.60</td>
<td>6.50 **</td>
</tr>
<tr>
<td>Group 6</td>
<td>88.33±1.20</td>
<td>296.33±5.23</td>
<td>257.66±0.88</td>
<td>228.00±0.88</td>
<td>165.33±0.88</td>
<td>139.33±2.60</td>
<td>124.66±0.33</td>
<td>7.07 **</td>
</tr>
<tr>
<td>Group 7</td>
<td>88.00±1.52</td>
<td>292.66±3.48</td>
<td>249.33±1.45</td>
<td>217.00±1.15</td>
<td>155.66±2.02</td>
<td>131.66±1.45</td>
<td>117.00±2.31</td>
<td>6.22 **</td>
</tr>
<tr>
<td>LSD Value</td>
<td>4.95 NS</td>
<td>12.12 **</td>
<td>6.71 **</td>
<td>5.21 **</td>
<td>7.44 **</td>
<td>6.48 **</td>
<td>5.89 **</td>
<td>---</td>
</tr>
</tbody>
</table>

** *(P<0.01)*

Effect of polyherbal leaves extracts on body weight

At present, the treatment of diabetes mainly involves a sustained reduction in hyperglycaemia by the use of hypoglycaemic drugs in addition to insulin. More so, myriads of medicinal plants seem to reveal potential hypoglycaemic activity and antioxidant action with desirable properties. The present study indicated that the final body weight of positive control (diabetes induction) was significantly decreased (23.97 gram) when compared with control negative group 30.26 gram (group 1). Otherwise, the reduction in body weight was partially restored or improved upon administration of
polyherbal methanolic and aqueous extracts at doses 200 and 400 mg/kg (groups 4, 5, 6, 7) when compared with control positive group as shown in Table (5). Daye et al. 30 reported that glibenclamide suppressed the decrease in the body weight, while the suppression of weight loss in this study was achieved using polyherbal extracts. Chinwe et al. 31 suggest that the *Garcinia kola* extract has shown to be a potential agent for the treatment of diabetes mellitus and restoration of body weight loss in alloxan induced diabetic rats. Furthermore, Shahadat et al. 32 revealed that the final body weights of different treatments with plant extracts have showed significantly increased from the initial body weight.

### Table 5: Effect of polyherbal leaves extracts on body weight

<table>
<thead>
<tr>
<th>Groups</th>
<th>Initial weight (g)</th>
<th>Final weight (g) After 5 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>27.30 ±0.21</td>
<td>30.26 ±0.18</td>
</tr>
<tr>
<td>Group 2</td>
<td>31.30 ±0.47</td>
<td>23.97 ±0.23</td>
</tr>
<tr>
<td>Group 3</td>
<td>30.76 ±0.23</td>
<td>30.13 ±0.20</td>
</tr>
<tr>
<td>Group 4</td>
<td>29.53 ±0.08</td>
<td>28.60 ±0.05</td>
</tr>
<tr>
<td>Group 5</td>
<td>31.30 ±0.37</td>
<td>30.53 ±0.35</td>
</tr>
<tr>
<td>Group 6</td>
<td>29.73 ±0.08</td>
<td>28.26 ±0.12</td>
</tr>
<tr>
<td>Group 7</td>
<td>28.66 ±0.14</td>
<td>27.53 ±0.12</td>
</tr>
</tbody>
</table>

| LSD value       | 0.811 **           | 0.614 ** (P<0.01)               |

Group 1: Control, Group 2: Alloxan (150 mg/kg), Group 3: Diabetic mice + Metformin (150 mg/kg), Group 4: Diabetic mice + Polyherbal methanolic extract (200 mg/kg), Group 5: Diabetic mice + Polyherbal methanolic extract (400 mg/kg), Group 6: Diabetic mice + Polyherbal aqueous extract (200 mg/kg), Group 7: Diabetic mice + Polyherbal aqueous extract (400 mg/kg).

**Conflict of Interest:** The authors declared that present study was performed in absence of any conflict of interest.

**Source of Funding:** Self

**Ethical Clearance:** Ethical Committee for Research, Institute of Genetic Engineering and Biotechnology, University of Baghdad, Baghdad, Iraq.
References


Performance Analysis of Pulmonary Tuberculosis Treatment in Indonesia

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Abstract

If health workers not treated tuberculosis (TB) patients or the treatment is not complete, it can cause dangerous complications and death. The study aims at analyzing the performance of pulmonary TB treatment in Indonesia. The ecological analysis carried out using secondary data from “Data and Information on the 2018 Indonesia’s Health Profile”. Apart from the percentage of success in pulmonary tuberculosis treatment as the dependent variable, four other variables analyzed as independent variables were the completeness of pulmonary TB treatment, the smoking population’s rate, the ratio of public health centers per district, and the percentage of poor people. Data were analyzed using cross-tabulation. The results show the percentage of successful pulmonary TB treatment that is high tends to be lower in provinces with a low rate of pulmonary TB treatment completeness. Regions with inadequate completeness of pulmonary TB treatment have low pulmonary TB treatment success. Meanwhile, there is a tendency that a high percentage of the population who smokes tends to have a low rate of successful pulmonary TB treatment. Moreover, the high Public Health Centers’ ratio tends to be more in provinces with increased pulmonary TB treatment success. Finally, the low percentage of poor people tends to be more in regions with high pulmonary TB treatment success. The study concludes the four independent variables studied were related to the success of pulmonary TB treatment.

Keywords: ecological analysis, secondary data, pulmonary tuberculosis, treatment success.

Background

Tuberculosis (TB) is an infectious disease caused by the bacteria Mycobacterium tuberculosis, which can attack various organs, especially the lungs. If health workers not treated TB patients, or the treatment is not complete, it can cause dangerous complications and death. TB is estimated to have existed in the world since 5000 years BC, but advances in the discovery and control of TB disease have only occurred in the last two centuries¹.

Currently, one-third of the world’s population is estimated to have been infected by Mycobacterium Tuberculosis. In 2019, WHO estimated that the number of TB cases worldwide would be 10 million cases, consisting of 5.6 million men, 3.2 million women, and 1.2 million children. A total of 1.4 million people died from TB in 2019. The incidence and death rate caused by TB is still very high, and it is even one of the five deadly diseases. Indonesia has a burden of disease with the second-highest number of TB cases in the world after India, according to the WHO².

Based on a survey conducted by the Ministry of Health of the Republic of Indonesia in 2015 regarding the coverage of pulmonary TB case detection, the results showed that the range of all TB cases in Indonesia in
2014 was 285,254 cases. Meanwhile, the number of new cases of smear-positive lung TB was 176,677 cases. The percentage of CDR or Case Detection Rate of TB cases in Indonesia is 70.08%\(^3\). One of the efforts to control and cope with the number of TB sufferers is medication. The indicator used for the evaluation of treatment is the success rate of the program. The government calculates the treatment success from the cure rate and the complete treatment rate\(^4\).

In 2018, pulmonary TB treatment (success rate) was the highest in Indonesia in West Sulawesi Province, which was 92.37%. The success of pulmonary TB treatment was the lowest in West Papua Province was 35.88%. The average success rate of pulmonary TB treatment in 34 areas in Indonesia in 2018 was 78.58%\(^5\). The 2018 Indonesia Basic Health Survey report states that the prevalence of clinical pulmonary TB spread throughout Indonesia is around 1.0%. Several provinces recorded as having prevalence rates above the national figure are Aceh, Jakarta, Yogyakarta, West Sumatra, Riau Islands, West Nusa Tenggara, East Nusa Tenggara, South Sulawesi, Central Sulawesi, and eastern Indonesia\(^6\).

The success of pulmonary TB treatment as one of the national health problems is now a concern. We need an in-depth analysis of the causative factors to increase it. This study aimed to analyze the success of pulmonary TB treatment in Indonesia.

**Materials and Methods**

**Study Design**

The authors use an ecological analysis to design the study. Comparisons between communities, not individuals, rely on environmental studies. The analyzed data is the aggregate data at a specific community or level, the provincial level in this analysis. Aggregate measures, ecological measurements, or global measurements may be variables in an ecological study\(^7,8\).

**Data Source**

The study carried out an analysis using secondary data from “Data and Information on the 2018 Indonesia’s Health Profile”\(^5\). The sample was 34 provinces in Indonesia.

**Data Analysis**

The dependent variable in this study is the percentage of successful treatment of pulmonary tuberculosis. This study’s independent variables were the completeness of pulmonary TB treatment, the portion of the smoking population, the public health center’s ratio per district, and the poor people. All variables consist of three parts of the same size. The data were analyzed by univariate and bivariate. Besides, the bivariate analysis performs using cross-tabulations. The entire analysis process uses SPSS software.

**Results and Discussion**

Table 1 shows the variables’ descriptive statistics in the ecological analysis of pulmonary TB treatment success in Indonesia. The number of samples is 34, which are all provinces in Indonesia.

## Table 1. Descriptive Analysis of the Success of Pulmonary TB Treatment in Indonesia in 2018

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Percentage of Successful Treatment for Pulmonary TB</th>
<th>Percentage of completeness of pulmonary TB treatment</th>
<th>Percentage of Population Smokes</th>
<th>The ratio of Public Health Center</th>
<th>Percentage of Poor Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Mean</td>
<td>78.5862</td>
<td>10.9579</td>
<td>31.7771</td>
<td>1.5456</td>
<td>10.6482</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>11.80766</td>
<td>5.31742</td>
<td>2.86843</td>
<td>1.04999</td>
<td>5.67326</td>
</tr>
<tr>
<td>Range</td>
<td>56.49</td>
<td>24.69</td>
<td>10.76</td>
<td>6.57</td>
<td>23.88</td>
</tr>
<tr>
<td>Minimum</td>
<td>35.88</td>
<td>2.61</td>
<td>25.80</td>
<td>0.73</td>
<td>3.55</td>
</tr>
<tr>
<td>Maximum</td>
<td>92.37</td>
<td>27.30</td>
<td>36.56</td>
<td>7.30</td>
<td>27.43</td>
</tr>
<tr>
<td>Percentiles 33.333</td>
<td>78.3367</td>
<td>7.3267</td>
<td>30.7333</td>
<td>1.3067</td>
<td>7.2100</td>
</tr>
<tr>
<td>Percentiles 66.666</td>
<td>85.5767</td>
<td>13.7833</td>
<td>32.7600</td>
<td>1.4567</td>
<td>12.1467</td>
</tr>
</tbody>
</table>

Source: Data and Information on the 2018 Indonesia’s Health Profile
Table 1 shows a descriptive analysis of the success of pulmonary TB treatment in Indonesia in 2018. Based on Table 1, the lowest percentage of successful pulmonary TB treatment was in West Papua Province at 35.88%, and the highest was in West Sulawesi Province at 92.37%. Meanwhile, the percentage of success in pulmonary TB treatment on average from 34 provinces was 78.58%.

Table 2. Cross-tabulation of the Success of Pulmonary TB Treatment with Completeness of Pulmonary TB Treatment

<table>
<thead>
<tr>
<th>Completeness of pulmonary TB treatment</th>
<th>The Success of Pulmonary TB Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (35.88%-78.34%)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (2.61%-7.33%)</td>
<td>4</td>
</tr>
<tr>
<td>Middle (7.34%-13.79%)</td>
<td>2</td>
</tr>
<tr>
<td>High (13.80%-27.30%)</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Data and Information on the 2018 Indonesia’s Health Profile

Table 2 shows the cross-tabulation between the success of pulmonary TB treatment and completeness of pulmonary TB treatment. The analysis results show that in provinces with a high percentage of pulmonary TB treatment success, as much as 9.1% are in a low percentage of completeness of pulmonary TB treatment. Table 2 shows that the rate of successful pulmonary TB treatment that is high tends to be lower in provinces with a low percentage of completeness of pulmonary TB treatment. Areas with the low entirety of pulmonary TB treatment have low pulmonary TB treatment success.

Treatment of sensitive TB patients and RO TB principally consists of two stages: the initial stage and the advanced stage. The treatment phase must be undertaken regularly and correctly by TB patients to recover and minimize the risk of Multi-Drug Resistant TB (MDR) or even Extensively Drug-Resistant (XDR). The DOTS (Directly Observed Treatment Short Course) strategy is the direct supervision of short-term treatment with every tuberculosis program manager’s obligation to focus attention on finding sufferers by microscopic examination. Health worker must observe each patient in swallowing the drug, each drug that the patient swallows must be in front of a supervisor. Health workers must also organize patients’ treatment in a management system, distribution with sufficient drug supply. Each patient must then receive good medicine, meaning standard short-term treatment that has been clinically proven to be effective.
Table 3. Cross-Tabulation of the Success of Pulmonary TB Treatment with a Smoking Population

<table>
<thead>
<tr>
<th>Percentage of Population Smokes</th>
<th>The Success of Pulmonary TB Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (35.88%-78.34%)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (25.80%-30.74%)</td>
<td>1</td>
</tr>
<tr>
<td>Middle (30.75%-32.76%)</td>
<td>5</td>
</tr>
<tr>
<td>High (32.77%-36.56%)</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Data and Information on the 2018 Indonesia’s Health Profile

Based on table 3, it appears that the cross-tabulation between the success of pulmonary TB treatment and the smoking population. Table 3 shows the provinces with the highest percentage of lung TB treatment success were provinces with a high rate of smoked people, namely 45.5%. It shows that there is a tendency that a high percentage of the population who smokes tends to have a low rate of successful pulmonary TB treatment.

Smoking is the leading cause of TB, the world’s deadliest infectious disease\textsuperscript{10–12}. Based on gender, the number of new TB cases in 2017 in men was 1.4 times greater than in women. Even based on the Tuberculosis Prevalence Survey, men’s prevalence is three times higher than in women’s. The same is true in other countries. It may be because men are more exposed to TB risk factors, such as smoking, and less medication adherence\textsuperscript{13}. This survey found that of all male participants who smoked as much as 68.5% and only 3.7% of female participants smoked\textsuperscript{14}.

Table 4. Cross-tabulation of the Success of Pulmonary TB Treatment with the ratio of Public Health Center per district

<table>
<thead>
<tr>
<th>The ratio of Public Health Center per district</th>
<th>The Success of Pulmonary TB Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (35.88%-78.34%)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Low (0.73%-1.31%)</td>
<td>5</td>
</tr>
<tr>
<td>Middle (1.32%-1.46%)</td>
<td>4</td>
</tr>
<tr>
<td>High (1.47%-7.30%)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
</tr>
</tbody>
</table>
Table 4 shows the cross-tabulation between pulmonary TB treatment’s success with the ratio of Public Health Center. The analysis showed that the provinces with a high percentage of pulmonary TB treatment success, 45.5% had a high Public Health Center ratio. Table 4 shows that high Public Health Centers’ ratio tends to be more in provinces with high pulmonary TB treatment success. Regions with a low proportion of Public Health Center have low pulmonary TB treatment success. In Indonesia, the Public Health Center is the leading health care facility that deals directly with the community15,16. Therefore, the pulmonary TB treatment program’s success is closely related to the ratio of the Public Health Center per district.

Table 5. Cross-tabulation of the Success of Pulmonary TB Treatment with the Percentage of Poor Population

<table>
<thead>
<tr>
<th>the Percentage of Poor Population</th>
<th>The Success of Pulmonary TB Treatment</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (35.88%-78.34%)</td>
<td>Middle (78.35%-85.56%)</td>
<td>High (85.57%-92.37%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Low (3.55%-7.21%)</td>
<td>1</td>
<td>9.1</td>
<td>5</td>
<td>41.7</td>
</tr>
<tr>
<td>Middle (7.22%-12.14%)</td>
<td>4</td>
<td>36.4</td>
<td>3</td>
<td>25.0</td>
</tr>
<tr>
<td>High (12.15%-27.43%)</td>
<td>6</td>
<td>54.5</td>
<td>4</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>100</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Data and Information on the 2018 Indonesia’s Health Profile

Table 5 shows the cross-tabulation between the success of pulmonary TB treatment with the poor. The results show that the provinces with a high percentage of pulmonary TB treatment success, as much as 54.5% have a low rate of poor people. Table 5 shows that the low percentage of poor people tends to be more in provinces with high pulmonary TB treatment success. Regions with a high rate of poor people have low TB treatment success. Previous studies found that the factor affecting the use of health facilities for outpatient treatment was wealth status. People with good wealth or socioeconomic status have a great opportunity to better use health facilities for outpatient treatment17,18. People with higher wealth status have smaller barriers to access health services, both service and transportation cost barrier19,20.

**Conclusions**

The research concluded four independent variables studied were related to the success of pulmonary TB treatment. The four variables are completeness of pulmonary TB treatment, Percentage of Smoking Population, Ratio of Public Health Center per district, Percentage of Poor Population.

**Acknowledgments:** The authors thank the Ministry of Health of the Republic of Indonesia for providing the reports. Through this data, the author can carry out analysis in this manuscript.

**Source of Funding:** Self-funding

**Ethical Clearance:** The study was conducted by utilizing secondary data from published reports. For this
reason, the study not required ethical clearance in the implementation.

**Conflicting Interests:** Nil

**References**

Ecological Analysis of Health Resource Related to Measles at Primary Health Center in Indonesia

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Abstract

Measles is a vaccine-preventable disease. The case increases over the past 3 years in Indonesia. The study aimed to analyze the correlation between health resources and measles. The ecological analysis was conducted using secondary data from the Ministry of Health report in 2019. All provinces were taken as samples. Apart from measles cases as a dependent variable, while the independent variable consists of a ratio of public health center (PHC), a number of active Posyandu (Integrated Health Post), adequacy of midwives, availability of five types of promotive-preventive health workers at PHC, availability of drug and essential vaccine at PHC and the obedience of district drug warehouse to applied good management of drug and vaccine. The univariate analysis shows a descriptive table. Bivariate analyses were analyzed using a scatter plot. The results show a gap of measles cases between province in Indonesia were uneven. The highest measles cases occurred at Central Java (1,310 cases) and the lowest at North Maluku (0 cases). The mean of suspect measles was 226, the higher cases of mean were dominated at Java. The variable of health worker and health logistic depict a random pattern with measles cases. It was concluded that the effectiveness of health workers to prevent measles was measured by their performance. As well as optimizing the potential of five types of promotive-preventive health workers at the PHC. The choice of method in distribution management and vaccine management at the health center level must be a concern.

Keywords: ecological analysis, health resources, measles, primary health center.

Background

Measles is a public health challenge in Indonesia. The agent is Paroxymvirus that highly contagious and often cause outbreaks. The disease cause life long complications even mortality. The disease infects the respiratory tract which is transmitted through droplets containing a virus. Symptoms of measles include high fever, skin rash, and cough. Humans asa host who transmitted the disease. People with measles are very susceptible to infected by other diseases caused attacked the respiratory tract and the immune system.

Half of global measles mortality came from South-East Region (SEARO)3. Indonesia is one of the “big six countries” with measles endemic4. The susceptible group of measles in Indonesia wasa child aged more than 1-year-old, unvaccinated infants, adolescents, and young adultsfor the second dose. The high incidence of measles occurred in a child aged less than 5 years were reached 5% in 20135. More than 11,000 cases of suspected measles are reported in Indonesia each year, as much as 12% to 39% were being confirmed measles. The incidence rate of measles per 100,000 population during 2011-2017 tends to decline but tends to increase in the last 3 years (2015-2017). The frequency of measles outbreak has also increased over the last 3 years.

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Measles outbreak report coverage during 2015-2017 spread wider to 30 provinces (before only 27 provinces)\(^6\).

Measles elimination is targeted to be achieved by 2020, however, measles cases finding an increase in 2019. Ensuring the quality of immunization can be seen from the aspect of facilities and service providers. A study found inadequate the facility of the vaccine will encourage the measles risk\(^2\). According to the background, the study aimed to analyze the correlation between health resources with the case of suspected measles at primary healthcare.

**Materials and Methods**

The study was designed using an ecological analysis approach. Ecological studies focus on comparisons between groups, not individuals. The data analyzed was aggregate data at a certain group or level, which in this study was the province level. The variables in an ecological analysis can be aggregate measurements, environmental measurements, or global measurements\(^7,8\).

The study was conducted using secondary data from the 2019 Indonesia Health Profile report. A total of 34 provinces in Indonesia were involved in this analysis. The dependent variable in this study was measles cases. There were 3 independent variables analyzed, namely adequacy of midwives at PHC, the availability of five types of a promotive-preventive health worker at PHC, the obedience of district drug warehouse to apply good management for drug and vaccine. Data were analyzed by univariate and bivariate. The bivariate analysis was performed using the scatter plot.

**Results and Discussion**

Measles elimination is a success indicator of Millennium Development Goals (MDGs) to reduce 2 to 3 global child mortality by 2015\(^9\). WHO-SEAR set regional goals for eliminating measles by 2020\(^10\). Indonesia as part of them has conducted a campaign of MR vaccination as government commitment to measles elimination, control of congenital rubella syndrome at 2020\(^11\). The suspected cases of measles in 2019 increased compared to 2018. The number of cases found in 2019 was 8,819, while in 2018 it was only 8,429. The distribution of suspected measles cases occurred in almost all provinces in Indonesia. Only 1 province out of 34 provinces in Indonesia had no suspected measles cases, namely North Maluku\(^12\).

Identified nine provinces with suspected measles cases above the average including Central Java (1,310), Jakarta (1,069), Aceh (944), East Java (658), West Java (621), Yogyakarta (591), South Sumatra (568), South Sulawesi (293), and Lampung (252). The case of suspected measles dominated at Java Island. Java was the highest population density in Indonesia. Someone can be infected by measles while doing activities either at home, school, or public space\(^13\). Research of Yogyakarta found a higher population density will increase the transmission risk of measles. A high-density population encourages easier transmission between people\(^14\).

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case of suspected measles</td>
<td>34</td>
<td>0.00</td>
<td>1.310</td>
<td>226.32</td>
<td>338.73</td>
</tr>
<tr>
<td>The adequacy of midwife at PHC</td>
<td>34</td>
<td>0.00 %</td>
<td>68.45 %</td>
<td>10.58 %</td>
<td>16.89</td>
</tr>
<tr>
<td>The availability of five type promotive-preventive health worker at kecamatan PHC</td>
<td>34</td>
<td>13.62 %</td>
<td>92.19 %</td>
<td>45.62 %</td>
<td>17.63</td>
</tr>
<tr>
<td>The obedience of a district drug warehouse to apply good management for drug and vaccine</td>
<td>34</td>
<td>50.00 %</td>
<td>100.00%</td>
<td>91.48 %</td>
<td>12.61</td>
</tr>
</tbody>
</table>

Source: The 2019 Indonesia’s Health Profile
Health Worker

The health worker factor assessed the adequacy of a midwife at PHC and the availability of fivetypes of promotive and preventive personnel at PHC. The adequacy of midwives described the proportion of midwives shortage at PHC. Table 1 figured the proportion of midwives shortage exceeding 50% at Papua (53.26%) and Jakarta (68.45%). Three provinces did not declare a shortage of midwives (0.00%) including Lampung, Bali, and Bangka Belitung. The proportion of PHC who have 5 types of promotive-preventive health workers in Indonesia in 2019 is quite low (less than 50%) and varies between provinces. The lowest percentage was Jakarta (13.65%). Figure 1 showed a random tendency of all variables of health workers. The highest case of suspected measles in 2019 was in Central Java, both the variable was good. Meanwhile, Jakarta placed at the second rank showed both the variable were low.

Health workers and healthcare facilities were inseparable. Health workers as the main actor of service. The random pattern of results indicated the performance variability of health workers between provinces. In Indonesia, measles immunization is a responsible program of PHC but nationally also provided at Posyandu by midwife. Besides, the high ratio of Posyandu did not correlate to high coverage of measles immunization caused lack of health resources, such as the health worker. The geographic disparity caused the immunization coverage of the “big six countries” especially India, Bangladesh, Indonesia, and Myanmar was not the track. The countries can not achieve the outlined goals to eliminated measles by 2020. The disparity between the eastern and western regions of Indonesia has inhibited the acceleration of equitable development. Although immunization was provided free charge, but not guarantee the immunization coverage achieved the target, especially for the community who live in hardly achievable areas.

Thus, the health worker in areas with physical constraints have to innovative programs to increase coverage.

The sufficient of health worker must be well knowledge through measurable and precise training, both the material and target people should be thought to a minimized knowledge gap and good skills of communication. Several studies found increasing the knowledge of parents, especially mothers, regarding the willingness to immunization. Religion could be a source of public distrust, such as Aceh is the only province that applied shari’ah law, while had the lowest measles vaccination coverage at 54%. The study found related to our study result that cases finding of suspected measles at Aceh placed at the third-ranked after Jakarta.
According to the Regulation of Minister of Health number 75, 2014, the PHC is required to recruit at least five types of promotive and preventive health workers, consist of pharmacy personnel, medical laboratory technologist, nutritionist, public health professional, and sanitarian. The health worker should be strengthened promotive-preventive program at the PHC level, such as surveillance. Evaluation of measles surveillance in East Java was weak. The problems include the accuracy and completeness of data. Besides, it is related to a lack of human resources. A study of North Sumatera also recommended to all PHC and authorities to conduct a strict measles surveillance. According to the study, in the low-middle, doctors and nurses were prioritized to provide services, including promotive-preventives. Meanwhile, the promotive-preventive health worker has the appropriate competence for strengthening surveillance. Unfortunately, the distribution of them varied focused on near urban, accredited, and independent financial.

Health Logistic

Health logistic assessed the obedience of the district drug warehouse to applied good management for drug and vaccine. Table 1 above 90% district drug warehouse applied standard management for drug and vaccine. The low coverage was Jakarta (50%), West Papua (53.85%), and North Maluku (70%). Figure 2 showed a random tendency of all variables of health logistics. High suspected measles cases occurred in provinces with good health logistics.

Drug and vaccine management at Jakarta has been directly transferred to the sub-district drug warehouse through Regional Budget and Expenditure Income, while the data reported drug management in District Health Office (DHO). However, the other province from eastern Indonesia which is very likely to be constrained by geographical aspects and supporting facilities for storing drug and vaccine. As cold chain product, the critical point of a vaccine is temperature control. A study at Western Uganda found the vaccine effectiveness is lower in the Southeast Asian. The effectiveness is influenced by vaccine factors, such as vaccine quality and the adequacy of the cold chain. The study in remote and border areas of Indonesia...
explained unstable electricity and bad weather such as a village in a hard area of a small isle were being inhibited factors on vaccine storage. The electric generator has provided, unfortunately, the operational was constrained by the fuel prices, distance, as well as the road condition\textsuperscript{15,25}. Vaccine damage in the PHC frequently due to geographic constraints, travel time, lack of temperature monitoring, and inadequate supporting facilities such as cool packs\textsuperscript{26}.

![Figure 2. Scatter plot of suspected measles cases with the variable of health logistic in Indonesia, 2019](source)

The assessment provides at the DHO level, while the weakness of drug and vaccine management potentially at PHC and other lower levels. A study at PHC in Sidoarjo showed the weakness of recording of a cold chain, consist of weekly and monthly maintenance such as storage tools and routinely temperature recording\textsuperscript{27}. Meanwhile, the study at Pasuruan found not standard vaccine distribution facilities, inappropriate treatment vaccine preparation, and vaccine after used by the midwife at Posyandu\textsuperscript{28}. Distribution management a crucial process to maintained the vaccine quality. A study figured a better vaccine distribution management in Belitung. The DHO was distributed to PHC. The distribution to the Posyandu by midwives and supporting by standard facilities such as proper vaccine carrier and an ice pack. As the isle area, the health worker developed a good relationship with the boat’s owner, there were almost no problems related to the vaccine’s quality in the field\textsuperscript{15}.

**Conclusions**

All variables figures a random tendency, which means no correlation with the number of suspected measles. The effectiveness of health workers to prevent measles was better measured by their performance. As well as optimizing the potential of promotive-preventive health workers at the PHC. Management of vaccine storage and distribution at the PHC level must be a concern. Physical factors, such as geographical and electrical disparity also socio-economics factors, such as religion must be considered as inhibiting factors.

**Acknowledgments:** Thank you to the Center of Data and Information as part of the Indonesian Ministry of Health for providing the Indonesia’s Health Profile in 2019. Through this data, the analysis in this manuscript can be carried out.

**Source of Funding:** Self-funding
Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, ethical clearance is not required in the implementation of this study.

Conflicting Interests: Nil

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22. Rosita, Su’udi A, Mujati, Mardikani S, Wibowo. Availability of Health Workers of Promotion and


The Effect of Breastfeeding Technique Demonstration Methods on Baby Weight

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Abstract

Optimize the development of children in NTB Province, the NTB golden generation program was launched. One of the efforts made to create a golden generation is by giving exclusive breastfeeding. Exclusive breastfeeding coverage in North Lombok Regency decreased from 73.94% to 45.50%. Breastfeeding failure is usually caused by improper technique and position. This study aimed to determine the effect of the demonstration of the correct breastfeeding technique on infant weight. This type of research is pre-experimental with one group pre-post test design. The population was all breastfeeding mothers and babies at the Posyandu in Jenggala Village. The sampling technique used purposive sampling. The number of samples was 32 people. Data analysis using paired sample t-test. The results showed that the baby’s weight before the demonstration of the breastfeeding technique was most appropriate, namely 90.6%, and the bodyweight after the demonstration of the breastfeeding technique was mostly by it, namely 100.0%. The results of the paired sample t-test obtained a value of 5.568 with a p-value of 0.000 (p <0.05), this indicates that there is an effect of the correct method of breastfeeding demonstration technique with the baby’s weight. This study concludes that underweight babies can be increased by providing the correct breastfeeding technique so that the baby’s weight increases.

Keywords: Demonstration, Breastfeeding Technique, Weight Loss

Introduction

Health development is part of national development. One of the goals of health development is to reduce infant mortality. The infant mortality rate according to the Sustainable Development Goals (SDGs) in 2015 amounted to 40 per 1000 live births and still ranks the 4th highest infant mortality in ASEAN. Infant mortality rate (IMR) is the number of infant deaths within the first 28 days of life per 1000 live births¹. According to Moascara (2011), many studies have been carried out, using sophisticated technology, but not preventive, the most effective way to save babies in Indonesia is to initiate early breastfeeding (IMD) and provide exclusive breastfeeding.

Exclusive breastfeeding coverage in Indonesia is low compared to India, 46% and better than the Philippines 35% and Vietnam 27%. The low level of breastfeeding (ASI) is a threat to children’s development. As is known, babies who are not breastfed, for at least 6 months, are more prone to experiencing nutritional deficiencies². Breastfeeding failure is usually caused by improper technique and position. The correct breastfeeding technique is one of the factors that influence the success of breastfeeding. According to Rinata et al³, breastfeeding with the wrong technique causes problems such as blisters and milk does not come out optimally, which affects milk production, causing babies to be reluctant to breastfeed. With the correct breastfeeding technique, this reduces the bad effects for the mother and the baby itself. Often babies feel confused and cry because there is no response from the mother so that milk production is also not optimal, the baby becomes fussy, has difficulty sleeping, is restless, and cries. This is because the baby’s
needs have not been met and cause weight loss\(^{(1)}\).

The correct breastfeeding technique will encourage the maximum release of breast milk so that breastfeeding success can be achieved. One sign of the success of the correct breastfeeding technique is the child’s weight gain or increase\(^{(4,5)}\). Based on the results of a preliminary study on breastfeeding mothers in Jenggala village, Tanjung sub-district, North Lombok Regency, data on the number of babies aged 0-5 months were 50 with 13 people with bodyweight/age on the yellow line and 6 people on the red line (BGM ). As for babies with exclusive breastfeeding as many as 47 people and without exclusive breastfeeding as many as 3 people. After observing 7 breastfeeding mothers who visited the integrated service post of Jenggala village, Tanjung sub-district, North Lombok regency with 4 babies weighing <5 kg (age 4 months), 1 baby weighing 5.1 kg (5 months old), and age. 3 months as many as 2 people with weight 5 kg and 6 kg. Based on the background description, the authors are interested in researching the effect of the correct method of demonstration of breastfeeding techniques on baby weight at the Posyandu in Jenggala Village, Tanjung District, North Lombok Regency, West Nusa Tenggara Province in 2019.

**Method**

This type of research is pre-experimental with one group pre-post test design. The population is all mothers and babies at the Posyandu Desa Jenggala. The sampling technique used purposive sampling. The variables in this study were the independent variables of the correct breastfeeding technique demonstration, the measurement using SOP, and the dependent variable of the baby’s weight, the measurement using a scale. The number of samples was 32 people with inclusion criteria, namely breastfeeding mothers in good health, willing to be respondents, and babies in good health. Exclusion criteria for mothers who do not provide exclusive breastfeeding, health workers who visit integrated service post, breastfeeding mothers with comorbidities such as heart disease, diabetes mellitus, preeclampsia and eclampsia, babies with disorders and comorbidities (Labiopalatokizis, atresia ani, atresia biliary, hydrocephalus, heart disease default). This research will be conducted at the Posyandu in Jenggala village. This research was conducted from March 1 to April 21, 2019. The statistical test in this study used the Paired Sample T-Test

**Result**

**Univariate Analysis**

| Table 1 The Gender of Babies at the Jenggala Village Posyandu in 2019 |
|-------------------------|-----------------|-----------------|
| Gender                | Total | Percentage |
| Male                   | 17    | 53.1          |
| Female                | 15    | 46.9          |
| Total                 | 32    | 100           |
| Age                   |       |               |
| 0-3 Months            | 19    | 59.4          |
| 4-5 Months            | 13    | 40.6          |
| Total                 | 32    | 100           |
| Weight                |       |               |
| Fit                   | 29    | 90.6          |
| Not suitable          | 3     | 9.4           |
| Total                 | 32    | 100           |
| Increase in Baby Weight |       |               |
| Fit                   | 32    | 100           |
| Not suitable          | 0     | 0,0           |
| Total                 | 32    | 100,0         |
Based on table 1 above, it is found that most of the male gender is 17 people or 53.1% and the female gender is 15 people or 46.9%. Most of them were between 0-3 months as many as 19 people or 59.4% and aged 4-5 months as many as 13 people or 40.6%. The bodyweight of babies before being given a demonstration of the correct breastfeeding technique was most appropriate, namely as many as 29 people or 90.6% and not as many as 3 people or 9.4%. Most of the babies’ weight after being given a demonstration of the correct breastfeeding technique was 32 people or 100%.

**Bivariate Analysis**

**Table 2 Paired Sample T-Test Results**

<table>
<thead>
<tr>
<th>Baby’s weight</th>
<th>t</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>5.568</td>
<td>31</td>
<td>.000</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on table 2 above, the results of the paired sample t-test obtained a value of 5.568 with a table of 2.042 (t<sup>count</sup> > t<sup>table</sup>) with a significant level of 5% and a value of p = 0.000 (p < 0.05), which means that there is an effect of the technique demonstration method, correct breastfeeding against baby weight.

**Discussion**

Based on the results of research on breastfeeding mothers at Posyandu, Jenggala village, Tanjung sub-district, North Lombok Regency, the results showed that there was an effect of the correct method of demonstration of breastfeeding techniques on the baby’s body weight, this is based on table 4.5, the results of the paired sample t-test obtained value of 5.568 (t<sup>count</sup> > t<sup>table</sup>) with a significant level of 5% and a p-value of 0.000 (p < 0.05), which means that there is an effect of the correct method of demonstration of breastfeeding techniques on the baby’s weight. In line with the research conducted by Sofiana<sup>(6)</sup>, it was found that the effect of correct breastfeeding techniques on the increase in body weight of infants aged 0-5 months at the Jenggala village integrated service post, Tanjung District, North Lombok Regency, West Nusa Tenggara Province in 2019 with a value of p = 0.000.

**Conclusion**

Infant body weight before being given a demonstration of the correct breastfeeding technique was mostly appropriate at 90.6%. The baby’s body weight after being given the correct breastfeeding technique was most appropriate, namely 100%. There is an effect of the correct method of demonstration of breastfeeding techniques on the bodyweight of infants aged 0-5 months at the Jenggala village integrated service post, Tanjung District, North Lombok Regency, West Nusa Tenggara Province in 2019 with a value of p = 0.000.

**Acknowledgment:** I would like to thank the respondents who participated.

**Conflict on Interest:** There is no conflict of interest to be declared

**Source of Funding:** None

**Ethical Clearance:** The study was approved by the health research ethics commission

**References**


Potential Therapy from Punica granatum Peel Extract for the Treatment of Recurrent Aphthous Stomatitis. Design, Formulation and Characterisation of a Mucoadhesive Patch

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Abstract

Recurrent aphthous stomatitis (RAS) is an inflammation that occurs in oral mucosa. Etiology of RAS may be caused by several factors involving systemic conditions, local, microbes (Candida albicans), moniliasis, hygiene and genetics. Several studies has shown that pomegranate (Punica granatum L.) peel serves to inhibit Candida albicans, antibacterial Staphylococcus aureus, Staphylococcus mutans, Escherichia coli and antifungal Aspergillus niger, which is common microorganisms involved in dental and oral problems. This study aims to formulate a pomegranate peel extracts (PPE) mucoadhesive patch and test its effectiveness in healing sores. PPE obtained from the maceration method. Polyvinylpyrrolidone patch formulations, chitosan and Hydroxypropyl Methyl Cellulose (HPMC) using a ratio of 1:1, 2:1, and 3:1 weight/volume. Patch tested his physical characteristics, including weight uniformity, uniformity of dimension, thickness, surface pH, swelling and adhesion test, and in vivo test. The F8 formulation of PPE 10% with the addition of HPMC, tween, and glycerin have a fairly elastic properties. Even though experiment of physical evaluation produce uniformity of same weights and dimensions, pH 6.63, an average of swelling percentage 40.69% ± 16.37% and an average of stickness 13.50 ± 11.6 seconds. In vivo test show that formulation of PPE 10% has the same effectivity in reducing the diameter of the mouth ulcers with the positive control group.

Keywords: Recurrent aphthous stomatitis, Pomegranate peel, Mucoadhesive Patch, Antioxidants, In vivo.

Introduction

Recurrent aphthous stomatitis (RAS) is a disease that is often encountered in society. This disease is characterized by the presence of white round lesions or sores on the oral mucosa [1]. Based on research, RAS is caused by several factors, including local trauma, bacteria, systemic, nutrition, genetics, allergies and immunology[2]. The lesions that form in sprue can actually heal on their own without medication therapy. However, the formation of RAS lesions can interfere with the patient’s physical activity due to the pain they experience. Therefore, medical therapy is needed to overcome this.

In the medical world, topical disinfectant and anti-inflammatory agents have been developed to treat RAS. The preparation for RAS can be in the form of mouthwash or ointment. However, the form of mouthwash or ointment is still ineffective in overcoming RAS because of its use which covers the entire oral cavity and the short period of contact between the active substance and the RAS in the mouth. Meanwhile, in the last few years, there have been many herbal medicines such as black cumin[3], okra seeds[4,5] and pomegranate[6,7]. One plant that has been widely researched is pomegranate peel.
Research shows that pomegranate peel extract contains compounds that function as antioxidants\cite{8,9,10}, anti-bacterial\cite{11,12}, anti-fungal\cite{13}, and as a potent analgesic and anti-inflammatory\cite{14}. Its content is very necessary in dealing with RAS. However, a modification is needed, so that the extract can become a preparation that can work optimally to treat RAS. One alternative that is considered suitable for topical application to mucosal tissue is mucoadhesive patches. Mucoadhesive preparations are designed to adhere to the mucosal layer which can prolong the residence and contact time of the drug on the site of application or absorption as to increase drug bioavailability\cite{15}. This can increase the therapeutic effect of the drug and is also effective, practical, comfortable, and easy to apply by simply attaching it to the affected area to accelerate healing.

The mucoadhesive characteristics of the patch need to be supported by the use of suitable materials. Several previous studies made use of various synthetic, semisynthetic, and natural polymers. Chitosan is a cationic polymer produced by the synthesis of natural compounds which has high adhesion as a mucoadhesive polymer\cite{16}. Polyvinylpyrrolidone (PVP) is used as an expansion agent so that it is useful for increasing drug release, increasing elasticity and forming a film layer on the patch\cite{17}. This combination will later function to improve the local drug delivery system. So, it is hoped that later it will help provide a quick (effective) and potential effect.

This study aims to develop a patch preparation for pomegranate peel extract based on chitosan and polyvinylpyrrolidone as new candidates in the treatment of RAS. In addition, the results of the patch formulation will be tested in vivo on male white rats Wistar strain to see the effectiveness of healing RAS. This research is expected to play a role in the implementation of the “back to nature” program recommended by World Health Organization (WHO) to promote the use of natural traditional medicines in maintaining public health. This momentum is perfect for Indonesia to be more serious in developing and increasing the production of indigenous Indonesian medicines by applying the latest science and technology. The results of this study are expected to have good prospects for commercial preparations through collaboration with the pharmaceutical industry in the future.

Materials and Methods

This research was conducted from February 2013 to June 2013. The research was conducted in Unit 2 Fitomedicine, Gadjah Mada University and, Research Laboratory and in Animal Laboratory, Faculty of Medicine and Health Sciences, Muhammadiyah University of Yogyakarta.

Pomegranate rind (Punica granatum L.) was obtained from Pakem Kaliurang Yogyakarta, Indonesia in January and February 2013 and has been determined at the Laboratory of Pharmaceutical Biology Unit II, Faculty of Pharmacy, Gadjah Mada University.

Commonly used glassware (Pyrex, USA) were analytical scales, water baths, vacuum rotary evaporators, ovens, erlenmeyer flasks, electric stoves, freezers, and digital scales. The materials were Chitosan (Pioneerbiotech, China), Polyvinylpyrrolidone (PVP) (Sigma-Aldrich, Germany), Hydroxypropyl methylcellulose (HPMC) (Shijiazhuang Jianxin Cellulose Co., Ltd, UK), Pappermint (Indotrading, Indonesia), acetic acid (Indo Acidatama, Indonesia), aquadest (Indo Daisun Sakti, Indonesia). Male white rat (Rattus norvegicus L.) used aged 40-60 days with a body weight of about 150-200 grams, 10% hydrogen peroxide (H2O2) and chloroform, Broiler Pellet II, 70% ethanol, Albothyl® (Pharos, Indonesia).

Extraction

The extract was made using the maceration method. First, the dry skin of pomegranate (Punica granatum L.) was mashed in a blender so that it became a fine powder. The fine powder was then soaked in 70% ethanol solvent. The maceration process was carried out for 5 days followed by remaceration for 2 days. During maceration, occasionally the powder was being shaken out for a perfect search. After 5 days, the soaking powder was filtered and separated between the filtrate and the dregs formed. The separated filtrate would be evaporated with a rotary evaporator until a thick extract is formed while the dregs formed earlier would be remacerated for 2 days. The process for obtaining a viscous extract from
remacery was the same as in the maceration process.

**Patch Formulation**

The obtained extract was used as the active substance in the mucoadhesive patch preparation while the polymers used were PVP, HPMC, and Chitosan. The other additives were glycerin, tween 80, peppermint, 96% ethanol and aquadest. The dissolving method would be used in the preparation of this formulation. Chitosan was first dissolved using acetate buffer pH 4. HPMC and PVP were dissolved in 96% ethanol, respectively. After that, all the ingredients were mixed until they are homogeneous and dried until they form a film. In general, the table of variations in the composition of the formula can be seen in Table 1.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Active substance (% w/v)</th>
<th>PVP (% w/v)</th>
<th>Chitosan (%w/v)</th>
<th>Peppermint (%w/v)</th>
<th>HPMC (%w/v)</th>
<th>Tween</th>
<th>Glycerin</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>5</td>
<td>61.5</td>
<td>31</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F2</td>
<td>10</td>
<td>58</td>
<td>29.50</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F3</td>
<td>5</td>
<td>69.4</td>
<td>23.10</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F4</td>
<td>10</td>
<td>65.5</td>
<td>22</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F5</td>
<td>5</td>
<td>48.75</td>
<td>48.75</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F6</td>
<td>10</td>
<td>43.75</td>
<td>43.75</td>
<td>2.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F7</td>
<td>5</td>
<td>33.04</td>
<td>21.52</td>
<td>5.19</td>
<td>5.38</td>
<td>22.08</td>
<td>7.79</td>
</tr>
<tr>
<td>F8</td>
<td>10</td>
<td>30.29</td>
<td>19.72</td>
<td>5.19</td>
<td>4.93</td>
<td>22.08</td>
<td>5.19</td>
</tr>
</tbody>
</table>

**Physical Evaluation Test**

The physical evaluation tests carried out in this study included weight and dimensional uniformity, swelling test, pH test, adhesion test and adhesion time.

**Uniformity of weights and dimensions**

Each patch was weighed using a digital scale which then measured its thickness dimensions using a screw micrometer.

**Swelling Test**

The patch as dry weight (Wd) was placed into the test tube, then 1.0 mL of physiological NaCl was added to each test tube. The samples were then incubated at certain time intervals at 37 °C. After being removed from the incubator, physiological NaCl was removed and rinsed using aquadest three times. The sample was placed on a tissue to remove the stuck water before weighing the wet weight (Ww). The amount of% swelling was calculated using the following equation:

\[
\% \text{ swelling} = \frac{W_w - W_d}{W_d} \times 100
\]

**pH Test**

Each patch was allowed to expand in 1 mL of distilled water for 1 hour at room temperature. Furthermore, the pH of the patch surface was measured using a pH meter.

**Adhesion and Sticky Time Test**

The patch was affixed to the intestines of the mice which had been attached to the beaker glass. The beaker
glass was put into a container containing 0.9% NaCl physiological fluid. The container was then rotated with a magnetic stirrer. Furthermore, it was observed how long the patch was attached to the rat intestine.

**in vivo Test**

Patch effectiveness test was carried out in vivo using mice as samples. Rats were divided into 4 groups, namely negative, positive, untreated and treated controls. Each group consisted of 5 mice. In negative control, the mice induced with aphthous stomatitis were simply left alone without any drug administration. As for the positive control, the mice would be treated with albothyl®. Furthermore, for control without treatment, rats were given a patch without containing pomegranate peel extract (Punica granatum L.). As for control with treatment, rats were given a patch containing pomegranate peel extract (Punica granatum L.). Observations were made after 1, 3 and 5 days after treatment on test animals induced by thrush by measuring the diameter of the lesions on the affected part.

**Results and Discussion**

Patch formulation was carried out using the dissolving method. Based on the results of the formulations in table 1, it resulted a patch with quite different characteristics. Formula F1 - F6 had properties that were hard, less elastic and easily brittle. Meanwhile, the F7 and F8 formulas produced patches that were not hard and quite elastic, but still fragile. Therefore the patch at F7 and F8 was given an additional layer containing 0.19% PVP and 0.06% HPMC on top. PVP in this case functioned as an adhesive while HPMC functioned as a film forming agent. This layer functioned to maintain consistency, so that the resulting patch was not easily brittle. PVP is water soluble and these characteristics influenced miscibility with the mucoadhesive polymer, the uniformity of the film as well as permeability to water of the film matrix [18]. HPMC is a derivative of cellulose, obtained by substituting hydroxypropyl and methyl groups to primary and secondary hydroxyl groups, three factors, namely, methyl content, hydroxypropyl content, and molecular weight control the final properties and behavior of HPMC [19]. The molecular weight determined the viscosity in aqueous solution, with low molecular weight also correlating to good water solubility and good film-forming properties. Furthermore, a physical evaluation test was carried out on the patches with the F7 and F8 formulas which had better physical properties, so it increased the comfort of the formulations and possibly affected mucoadhesion through better interactions with the mucosa.

The uniformity of weight and dimensions obtained from the physical evaluation test of patches was uniform, because nothing deviated from 5%-10% of the average weight [20]. The pH test results that met the requirements of mucosal pH were patches with 5% extract resulting 6.63 because the pH range of human mucosa was 5.6 - 7 [21]. Yet, from the results of this pH test, pH optimization still needed to be done because after replicating pH measurements, the pH drop was unstable. Meanwhile, for the mean ± SD of extract 5% was 35.76% ± 15.87, and the mean ± SD of 10% extract was 40.69% ± 16.37%. The higher the% sweating, the higher the ability of the patch to absorb fluids in the environment, and the easier for the drug to be released or released from the drug dosage form (patch). Power test and patch adhesion time with 5% and 10% extract obtained mean ± SD of 31.01 ± 9.72 and 13.50 ± 11.6, respectively. The ideal adhesion test and patch adhesion time was above 180 minutes [22]. This test was part of the physical characteristics of the patch which was very important if the patch was to be used in biomedical applications, because it was a major factor in the mucoadhesive system [16].

The results of the in vivo test showed that there was no significant difference between the positive control group, 5% treatment, 10% treatment, and no treatment in reducing the diameter of RAS. However, the reduction in RAS diameter in the control group treated 10% was greater than the control group 5%. Meanwhile, the negative control group showed an increase in the development of RAS diameter. The graph of the effectiveness of the patch can be seen in Figure 1. The results showed that the patch containing 10% pomegranate peel extract had the same effectiveness as the positive control group containing albothyl®.
Conclusion

Pomegranate peel extract can be formulated with chitosan and polyvinylpyrrolidone (PVP) polymers into mucoadhesive patches with the addition of HPMC, tween and glycerin. Meanwhile, the characteristics of the patch (weight and dimensional uniformity, swelling, pH, adhesion and adhesion time) resulted from the formulation are sufficient. The in vivo test showed that the 10% treatment control group had the same effectiveness in reducing the diameter of thrush with the positive control group containing albothyl®.

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Conflict of Interest: The authors declared that there are no conflicts of interest relevant to the contents of this article.

Ethical Approval: The procedures were carried out in accordance with the recommendations of the Research Ethics Committee of the Faculty of Medicine and Health Science, Muhammadiyah University of Yogyakarta. This procedure were examined and approved by the Committee.

References


Introduction. Reform in the medical field is getting especially topical in the context of the Covid-19 pandemic, which has exposed the areas of concern that existed before. Professional negligence of health workers is an issue that needs to be improved in terms of statutory regulation.

The aim. Research of criminal and procedural aspects of professional negligence when providing medical care.

Materials and Methods. Modern literature sources and normative legal documents; method of theoretical analysis and conclusions systematization; comparative law and system-analytical method.

Findings and Discussion. The main issues arising during “medical crimes” investigation: the need to quickly obtain the decision of the investigating judge on temporary access to the stuff and documents; corrupt schemes, destruction of evidence; the difficulty of distinguishing negligence from medical error, accident and justified medical risk.

Conclusions. Areas of improvement of normative and legal regulation of cases of medical workers negligence are the following: development of unified methodical recommendations concerning medical crimes qualification, which can help to give a correct criminal and legal assessment of medical workers’ illegal activity.

Keywords: Professional negligence, criminal liability, medical worker; legal regulation, criminal case.

Introduction

The modern sector of medical services has changed significantly in the context of the Covid-19 pandemic. Many countries implement reforms in the health sector, provide medical care and legal support to health professionals. The issue of medical services quality is extremely important in today’s world, as the coronavirus pandemic has exposed the acute and topical problems existing before the pandemic. Different countries around the world have different approaches to the legal regulation of disputes arising as a result of inflicting harm to health and negligence of health professionals. For example, the United States, New Zealand, Canada, and the United Kingdom resolve such disputes mostly through civil law methods. Other countries, such as Japan, Saudi Arabia, Ukraine, Russia, and Belarus, in most cases deal with medical negligence disputes within criminal law. European countries combine the application of civil and criminal law in resolving health professionals’ negligence cases. Existing shortcomings in the system of legal regulation of inflicting harm to
health and negligence of medical workers require improvement of criminal law, which determines the significance of the research topic.

The aim. Research of criminal and procedural aspects of professional negligence when providing medical care.

Materials and methods. To write the article, modern literature sources and normative-legal documents regulating the sector of medical services provision, detection of professional negligence of medical workers and establishment of criminal liability for professional negligence of medical workers were used. To achieve the set goal, comparative law and system-analytical methods are used; method of theoretical analysis and systematization of conclusions.

Findings and discussion. Right to life is a fundamental right of every person, which is complemented by the rights to health, honor, dignity and freedom. One of the guarantees of the above rights is the establishment of responsibility in the field of health care for the doings threatening public values, including life and health of the patient.

The type of legal regulation mechanism depends on the specifics of the health care systems of a particular state, its legal traditions and the purpose of bringing to a particular type of legal liability. There are different approaches to resolve the issue concerning institution of criminal proceedings against medical workers for professional crimes. Thus, in the vast majority of states, the liability of such entities arises according to the general rule providing liability for inflicting harm to life and health. At the same time, the criminal legislation of other states includes special provisions, the subjects of which are exclusively medical workers.

Initiating criminal proceedings against health professionals is common in some countries. Thus, in the United Kingdom between 1990 and 2003, twenty-three criminal cases were instituted against doctors for gross negligence that caused a patient’s death. There are also cases of doctors being prosecuted for similar crimes in Canada, New Zealand and France.

According to the General Prosecutor’s Office of Ukraine, the most common crime is a crime specified in Art. 140 of the Criminal Code of Ukraine, in respect of which only in February 2019, 130 criminal offenses were registered, but in 23 cases criminal proceedings were ceased. Last year, 99 criminal offenses were registered under this article, and 3 criminal proceedings were ceased in the case.

It stands to mention that according to the data of the Unified State Register of Court Decisions, over the past 10 years, the largest number of charges were brought against obstetricians-gynecologists (about 30%), surgeons (about 23%), physicians (12%), anesthesiologists (11%).

Examining the outcome of open criminal cases concerning improper performance of professional duties by medical workers, V. Franchuk notes that courts in Ukraine have proved the guilt of medical workers in 109 (80.8%) cases. Acquittals were delivered by the courts in 8 (5.9%) cases, the other 18 (13.3%) cases were returned for further investigation due to inconsistency of the evidence collected during the pre-trial investigation or due to lack of established facts in this case. Such decisions were recorded as a result of the trial of 14 (10.4%) criminal cases. In another 3 (2.2%) cases, doctors were released from criminal liability due to the admitting to bail of the workforce, and in 2 (1.5%) cases - due to changes in the circumstances of the case.

There is a similar situation in civil proceedings: about 70% of lawsuits against doctors for medical negligence were rejected in Italy, and in the Federal Republic of Germany 2/3 of such lawsuits were rejected.

The analysis of medical and legal practice gives grounds to claim that the causes of defects are: low level of medical workers qualification; negligent and unconscientious performance of professional duties by medical workers, improper organization of medical care; non-compliance with health standards; formal attitude to the patient.

Assessing the statistics of medical errors, which differ from the cases of deliberate negligence of health professionals in foreign countries, it should be noted that in the leading countries of the world these concepts are distinguished. This is the main difference between the health care system of Ukraine and the leading countries.
of the world. This is the difference in attitude towards a
common person. Errors in the provision of health care in
leading countries can also occur, but cases of systemic
and deliberate negligence, if any, are rare.

According to various studies, almost 100,000
patients in Germany become victims of medical errors
each year. The condition of 11% of patients gets worse
due to improper treatment, 8% of medical errors lead to
death. In the United States, where the public information
system is most open, the situation is not better: about
100,000 patients become the victims of medical errors.
In the United Kingdom, errors in the doctors’ activities
kill about 70,000 people each year4.

From the point of view of criminal law, a medical
worker is considered taking into account two features.
The first one is the perception of a physician as the general
subject of the crime. The second one is the perception of
a medical worker as a special subject of the crime related
to the fact of obtaining medical education. Guided by the
following features, as well as the ability of the physician
to perform certain duties, all crimes for which medical
workers can be prosecuted are divided into three groups:

- professional medical crimes;
- official medical crimes;
- crimes for which medical workers are prosecuted
  on general grounds7.

Criminal liability is the most severe type of liability
of medical workers. Criminal liability is a type of legal
liability, which implies obligation of a person who
has committed a socially dangerous act (crime) to be
subject to restrictions of rights in the form of criminal
punishment. The basis for bringing a medical worker to
criminal responsibility is the commission of a crime8.

The issue of “professional medical crimes” is
important and quite controversial today, because for
their commission medical workers are prosecuted as
special subjects of the crime. A detailed definition of this
category, in our opinion, is provided by S.H. Stetsenko,
who notes that a professional crime should be deemed
to be an intentional or negligent doing committed by
a medical worker during the performance of his or her
professional duties, prohibited by the criminal law under
the threat of punishment9.

Having examined patients’ complaints, B. Hladun
points out that patients in Ukraine mostly complain
about poor quality of treatment, including incomplete
examination, incorrect or inaccurate diagnosis of the
disease, incorrect treatment or its negative result;
tactlessness, rudeness, and even offensive behavior of
medical staff. In fact, patients have much more grounds
for complaints10.

The main causes of medical errors in the focus of
Ukraine are:

- imperfection of certain diseases treatment methods;
- insufficient level of a particular medical worker
  training;
- lack of proper conditions necessary for the qualified
  treatment;
- imperfect study by medical science of the causes
  of some diseases and their course;
- incorrect interpretation by a medical worker of the
diagnostic procedures results;
- underestimation of colleagues’ opinions or
  overestimation of own knowledge.

Despite the fact that the world medicine is confidently
keeping abreast of the times and has found methods
for treating many diseases, the human body remains
incompletely studied, and therefore, medical errors will
constantly take place, and the issue of medical errors
nature will remain topical. In view of the above, the task
of legal regulation of medical activity is to develop a
single legal qualification of doctors’ erroneous actions4.

According to American lawyers who prefer civil
liability, criminal acts constitute an encroachment on
public order, while civil liability occurs in the case of
harm to an individual11. It is seen that the two main tasks
of civil law regulation of so-called “medical disputes”
are compensation for damage caused to a patient and
control over the quality of medical care12.
According to H. Barkus, civil liability is a more convenient means of resolving legal relations in case of negligence of medical staff, which provides a patient with the opportunity to compensate for the damage to health and financial losses incurred due to the treatment. In addition, the existing mechanisms in the United States to bring the guilty persons to justice eliminate the need for imprisonment. When applying civil liability and sanctions to physicians, the main attention is devoted to the prevention of harm to patients by persons providing medical care, rather than their imprisonment for inflicting unintentional harm\textsuperscript{13}.

However, some authors point to the imperfection of the system, according to which doctors are held solely liable for damage to the patient’s health. Thus, K. Meshivits draws attention to the disproportionately small number of persons who seek legal assistance in these cases. That is, the number of civil lawsuits is much smaller than the number of persons objectively injured due to medical activities. Some people claim that even a successful plaintiff does not obtain the full indemnification for the financial costs incurred during the trial\textsuperscript{14}.

The main issues in the process of “medical crimes” investigation are:

1. Lack of relevant special knowledge of the investigator (need for performing expert examination, involvement of subject matter experts to conduct investigative / search actions and unwillingness to investigate such crimes).

2. The need to obtain quickly the decision of the investigating judge on temporary access to the stuff and documents. As a matter of actual practice, there are often situations when, as a result of delays in obtaining such a decision, a medical institution manages to destroy evidence.

3. Collective responsibility, which implies the destruction of evidence (destruction of medical records, test results, etc.). The desire to attribute solely to medical error any unsuccessful manipulation or surgery that has led to serious consequences. Covering up by the heads of medical institutions of their subordinates. Active opposition to the investigation.

4. The fine line between distinguishing negligence from accident, medical error and justified medical risk\textsuperscript{4}.

The application of criminal liability is the strongest mechanism by which the state can bring a person to justice for actions that are contrary to the interests of society. However, bringing the guilty persons to justice in real life is complicated by the specifics of the health care sector\textsuperscript{15}.

**Conclusions and Recommendations**

In modern states, there are changes in society caused by Covid-19 pandemic, which is the impetus for the distinguishing of medical crimes from all crimes against life and health of a person. This approach emphasizes the social significance of the medical sector in general, and thus the greater social danger of crimes related to medical negligence. In a number of countries, such as Belarus, Armenia, Kazakhstan and Latvia, special essential elements of offence have been identified, which provide for liability for improper performance of professional duties by a healthcare professional.

This legal drafting methodology contributes to the differentiation of criminal liability depending on the obviously different social dangers of crimes. The main directions of improving the regulatory and legal support in the medical services sector and legislative regulation of cases of medical workers’ negligence are: development of unified methodological recommendations concerning qualification of medical crimes, which can help to give a correct criminal assessment of illegal activities of medical workers; making amendments to the legislation in terms of establishing a clear interpretation of the concept of “professional negligence of medical workers”; informing medical workers of the legal regulation of professional negligence cases and familiarization with the forms of liability for such negligence.

**Conflict of Interest**- None

**Source of Funding**- Authors

**Ethical Clearance**- Yes

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TLC Identification of Bacteriocin from Different LAB Clinical Isolates of Najaf Hospitals and in Vitro Evaluation of Its Effectiveness Against three Pathogenic Bacterial Isolates

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Abstract

Probiotics are useful microorganisms that are effective in protecting against pathogenic microorganisms, used to support food to provide beneficial effects to human health by maintaining the natural balance of the intestinal flora and reducing diseases, especially those related to the gastrointestinal tract. The ability of the Lactic acid bacteria to produce bacteriocin. In this study 74 samples were collected from various clinical sources include 31 samples of mouth and 43 samples from Vaginal swabs, for the period July 2018 until December 2018. The results of the isolation and laboratory diagnosis and biochemical testes the ownership of 43 isolates from lactic acid bacteria in vaginal swab and the highest percentage isolates bacterial (52%) of the samples of the vagina. All isolates showed lactic acid bacteria effectiveness of the microbial agents toward some negative bacterial species to dye grams diameters ranged between inhibition zones (14 – 22mm). Findings showed that RF bacteriocin values produced by the bacterium LAB isolates ranged from (0.45 – 0.57).

Keywords: Lactic acid bacteria LAB, bacteriocin, TLC.

Introduction

Probiotics are useful microorganisms that are effective in protecting against pathogenic microorganisms, used to support food to provide beneficial effects to human health by maintaining the natural balance of the intestinal flora and reducing diseases, especially those related to the gastrointestinal tract (⁴). Species belonging to genera Lactobacillus and Bifidobacterium are the most important biological enhancers possessing high tolerance to storage conditions and manufacturing of fermented milk products (¹⁶). Lactobacillus species are prevalent in the natural flora of the small and large intestine of the healthy human body in various age groups (¹⁴). Beside their use to protect against many pathogens and support metabolic processes, LAB can also be a therapy for people with allergies to glucose and different type of diarrhea (¹⁴). It is therefore preferred to be used as alternative to antibiotics and other chemicals with adverse side effects C. W Tannok, (⁴).

LAB are known to produce a sort of metabolites namely ‘bacteriocins’ which was first studied in 1925 with the discovery of a plasmid carrying gene encoding a protein produced by E.coli.

LAB bacteriocins are characterized by low molecular weights and antibacterial activity, often extending to species other than those closely related to producing bacteria (⁸). Yeasts and molds, but have an effect in some gram-positive bacteria and the possible presence of strains of insensitive cells within the sensitive strain (¹⁰).

Bacteriocin has been described as a bacterially lethal protein with a narrow range of inhibition limited to the type of bacteria it produces or closely related species, and that its coding genes should be carried on sensitive cells. These properties are generally produced by many bacteria, but not all of them, especially those

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produced by Cram positive bacteria in general, by LAB in particular (9).

Bacteriocyes are ribosomia-made bacterial peptides and have antimicrobial and antimicrobial properties and thus differ from antibiotics, which are secondary metabolites produced in the phase of Idiophase. Although bacteria are produced by positive and negative Cram bacteria, the most important are bacteria produced by Lactic acid bacteria LAB because of their large use in food processing as amino preservatives (5). The amount of bacteria produced depends on the type of environment in which these species grow. Bacteriocyes are secondary metabolites that are synthesized in stationary growth phase, but the maximum yield in the farm can occur at some growth stages. (7), have found that the production of Streptocin (STH) is better. Logarithmic reaches higher after 24 and 48 hours of incubation.

Bacteriocyes are antimicrobial compounds of a protein nature produced by a large selection of bacteria and have a killer or developmental effect against their sensitive bacteria, which are often related or genetically related to the producing bacteria. It has anti-bacterial activity and often extends to species other than those related to the producing bacteria, where it is characterized by its ability to eliminate some pathogenic bacteria and maintain the quality of the product added to it. Recent studies have suggested the possibility of the use of these bacteriocins instead of preservatives to keep the product for a long time without adding preservatives manufactured (15).

Materials and Methods

SAMPLING

74 random samples including 31 oral samples and 43 vaginal samples were collected. Samples were cultured in LAB selective medium for the presence of LAB bacteria. Routine tests were performed to confirm the presence of LAB.

Pathogenic isolates used in the study

Three pathogenic bacterial isolates, Pseudomonas aerugenasa, E.coli and Proteus mirabilis, previously diagnosed with Vitek were obtained after being isolated from wounds in hospitals in Najaf province. The sensitivity test was performed on these isolates to assess their resistance to five antibiotics. Biological activity of LAB bacteriocin against these pathogenic isolates was tested and compared with the results of antibiotics sensitivity test.

Microbiological and biochemical tests

Microbial, microscopic and biochemical tests of lactic acid bacteria LAB were carried out based on the morphological characteristics of the bacterial colonies, their forms and appearance under electron microscopy, and their pigmentation with Cram stains (13). Based on the method by (6), the bacteriocin produced by LAB was deposited on the Brain heart infusion broth using 24-hour-old young colonies for the LAB isolates, which were selected based on their growth efficiency and efficacy towards gram-negative bacterial species. The final sediment product was left to dry to be tested as bacteriocin.

TLC was used to detect bacteriocin in sediment extracted from LAB for all developing isolates. The value of (Rotation factor) was calculated. TLC results were photographed using a Sony camera (20).

Antagonistic Effect of bacteriocin against Gram-negative pathogenic bacteria

The detected bacteriocins from each producing LAB were tested for their biological activity against pathogenic isolates under test. Muller Hinton Agar medium was prepared according to the manufacturer’s instructions, autoclaved and poured into Petri dishes. The dishes were allowed to cool at 37°C and cultured with the pathogenic bacteria using Cotton swab. Five holes with a diameter of 5 mm were made in each dish using a sterile cork-borer. 100µL of bacteriocin was carefully added in each hole and the plates were incubated at 37 C ° for 24 hours after which the inhibition diameter was measured for each hole.

Antibiotics Sensitivity test of pathogenic isolates

The sensitivity test was carried out according to the method used. The samples were spread on Muller Hinton Agar medium as in the previous method. The
manufactured antibiotic tablets were then placed five tablets in each dish. The plates were incubated at 37 °C for 24 hours and the inhibition diameter was measured and compared with the bacteriocinase inhibition diameter.

**Results and Discussion**

**Isolation and diagnosis**

74 samples were collected, including 31 oral samples and 43 vaginal samples, which were grown on MRS agar medium, a differential medium for LAB. 18 oral samples (28%) were LAB and 13 non-developing samples were non-developing isolates whereas all vaginal isolates (52% of total samples) were LAB (Figure1).

![Figure1. Distribution of LAB growth from a total of 74 samples under study](image)

The diagnosis of the isolates was confirmed using microscopic examination and its acceptance of the Cram stain, in addition to the initial routine tests for oxidase and catalase. The agricultural properties were also based on MRS agar medium. Oral isolates were labeled from LAB1 to LAB31 and vaginal isolates were from LAB32 to LAB74. Molecular detection results of the TLC test showed the presence of bacteriocin in one of the oral isolates (LAB22) and in three vaginal isolates, LAB43, LAB54 and LAB72 (Table 1,2) and (Figure2).

<table>
<thead>
<tr>
<th>Sample type</th>
<th>No. Of samples</th>
<th>No. of LAB isolates</th>
<th>No. of Failed isolates</th>
<th>No. of bacteriocin producing isolates</th>
<th>% Bacteriocin producing isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>31</td>
<td>18</td>
<td>13</td>
<td>1</td>
<td>5.5%</td>
</tr>
<tr>
<td>Vaginal</td>
<td>43</td>
<td>43</td>
<td>None</td>
<td>3</td>
<td>7%</td>
</tr>
</tbody>
</table>
Antibiotic sensitivity test

The results of the antibiotic sensitivity (susceptibility) test for the three pathogenic isolates were studied. Isolates differed in their sensitivity to antibiotics (Table 3). The highest inhibition diameter (25mm) was recorded with E. coli in the treatment of LEVOFLOXACIN. E. coli and P. aerugenasa were generally sensitive to all antibiotics used except CEFTRIAXONE, with inhibition diameters between 15 to 25mm for the first and 13 to 22mm for the second, respectively. Proteus mirabilis was sensitive only to AMIKACIN, NORFLOXACIN and MASTDISCS, with inhibition diameters of 18, 20 and 21 mm, respectively (Table3).

Antimicrobial activity of bacteriocin of different LAB isolates

The results of table (3) showed that bacteriocin for all isolates under study resulted in growth inhibition of all three isolates. The highest inhibition diameters were recorded in E. coli with inhibition diameters between 17 to 22 m, followed by Proteus Maarbeles Vrahaf 17-21 mm, and finally Pseudomonas aerugenasa With relatively lower diameters, it ranged from 14 to 19 AD. The results of the study showed the bacteriocin ability to inhibit the growth of the pathogens under study Pseudomonas aerugenasa, E.coli and Proteus mirabilis. There was a significant inhibition of bacteriocin depending on the inhibition diameter.
Table 3. Antibiotic sensitivity and antibacterial effect of bacteriocin of different LAB isolates against three pathogenic bacterial isolates

<table>
<thead>
<tr>
<th>Antibiotic (1-6) or bacteriocin (7-10)</th>
<th>Pseudomonas aerugenasa</th>
<th>Proteus mirabilis</th>
<th>E.coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMIKACIN</td>
<td>19 mm</td>
<td>18 mm</td>
<td>15 mm</td>
</tr>
<tr>
<td>CEFTRIAXONE</td>
<td>Zero</td>
<td>Zero</td>
<td>Zero</td>
</tr>
<tr>
<td>CIPROFLOXACIN</td>
<td>13 mm</td>
<td>Zero</td>
<td>15 mm</td>
</tr>
<tr>
<td>LEVOFLOXACIN</td>
<td>21 mm</td>
<td>Zero</td>
<td>25 mm</td>
</tr>
<tr>
<td>NORFLOXACIN</td>
<td>17 mm</td>
<td>20 mm</td>
<td>15 mm</td>
</tr>
<tr>
<td>MASTDISCS</td>
<td>22 mm</td>
<td>21 mm</td>
<td>21 mm</td>
</tr>
<tr>
<td>LAB22</td>
<td>17 mm</td>
<td>15 mm</td>
<td>17 mm</td>
</tr>
<tr>
<td>LAB43</td>
<td>14 mm</td>
<td>18 mm</td>
<td>22 mm</td>
</tr>
<tr>
<td>LAB54</td>
<td>19 mm</td>
<td>17 mm</td>
<td>19 mm</td>
</tr>
<tr>
<td>LAB72</td>
<td>14 mm</td>
<td>16 mm</td>
<td>22 mm</td>
</tr>
</tbody>
</table>

*E.coli* bacteriocin

Figure 3. Inhibitory effect of bacteriocin isolates on *E. coli*
The results showed that there was a clear inhibition of bacteriocin on the pathogenic bacteria negative for Gram stain compared to inhibition of antibiotics where the inhibition diameters resulting from bacteriocin were greater or equal to the diameters of antibiotic inhibition of the same isolates under test.

The results of the study showed that LAB isolated from the vagina had a higher efficacy against Gram-negative bacteria compared to the isolated bacteria from the mouth. This result was consistent with several studies that showed that the materials produced by LAB bacteria, especially bacteria, are capable of inhibiting the growth of many microorganisms such as *Pseudomonas aerugenasa*, *E. coli*, *K. pneumoniae* and *E. faecalis* (18,19).

Ali et al. (1) show that LAB isolated from the vagina has the potential to secrete a bacteriocin that has the potential to inhibit the growth of many microorganisms and that these strains are used as an alternative to antibiotics in the treatment of urinary and reproductive tract infections, while the bacteria produced from Pre-isolated LAB from the mouth has a broad spectrum of activity against many positive and negative microorganisms of the Cram dye. (19).

On the one hand, lactic acid bacteria have antibacterial activity against many positive and negative Gram bacterial species due to their production of many antibacterial effects of other microorganisms. Or, it may be due to the production of CO2 during the fermentation process, which leads to anaerobic conditions, causing an obstacle to the growth of compulsory aerobic microorganisms (3). Lactic acid bacteria have the ability to produce many compounds such as acetylsalicylic acid and diacetyl which have the inhibitory power against many microorganisms.

The inhibitory action of lactic acid bacteria in microorganisms can be attributed to the synergistic action of bacteria and lactic acid produced by bacteria. Or, it may be attributed to the lactic acid produced and the low pH that increase the permeability of the outer membrane, especially in Gram negative bacteria, which makes them weak and more sensitive to the bacteriocin produced (15,3).

The high efficacy of bacteria produced by lactic acid bacteria against bacterial species is due to the ability of bacteria to form openings in Phosphate bilayer found in the plasma membrane of the bacterium, thereby blocking the movement of protons (17).

The variation in the efficacy of the extracted and partially purified bacteriocin compared with that excreted by living cells can be attributed to the effect of the extract. Bacteriocin produced by lactic acid bacteria in vivo is highly active against Gram-negative bacteria. Cram negative bacterial species outside the in vivo are insensitive to bacteriocin produced by Cram positive species (11).

The results of the molecular diagnosis of bacteriocin produced from lactic acid bacteria by thin layer chromatography technique in the present study are consistent with a number of studies which indicated that the value of Rf in bacteriocin LAB isolates ranged from 0.54 to 0.11 (17,21).

Lactic acid bacteria are very important biological enhancers because of their wide spectrum of pathogenic antibacterial effect. It is also preferred to use in the treatment of genital and urinary infections. Therefore, it is significant to highlight the compounds resulting from the vital enhancers and to study the possibility of utilizing them in the treatment of outbreaks in hospitals in the country.

**Conclusion**

The ability of bacteria produced by lactic acid bacteria is very high on negative bacteria compared to Gram positive bacteria. Because bacteriocin is equivalent to the inhibitory action of known antibiotics, it is preferable to use them as safe alternatives to reduce the side effect of commercial antibiotics. However, this requires extraordinary efforts to find appropriate manufacturing methods, pills or capsules, to deliver pure bacteriocin to the bio-effect area as alternative therapies to antibiotics.

**Conflict of Interest:** None

**Funding:** self

**Ethical Clearance:** Not required
Reference


The Differences in Antibiotic-resistance among Several *Staphylococcus aureus* strains in Iraq

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Abstract

**Background:** The spread of antimicrobial-resistance had continuously emerged among *S. aureus* strains poses a major concern in treating the infection with this bacterium and established a challenge to clinical laboratories. Consequently, measuring resistance is essential to provide a clinical service for patients with *S. aureus* infections.

**Methods:** *S. aureus* was isolated from burn and wound injuries and identified according to the biochemical tests, then genotyped through *Spa*-typing method to diagnose at the strain level. The antibiotic resistance patterns of the 18 *S. aureus* strains were studied by Kirby-Bauer assay and the inhibition zone was measured.

**Results:** The antibiotic results of each *spa*-type were discussed according to the globally published researches. Moreover, the *spa*-type of this study was grouped into two groups, one with high resistance and the other with less resistance.

**Conclusion:** In conclusion, the high resistance bacterial group infects injuries that needed a long period to be healed, and therefore it is recommended to have a strict sterilized separated environment for cases most prone to infections such as patients with a burn or diabetic foot injuries.

**Keywords:** Antibiotics, burn, diabetic foot, *Staphylococcus aureus*, *spa*-type, wound

Introduction

*S. aureus* is the most invasive species and an etiological agent of diverse human and animal maladies, it is isolated from the community and can cause community-acquired infections and it is responsible for nosocomial infections when isolated in hospitals, it may affect the lower respiratory tract, urinary tract, skin and bloodstream (1).

The source of *S. aureus* infections can be (endogenous) from the patient’s anterior nares or by transferring from other reservoirs (exogenous infections). Exogenous reservoirs can often be nasal carriage in the medical staff and transmitted by their hands or aerogenic transmission by binding to particles of dust then transmitted to susceptible sites. Moreover, contaminated instruments and devices have also been identified as transient reservoirs for the spread of *S. aureus* (2).

*S. aureus* can persist for a long time especially in inadequately cleaned areas due to its ability to survive the dry conditions also can survive on surfaces of skin scales for up to 80 days (3). Some cases increases the risk of infection such as the hospitalized patients with general weakness and immune system suppression, particularly patients with burn injuries which they had lost their protective skin barrier and their immunological variation (4, 5).
The emergence of bacteria with multiple antibiotic-resistant, which persist and spread worldwide, will compromise the treatment of infections causing clinical failures of these treatments (6). Locally at burn units, several pathogenic bacteria, including S. aureus, were found with a high percentage of resistance to the commonly used antibiotics (7). Antibiotic resistance is the most important characteristic of bacterial pathogenicity. The incidence of antibiotic resistance has commonly grown in several bacterial groups, including the staphylococci. The increase in resistance can be due to frequent antibiotic administration resulting in selective pressure on bacteria (8). Also, the spreading of drug-resistance genes via effective vehicles called mobile genetic elements (MGEs) through horizontal gene transfer between S. aureus strains, will change the pathogen’s abilities to cause the disease and has a significant impact on the organism’s evolution (9).

It is of concern that the sensitivity of the wild-type bacteria to a specific antibiotic will not return after its absence, as in the case of rifampin-resistant S. aureus (10).

The examination of antibiotic-resistance according to S. aureus spa-types was not previously recorded in Iraq. In this study, S. aureus was genotyped by spa-typing method and the clinical cases with high resistance to the studied antibiotics were investigated.

**Material and Methods**

**Bacterial Isolation and Identification**

One hundred Burn, wound, and environmental samples had been swabbed then cultured on a selective medium (Mannitol salt agar) that differentiate Staphylococcus aureus through the fermentation of mannitol and formation of acidic products which reduce the pH of the medium, and this will turn the phenol red indicator to yellow (11). The microscopic examination by Gram stain was performed for the isolates that ferment mannitol of Manitol salt agar medium. Only the Gram-positive grape-like clusters were preserved at Nutrient agar slants at the refrigerator (4°C) to complete the tests of S. aureus identification.

A biochemical test such as catalase test was then performed, to indicate catalase enzyme through adding one drop of (3%) H₂O₂ on a glass slide then adding bacterial colony on it, bubbles will then appear as a positive result (11). Another biochemical test was performed to detect another Staphylococcal enzyme through tube coagulase test. By using human plasma at the dilution (1:5) with autoclaved Distal water (D.W) which will be added to an equal volume of cultured Nutrient broth medium.

Coagulase enzyme will clot plasma after 2 to 4 hours of incubation at 35°C and sometimes the clot will appear after overnight incubation (12, 13).

**Spa- typing of S. aureus**

Bacterial DNA was isolated by using Wizard Genomic DNA Purification Kit/Promega. The concentration value of DNA was detected using Quantus Fluorometer by mixing 199 μl of Quany Flour diluted dye with 1 μl of extracted DNA, then incubated at room temperature for 5 min, to investigate the goodness of samples and perform the downstream applications.

PCR amplification was done through preparing of the primers in final concentration (100pmol/μl)as a stock solution by adding nuclease-free water to the primer, according to the manufacturing company information then stored in the deep freeze. The primer that has been used was spa-1095F and spa-1517R (14, 15). In order to use this diluted stock solution in PCR mixture, it must be diluted to get 10 pmol/ μl as a final concentration by adding 10 μl from the original stock solution to 90 μl of deionized distal water and stored in the deep freeze until its usage in the PCR mixture.Final volume 20 μl of PCR mixture was prepared (Master mix 12.5 μl, forward and reverse 1μl for each, nuclease-free water 7.5μl, and DNA 3μl), then short spin by microcentrifuge.

By Thermal Cycler System the DNA have been amplified according to the following program: Initial denaturation for 4 min at 95°C for 1 cycle, Denaturation for 30 Sec. at 95°C for 30 cycles, Annealing for 45 Sec. at 50°C for 30 cycles, Extension for 45 Sec. at 72°C for 30 cycles, Final extension for 7 min. at 72°C for 1 cycle, and then Hold for 10 min. at 10°C for 1 cycle. To confirm the presence of amplified DNA by PCR, agarose gel electrophoresis was adopted.
The PCR products were sent to Macrogen Corporation in Korea, and the results of sequencing spa gene were received through E-mail, and then analyzed by BioNumerics software in order to genotype *S. aureus* isolates and identify their spa-types.

**Study the Antibiotic resistance for *S. aureus* isolates**

An overnight bacterial broth culture (Nutrient broth) was prepared by using isolated colonies on mannitol salt agar. To start the Kirby-Bauer assay, first, a bacterial suspension was prepared by taking five to six bacterial colonies and suspend them in 5ml sterilized D.W then mix by a vortex in order to compare and adjust their turbidities to match 0.5 McFarland standard by adding more colonies or more D.W. 0.5McFarland standard is equivalent between 1 x 10⁸ to 2 x 10⁸ CFU/ml of a bacterial suspension. The assay was started by swabbing the prepared suspension on the Muller-Hinton agar plate three times all over its surface by rotating the plate 60° after each time, then the swab will pass round the edge of the agar surface. After the plates were dried at room temperature, antibiotic discs (table 1) were placed on the agar surfaces using sterile forceps. Incubation at 35°C for 24 h. and the results were recorded depending on standard interpretative measures of inhibition zone as shown in table 1(16, 17).

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Disc content (μg unless stated)</th>
<th>Inhibition Zone Diameter interpretation**(mm)**</th>
<th>Reference</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin (CN)</td>
<td>10</td>
<td>≤12, 13-14</td>
<td>≥15</td>
<td>(18) Aminoglycoside</td>
</tr>
<tr>
<td>Amikacin (AK)</td>
<td>30</td>
<td>≤14, 15-16</td>
<td>≥17</td>
<td>(18) Aminoglycoside</td>
</tr>
<tr>
<td>Rifampin (RA)</td>
<td>5</td>
<td>≤16, 17-19</td>
<td>≥20</td>
<td>(18) Ansamycin</td>
</tr>
<tr>
<td>Ciprofloxacin (Cip)</td>
<td>5</td>
<td>≤15, 16-20</td>
<td>≥21</td>
<td>(18) Fluoroquinolones</td>
</tr>
<tr>
<td>Cephalothin (KF)</td>
<td>30</td>
<td>≤14, 15-17</td>
<td>≥18</td>
<td>(19) Cephalosporins 1st generation</td>
</tr>
<tr>
<td>Cefoxitin (Fox)</td>
<td>30</td>
<td>≤21</td>
<td>≥22</td>
<td>(18) Cephalosporins 2nd generation</td>
</tr>
<tr>
<td>Cefotaxime (CTX)</td>
<td>30</td>
<td>≤14, 15-22</td>
<td>≥23</td>
<td>(19) Cephalosporins 3rd generation</td>
</tr>
<tr>
<td>Chloramphenicol (C)</td>
<td>30</td>
<td>≤12, 13-17</td>
<td>≥18</td>
<td>(18) Miscellaneous</td>
</tr>
<tr>
<td>Doxycycline (Do)</td>
<td>30</td>
<td>≤12, 13-15</td>
<td>≥16</td>
<td>(18) Tetracyclines</td>
</tr>
<tr>
<td>Vancomycin (VA)</td>
<td>30</td>
<td>—</td>
<td>≥15</td>
<td>(19) Glycopeptides</td>
</tr>
<tr>
<td>Amoxicillin (AX)</td>
<td>25</td>
<td>≤21, 22-27</td>
<td>≥28</td>
<td>(20) Penicillins</td>
</tr>
<tr>
<td>Pencillin (P)</td>
<td>*10 U</td>
<td>≤28</td>
<td>≥29</td>
<td>(18) Penicillins</td>
</tr>
<tr>
<td>Oxacillin (OX)</td>
<td>5</td>
<td>≤13</td>
<td>≥16</td>
<td>(20) Penicillins</td>
</tr>
<tr>
<td>Trimethoprim (TMP)</td>
<td>10</td>
<td>19-26**</td>
<td>(21)</td>
<td>Folate pathway inhibitor</td>
</tr>
</tbody>
</table>

*U: Units; Penicillin is one of the few antibiotics that is still measured in terms of units rather than weight in milligrams or micrograms.

**Concentration of the Antibiotic provided by HiMedia as required by the users.
Results and Discussion

Antibiotic resistant pattern of different spa-type of S. aureus

Eighteen spa-types of S. aureus were detected, as illustrated in the table2 below.

Table 2: Different spa-types isolated from Burn, wound, and hospital-environment samples

<table>
<thead>
<tr>
<th>Number of isolates</th>
<th>The site of isolation</th>
<th>Spa-type</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>6 D.F</td>
<td>t037</td>
</tr>
<tr>
<td></td>
<td>1 Medical waste at nursing cart</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Burn injuries</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Burn injuries</td>
<td>t13157</td>
</tr>
<tr>
<td>1</td>
<td>Clean surface of nursing cart</td>
<td>t14870</td>
</tr>
<tr>
<td>1</td>
<td>Out patient with burn blister containing pus</td>
<td>t005</td>
</tr>
<tr>
<td>1</td>
<td>D.F</td>
<td>t223</td>
</tr>
<tr>
<td>1</td>
<td>After stabbing wound and surgery to the bladder</td>
<td>t386</td>
</tr>
<tr>
<td>1</td>
<td>bullet injury</td>
<td>t304</td>
</tr>
<tr>
<td>1</td>
<td>D.F</td>
<td>t304</td>
</tr>
<tr>
<td>1</td>
<td>D.F</td>
<td>t304</td>
</tr>
</tbody>
</table>

D.F: diabetic foot ulcer

All S. aureus isolates (18 isolates) showed 100% sensitivity to chloramphenicol, doxycycline and vancomycin.

The high sensitivity to chloramphenicol was also reported by Neha et al. when tested S. aureus from various skin samples (22). In Afghanistan, a high percentage of S. aureus was found to be sensitive to doxycycline (23). Furthermore, In 2013 Iraqi MS.C thesis, doxycycline sensitivity of S. aureus in wounds was different from that in burn isolates (24).

All the isolates were vancomycin sensitive in this study as well as in 2013 (24).

Sensitivity of trimethoprim, oxacillin and amoxicillin at higher concentrations than that determined by Clinical and laboratory standards institute (CLSI)

Four S. aureus isolates were sensitive to trimethoprim that used at concentration 10 μg, three of them (two spa type t304 and one t386) gave diameters 20, 28, and 29 mm of inhibition zone, while one isolate (t304) carried both tst and sea gave 32mm inhibition zone, this may be due to the increase of bacterial virulence that can cause a decrease in antibiotic resistance (25). The remaining S. aureus isolates were more resistant (zero inhibition zone) to the 10 μg trimethoprim concentration.
as compared with that corresponding inhibition zone diameter 19-26 mm that has been presented by Himedia\(^{21}\). A study on the resistance of \textit{S. aureus} from skin samples gave a smaller inhibition zone (12mm) when trimethoprim was 10 μg\(^{22}\).

Resistance to 5 μg of oxacillin was recorded in all \textit{S. aureus} isolates which have a diameter outcome of zero mm except two \textit{spa}-types t304 were (14 and 20 mm) and one t386 (10mm) as shown in figure 1. It was expected to see a 27-35mm diameter of inhibition zone instead of zero mm when testing \textit{S. aureus} to 5 μg oxacillin, according to the inhibition zones presented by Himedia\(^{21}\).

All the isolates were resistant to amoxicillin 25μg, by displaying no inhibition zone, although \textit{S. aureus} inhibition zone was predicted as 28-36mm according to Himedia\(^{21}\).

Table 3 shows the sensitivity of trimethoprim, oxacillin and amoxicillin at higher concentrations than that determined by CLSI.

### Table 3: The resistance of \textit{spa} type to TMP, AX, OX according to Fluka and Himedia

<table>
<thead>
<tr>
<th>Number of isolates</th>
<th>\textit{Spa}-type</th>
<th>TMP (10 μg) I.Z (mm)</th>
<th>OX (5 μg) I.Z (mm)</th>
<th>AX (25 μg) I.Z (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>t037</td>
<td>R **</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t13157</td>
<td>R **</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t14870</td>
<td>R **</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t005</td>
<td>R **</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t223</td>
<td>R **</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t386</td>
<td>S (29 mm)</td>
<td>R(10mm)</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t304</td>
<td>S (28 mm)</td>
<td>R **</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t304</td>
<td>S (32 mm)</td>
<td>I (14mm)</td>
<td>R **</td>
</tr>
<tr>
<td>1</td>
<td>t304</td>
<td>S (20 mm)</td>
<td>S (20 mm)</td>
<td>R **</td>
</tr>
</tbody>
</table>

I.Z: diameter of inhibition zone, R **: resist with No inhibition zone; OX: oxacillin, Ax: amoxicillin, TMP: trimethoprim
Figure 1: Showing Inhibition zone to Oxacillin 5μg according to Fluka, A; t386 showing resistant to OX with 10mm inhibition zone, B; t304 showing intermediate resistant to OX with 14mm inhibition zone, C; t304 showing Sensitivity to OX with 20mm inhibition zone
Resistance pattern according to CLSI

Table 4 shows the resistance of the \textit{S. aureus} to 8 antibiotics, it is clear that \textit{spa}-type t037 is highly resistant to antibiotics and it shared the same resistance pattern with \textit{spa}-type t13157 which differs from t037 by one repeat in X region of \textit{spa} gene. While t005 that differs by its repeats has also shown a high resistance pattern which may be due to the source of the isolate that was from burn blister in outpatient, and it depends on the medications that the person was taking.

All three \textit{spa}-type t304 showed lower resistance (resist 4 antibiotics) only one has additional resistance to rifampin with 16 mm inhibition zone which is the largest diameter to consider it resistant according to CLSI. The other types of \textit{spa} (t223, t14870, and t386) were similar to t304 in their resistance pattern as it is shown in table 4.

According to the pattern of antibiotic resistance, the isolates can be divided into two groups; one is a multi-drug resistant group (t037, t13157, and t005) that resist 7 or 8 out of 11 antibiotics and categorized within five groups: penicillins, cephalosporins, fluoroquinolones, ansamycins, and aminoglycoside; while the other group was not considered as multi-drug resistant (t304, t386, t223, and t14870) due to its resistance to four or five antibiotics which were within penicillins and cephalosporins classes.

<table>
<thead>
<tr>
<th>Number of isolates</th>
<th>\textit{Spa} type</th>
<th>Resistant pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>t13157</td>
<td>CTX, P, Fox, KF, CN, Cip, AK, Ra</td>
</tr>
<tr>
<td>4</td>
<td>t037</td>
<td>CTX, P, Fox, KF, CN, Cip, AK, Ra</td>
</tr>
<tr>
<td>3</td>
<td>t037</td>
<td>CTX, P, Fox, KF, CN, Cip, (AK-I)*, Ra</td>
</tr>
<tr>
<td>3</td>
<td>t037</td>
<td>CTX, P, Fox, KF, CN, Cip, RA</td>
</tr>
<tr>
<td>1</td>
<td>t005</td>
<td>CTX, P, Fox, KF, CN, Cip, AK</td>
</tr>
<tr>
<td>1</td>
<td>t386</td>
<td>CTX, P, Fox, KF, (AK-I)*</td>
</tr>
<tr>
<td>1</td>
<td>t304</td>
<td>CTX, P, Fox, KF, RA</td>
</tr>
<tr>
<td>2</td>
<td>t304</td>
<td>CTX, P, Fox, KF</td>
</tr>
<tr>
<td>1</td>
<td>t223</td>
<td>CTX, P, Fox, KF</td>
</tr>
<tr>
<td>1</td>
<td>t14870</td>
<td>CTX, P, Fox, KF</td>
</tr>
</tbody>
</table>

*I*: have Intermediate sensitivity; AK: Amikacin, Cip: ciprofloxacin, CN: gentamicin, RA: rifampin, KF: cephalothin, Fox: cefoxitine, P: penicillin, CTX: cefoxitine,

Amikacin-resistant was noticed to be varied among the same \textit{spa}-type, while all the isolates have the same resistance pattern for chloramphenicol, doxycycline, vancomycin, cephalothin, cefoxitin, penicillin, and cefotaxime. Therefore, the focus would be on three antibiotics: rifampin, gentamicin, and ciprofloxacin where the resistance varies according to the \textit{spa}-types of \textit{S. aureus} isolates.

Gentamicin and amikacin are aminoglycosides that were used in this study showed \textit{S. aureus} had different resistance patterns: both gentamicin/amikacin resistant, both gentamicin/amikacin sensitive, gentamicin
sensitive/amikacin intermediate, gentamicin resist/amikacin intermediate, and gentamicin resist/amikacin sensitive. These variations in the resistant pattern could be due to differences in resistant-mechanisms depending on the plasmodial or chromosomic genetic elements. \(^{(26)}\).

Many of \textit{S. aureus}12/18 (66.66\%) was noticed to be resistant to rifampin. Rifampin-resistant arises from a chromosome mutation. According to Guérillot \textit{et al.} the emergence of many stable rifampin-resistant lineages among a global collection of \textit{S. aureus} isolates might be due to the usage of this antibiotic \(^{(27)}\).

Ciprofloxacin resistance is chromosomally mediated and not associated with plasmids. It rapidly developed in \textit{S. aureus} after introducing the antibiotic \(^{(28)}\), therefore many \textit{S. aureus}(12/18) noticed to resist this antibiotic.

Penget \textit{et al.} recorded t037 strain was sensitive to rifampin\(^{(29)}\) and recently in Iran, rifampin sensitivity was recorded for t037 \(^{(30)}\). In California, a high sensitivity (98\%) for both rifampin and gentamycin was observed \(^{(31)}\). On the contrary to the t037 isolated in this study were 100\% resistant to rifampin.

Research conducted in Taiwan hospitals noticed that t037 from the skin was resistant 100\% to ciprofloxacin and gentamycin \(^{(29)}\), also it has been recorded a high percentage (80\%) of resistance in Palestine \(^{(32)}\), this was in agreement with the current study (100\% resistant for both antibiotics).

An Italian thesis \(^{(33)}\) studied the antibiotic resistance of t13157 that was isolated from clinical samples and found that it has a resistance to rifampin and gentamycin as that given in this study.

The single strain t005 of this study were resistant to gentamicin, amikacin, and ciprofloxacin. The same resistance was recorded in 66.7\% of the isolated t005 in Iran \(^{(30)}\).

Strain t304, and t386 showed sensitivity to ciprofloxacin, gentamycin and rifampin. This is similar to that reported in an Iranian study\(^{(34)}\).

A strain t223 has been isolated and it showed ciprofloxacin, gentamycin, and rifampin sensitivity. According to research in Gaza \(^{(35)}\), this strain that isolated from the nose of healthy peoples was sensitive to non-\(\beta\)-lactam antibiotics; including ciprofloxacin and gentamycin, also in Palestine\(^{(32)}\), t223 in different clinical samples had displayed low resistance to gentamicin (18.2\%) and ciprofloxacin (9.1\%), while in Iran\(^{(30)}\) the resistance to rifampin was 26.7\%.

\textbf{Conclusion}

The most resistant group in this study have been isolated from burn patients (three t037, one t13157, one t005), diabetic foot ulcers (six t037) and medical waste at nursing cart (one t037) while the other group with less resistance were collected from diabetic ulcer at the clinic (two t304), bullet injury (one t304), clean surface nursing cart (t14870), after stabbing wound and surgery to the bladder (t386) and diabetic foot ulcer (t223) that is isolated from a person who was residing at a different sector than that where t037 has been detected. This indicates that people stayed for long period at hospitals to treat their injuries are more susceptible to be infected by more resistant strains, and therefore it is recommended to separate each patient that required a prolong treatment with commitments to hygiene controls to prevent the transmission of high-resistant strains among the patients.

\textbf{Conflict of Interest:} Nil

\textbf{Source of Funding:} Self

\textbf{Ethical Clearance:} Samples were collected from Al-Kindy and Al-Yarmouk teaching hospitals, Baghdad/Iraq, after administrative approval.

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The Antioxidant and Antibacterial Activity of *Moringa oleifera* Extracts against some Foodborne Pathogens

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**Abstract**

The aim of this study is to determine the antioxidant and antibacterial activity of *Moringa oleifera* extracts. Maceration and Soxhlet apparatus were used to prepare aqueous and methanolic extracts respectively, while petroleum ether was used to extract seed oil. Many tests were conducted include, phytochemical detection, evaluation of antioxidant activity utilizing 2,2- diphenyl-1-picrylhydrazyl (DPPH) assay, total phenolic content. The extracts of *Moringa oleifera* were investigated against some foodborne pathogens include *Staphylococcus aureus, Bacillus cereus, Escherichia coli* and *Klebsiella pneumonia*. The results of phytochemical test showed the presence of alkaloids, phenols, flavonoids, tannins, saponins and glycosides in aqueous and methanolic leaves extracts. The antioxidant activity showed that the aqueous and methanolic leaves extract was more effective than the seed’s husk extract. The radical scavenging capacity (EC₅₀) of methanolic and aqueous leaves extract were found to be (1.6 and 1.9 mg/ml) respectively, while the EC₅₀ of methanolic and aqueous seed’s husk were (5.1 and 10 mg/ml) respectively. The antibacterial activity of *Moringa oleifera* extracts showed the best effect was seen in the aqueous and methanolic leaves extract on *Staph. aureus* in 200 mg/ml with inhibition zone 14.83 and 22.6 mm respectively. The results of the minimum inhibitory concentration (MIC) showed that the methanolic leaves extract was 16 mg/ml for both *Staph. aureus* and *E. coli*, and 32 mg/ml for *B. cereus* and *K. pneumonia*, while the MIC of aqueous leaves extract was 64 mg/ml for all bacterial isolates.

**Keywords:** *Moringa oleifera* extracts, antibacterial activity, MIC, DPPH, Total phenol.

**Introduction**

*Moringa oleifera* is a plant belongs to the family moringaceae which consists of one genus moringa ¹. It is a tree with a high value, distributed in many countries of the tropics and subtropics. The tree has different argot names such as marango, moringa, horseradish tree, drumstick tree, miracle tree, tree of life ². Almost all parts of the plant are used culturally for its nutritional value, purported medicinal properties and for taste and flavor as a vegetable and seed. The leaves of *moringa oleifera* can be eaten fresh, cooked or stored as dried powder for many months without any major loss of its nutritional value. Epidemiological studies have indicated that *moringa oleifera* leaves are a good source of nutrition and exhibit anti-tumor, anti-inflammatory, anti-ulcer, anti-atherosclerotic and anti-convulsant activities ³. The leaves of *moringa oleifera* are a good source of natural antioxidants due to the presence of different compounds such as ascorbic acid, flavonoids, phenolics and carotinoids. These compounds have the ability to do numerous functions including acting as free radicals scavengers, enzyme inhibitors, reduce damage caused by free radical activity and oxidation ⁴. Medicinal plants are a source for a wide variety of natural active compounds and are used for the treatment of diseases.
throughout the world. Several types of plant extracts or plant-derived molecules have been investigated for their potential as antibacterial and antioxidant sources against several diseases. Thus, the main purpose of this research is detection of the active compounds in *Moringa oleifera* cultivated in Iraq and evaluate the antibacterial activity on some foodborne pathogens.

**Materials and Methods**

**Collection of *Moringa oleifera***

*Moringa oleifera* seeds and leaves were obtained from the plantation of Al-Diwaniyah city, Iraq. The plant materials were botanically identified by the Laboratory of College of Science of the University of Baghdad. The leaves were washed with water and dried at room temperature, and ground using a grinder, and then stored at 4°C for further analysis. The seeds were shelled by using mortar and pestle. The husk and kernel were ground separately to a fine powder and stored at 4°C for further analysis.

**Preparation of aqueous extract**

The aqueous extract was prepared according to 8. Macerated 100 gram of *Moringa oleifera* leaves in 700 ml of distilled water for 72 hours, after extraction, the mixture was vacuum filtered through Whitman No. 1 paper. The filtrate evaporated to dryness under vacuum at 50°C by a rotary evaporator to eliminate water. The resulting extract stored in amber glass vials at 4°C until analyzed.

**Preparation of methanolic extract**

Methanolic extract was prepared according to 9, using Soxhelt apparatus. 100 gram of *Moringa oleifera* leaves was put in a thimble and 350 ml of 70% methanol was added within 40-60°C for 6 hours. The solution was filtered through a filter paper Whitman No.1 and evaporated to dryness under vacuum at 40°C by a rotary evaporator to get rid of methanol; the extract was stored in amber glass vials at 4°C until analyzed.

**Phytochemical screening**

The phytochemical screening of the aqueous and methanolic leaves and seed extracts has been done according to 10, 11, 12, 13, 14.

**Evaluation of the Antioxidant activity DPPH assay**

The radical scavenging activity of samples was determined according to 15. 5ml of a freshly prepared 0.004% of 2,2-diphenyl-1-picrylhydrazyl (DPPH) in methanol was mixed with 100 µl of different concentrations (2, 4, 6, 8 and 10) mg/ml of the methanolic and aqueous leaves and seeds extracts, and (20, 40, 60, 80 and 100) µl/ml of the seed oil extract, then the mixture was left to stand for 30 min. The absorbance was measured at 517 nm. Butylated hydroxytoluene (BHT) (artificial antioxidant) and vitamin C (natural antioxidant) were used as positive control. All tests were performed in triplicate. The percentage of DPPH reduction was calculated as:

\[
\% \text{ Reduction} = \left( \frac{\text{Abs DPPH} - \text{Abs Dil.}}{\text{Abs DPPH}} \right) \times 100
\]

Where:

Abs DPPH = average absorption of the DPPH solution

Abs Dil. = average absorption of the three absorption values of each dilution.

With the obtained values, a graphic was made using Microsoft Excel. The EC\(_{50}\) of each extract (concentration of extract or compound at which reduced 50% of DPPH) was taken from the graphic.

**Determination of total phenolic contents**

Total phenolic content of *Moringa oleifera* extracts were determined spectrophotometrically using the Folin-Ciocalteu method described by 16. 2 ml of Folin-Ciocalteu reagent (diluted 10 times) was mixed with 1.6 ml of 7.5% sodium carbonate solution and 0.4 ml of *Moringa oleifera* extracts. The volume was completed to 5 ml by adding distilled water. The tubes were covered with parafilm for 30 min. at room temperature, and then the absorbance was read at 760 nm spectrophotometrically.

**Bacterial isolates**

*Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhimurium*, *E. coli* (ATCC 25922), and *Staphylococcus aureus* (ATCC 6538)
coli and Klebsiella pneumoniae isolated from food, obtained from the Department of Food Sciences - College of Agricultural Engineering Sciences - University of Baghdad, and emphasize diagnoses by using VITEK-2 System.

**Agar well diffusion method**

Agar well diffusion method was employed for the determination of this study. Muller- Hinton agar plates were swabbed (sterile cotton swabs) with broth culture of respective bacteria. Wells 6 mm diameter was made in each of these plates using a sterile cork borer. 100 µl from each concentration (50, 100 and 200 mg/ml) of the methanolic and aqueous leaves and seeds extracts and (125, 250 and 500 µl/ml) of the seed oil extract were put in each hole by using micropipette and allowed to diffuse at room temperature for 30 min. The plates were incubated at 37 °C for 18-24 hours. All tests were performed in triplicate. The diameter of any resulting zone of inhibition was measured in millimeters 17.

**Determination of the minimum inhibitory concentration (MIC) of the Moringa oleifera extracts**

Broth Microdilution method was used to determine the MIC of Moringa oleifera extracts using the 96-well microtiter plate. The extracts were prepared in a double concentration, the desired final concentration as it will be diluted with an equal amount of bacteria in broth. 200 µl of the prepared methanolic and aqueous extracts (for leaves and seeds) were introduced into the first wells in columns 1-4 (in row A). Rows B-H in columns 1-4 had 100µl of broth alone while rows A-H in column 5 had 100 µl of the broth only, and 100µl of broth was in A-H in column 6. Twofold serial dilutions using micropipette was done systematically down the columns 1-4 (from rows B-H). 100 µl was removed from the starting concentrations (columns 1-4 in row A) and transferred to the next row with the 100µl broth, properly mixed, and the procedure was repeated up to the last row (H) where the last 100µl was discarded. This brings the final volume in all the test wells with the extracts to 100 µl except the 6th column which had 200 µl of the broth that served as sterility control. 100µl of the 1×10⁶ CFU/ml bacterial inoculum was transferred into all the wells except the 6th column to give us the desired final inoculum load of 5× 10⁵ CFU/ml. Column 5 served as positive control (bacteria- free). Microtiter plates were incubated at 37°C for 18-20 hrs. After incubation, 20 µl of resazurin dye was added to all the wells and incubated for some minutes to observe any color changes. The Minimum Inhibitory Concentrations were determined visually in broth microdilution as the lowest concentrations of the extracts at which color changed from blue to pink in the resazurin broth assay 18.

**Statistical Analysis**

The Statistical Analysis System was used to detect the effect of difference factors in study parameters. Least significant difference-LSD test was used to significant compare between means in this study 19.

**Results and Discussion**

Phytochemical characterizations of methanolic and aqueous (seed’s husk and leaves) of Moringa oleifera extracts were subjected to different chemical tests for the detection of different phyto-constituents. Table 1 show the phytochemicals presence in Moringa oleifera extracts. These results agreed with Shanmugavel et al. 20 they reported the presence of alkaloids, tannins saponins, flavonoids and glycosides in methanolic extract of Moringa oleifera leaves.
Moringa oleifera extracts had free radical scavenging activity; this was evident in a concentration-dependent manner with significant differences (P≤0.05) between concentrations, and the results revealed that the leaves extracts were more effective than seed’s husk extracts in free radical scavenging activity as shown in Table 2.

Charoensin 21 study the antioxidant activity of Moringa oleifera leaves using (DPPH) assay. Fitriana et al. 22 revealed that the methanolic extract of Moringa oleifera leaves had the highest free radical scavenging activity compared to ethyl acetate, n-hexane and dichloromethane extracts. Furthermore, El-Hadary and Ramadan 23 in their study of antioxidant traits of Moringa oleifera leaves extracts referred to the scavenging activity of aqueous leaves extract which was 79.13 ± 0.28.

### Table 1: Phytochemical screening of Moringa oleifera leaves and seed’s husk extracts

<table>
<thead>
<tr>
<th>Phytochemical compound</th>
<th>leaves extracts</th>
<th>seed’s husk extracts</th>
<th>Aqueous Extract</th>
<th>Methanolic Extract</th>
<th>Aqueous Extract</th>
<th>Methanolic Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meyer’s test</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Wagner’s reagent</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Tannins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead acetate</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ferric chloride</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>phenols</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead acetate</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ferric chloride</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

DPPH assay

**Total phenolic content of Moringa oleifera extracts**

The results of the total phenolic content of Moringa oleifera extracts as shown in Table 3. The methanolic extract in both leaves and seed’s husk had the highest total phenolic content which was (73.71 and 63.30) in 50 mg/ml respectively. The results were in agreement with Vyas et al. 24 which referred that the highest total phenolic content of Moringa oleifera was for leaves extracted by methanol, compared to other parts. Furthermore, Karim

### Table 2: Radical scavenging activity of Moringa oleifera leaves extracts

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>Leaves extracts</th>
<th>seed’s husk extracts</th>
<th>BHT</th>
<th>V.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aqueous extract</td>
<td>Methanolic extract</td>
<td>Aqueous extract</td>
<td>Methanolic extract</td>
</tr>
<tr>
<td>2</td>
<td>56.10 ± 0.08</td>
<td>64.27 ± 0.06</td>
<td>17.23 ± 0.16</td>
<td>37.83 ± 0.03</td>
</tr>
<tr>
<td>4</td>
<td>66.17 ± 0.14</td>
<td>86.95 ± 0.06</td>
<td>18.10 ± 0.01</td>
<td>43.57 ± 0.03</td>
</tr>
<tr>
<td>6</td>
<td>83.40 ± 0.01</td>
<td>90.83 ± 0.02</td>
<td>28.33 ± 0.01</td>
<td>54.29 ± 0.18</td>
</tr>
<tr>
<td>8</td>
<td>86.26 ± 0.19</td>
<td>91.40 ± 0.01</td>
<td>40.59 ± 0.03</td>
<td>57.98 ± 0.27</td>
</tr>
<tr>
<td>10</td>
<td>87.33 ± 0.03</td>
<td>92.88 ± 0.07</td>
<td>50.25 ± 0.06</td>
<td>63.47 ± 0.06</td>
</tr>
</tbody>
</table>

* (P≤0.05)
et al. mention, the low total phenolic content of aqueous leaves extract, which was 5.57 mg/g.

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>Moringa oleifera leaves extracts</th>
<th>Seed’s husk extracts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Methanolic extract (mg/g)</td>
<td>Aqueous extract (mg/g)</td>
</tr>
<tr>
<td>10</td>
<td>42.34 ± 0.24</td>
<td>25.31 ± 0.35</td>
</tr>
<tr>
<td>25</td>
<td>62.89 ± 0.12</td>
<td>50.11 ± 0.12</td>
</tr>
<tr>
<td>50</td>
<td>73.71 ± 0.14</td>
<td>61.59 ± 0.18</td>
</tr>
<tr>
<td>LSD value</td>
<td>0.613 *</td>
<td>0.827 *</td>
</tr>
</tbody>
</table>

* (P≤0.05)

### Antibacterial activity of *Moringa oleifera* extracts

Agar well diffusion method was used to evaluate the antibacterial activity of *Moringa oleifera* extracts against two gram positive bacteria (*Staphylococcus aureus* and *Bacillus cereus*) and two gram negative bacteria (*Escherichia coli* and *Klebsiella pneumonia*). The results were listed in Tables 4 and 5. For the methanolic leaves extract, all concentrations were found to be active against all tested bacteria. The maximum antibacterial activity was observed on *Staph. aureus* with inhibition zone 22.66 ± 0.66 mm in concentration (200 mg/ml), while the methanolic seed’s husk extract showed there was no inhibition zone at concentration 50 mg/ml in all tested isolates. The highest effect was seen on *Staph. aureus* with the inhibition zone (9.83±0.16 mm and 14.83±0.16 mm) in concentrations (100 mg/ml and 200 mg/ml) respectively, followed by *E. coli* and *K. pneumonia* (12.66 ± 0.33 and 14.33±0.33 mm) in concentrations (200 mg/ml) respectively.

The result was agreement with a study by Abdallah et al. which referred to the high inhibitory effects of methanolic leaves extracts of *Moringa oleifera* on *S. aureus* and *K. pneumonia* and the water extract of leaves at concentration 200 mg/ml had the lowest effect on the gram negative bacteria. Furthermore Yetunde and Comfort mentioned that the aqueous extract of *Moringa oleifera* leaves at concentrations 50, 100 and 200 mg/ml did not show any inhibitory effect on *B. cereus*, *E. coli* and *Staph. aureus*. In contrast, Singh and Tafida refer to the significant high antibacterial activity of aqueous and methanolic extracts of *Moringa oleifera* leaves on *E. coli* which were 7.33 + 0.57 mm and 8.67 ± 0.57 mm respectively compared to *Staph. aureus* and *Pseudomonas aeruginosa*.
The Minimum Inhibitory Concentration (MIC) of Moringa oleifera extracts was shown in Figure 1. A method using the oxidation-reduction colorimetric indicator resazurin has been proposed for the determination of drug resistance and MIC of antimicrobial agents against pathogenic organisms. The results of leaves extract showed that the MIC values of methanolic extract were 16 mg/ml for both Staph. aureus and E. coli, and 32 mg/ml for B. cereus and K. pneumonia, while the MIC of aqueous extract was 64 mg/ml for all bacterial isolates. For seed’s husk extracts, the result showed that the MIC of methanolic and aqueous extracts was 64 and 128 mg/ml respectively for each bacterial isolate.

Phenolic compounds of plants are of noticeable interest due to their antioxidant and antibacterial properties. The means by which microorganisms are inhibited by phenolic compounds involves a sensitization of the phospholipids bilayer of the cell membrane, causing an increase in permeability and leakage of vital intracellular constituents, or impairment of bacterial enzyme systems. Phenolic compounds act by inhibiting the amino acid decarboxylase in target bacteria.

### Conclusion

Moringa oleifera extracts have a wide variety of phytochemicals that show effectiveness against different diseases and The methanolic leaves extract of Moringa oleifera shows relatively a higher amount of phenolic compounds and have equal antioxidant activity to the synthetic antioxidant (BHT) moreover Different Moringa oleifera extracts have a potential antimicrobial activity.
agent against both gram positive bacteria (Staph. aureus and B. cereus) and gram negative bacteria (E. coli and K. pneumonia). The methanolic leaves extract has the largest effects against foodborne pathogen used in this study.

Conflict of Interest: The authors declared that present study was performed in absence of any conflict of interest.

Source of Funding: Self

Ethical Clearance: Not required

References


Necessary Measures to Control Pathogenic Pests

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¹Scholar Researchers, Plant Protection Dept., College of Agricultural Engineering Sciences, University of Baghdad, Iraq

Abstract

The measures necessary to control disease-causing pests in Iraqi environments need a lot of attention and care, and these measures take many forms and methods and due to the importance of this topic and its direct relationship to human health, it was appropriate to provide this service according to the integrated pest management system. When implementing the necessary measures to control pests, all domestic and international laws and policies must be complied.

Keywords: Necessary measures, pathogenic, pests

Introduction

The medical significance of pathogenic lesions: Arthropods and other animals affect human and animal health in various ways: First: As direct agents of disease or discomfort: 1 - Anxiety or dread about pests, pest phobia: the crawling or passing of a small insect on the face or any part of the body or its flight close to it may cause anxiety, annoyance or fear, and then it is called “Entomophobia” where a mental and mental disorder occurs in a person It may develop into a neurological disorder [1] 2 - Annoyance and blood loss: The mere humming of mosquitoes may deprive some people of sleep despite their ability to sleep in very noisy places, and the disgust of some people is a result of the unpleasant odors that they secrete or the residues that they leave in places visited by pests such as cockroaches and rodents[2]. 3- Accidental injury to sense organs: As in an old needle insect that may enter the ears, or some nymphs of ticks can enter the ear of the sleeper and cause severe pain. And some fly larvae may enter the genital openings of children when they are not covered during sleep, [3] 4 - Allergy: Some people show high sensitivity as a result of the formation of certain proteins, especially among those working in museums or apiaries, and it is the result of stinging, inhalation, or contact with insect feces, or their shedding skin, or parts of their bodies. Allergy is of two types: The first type is caused by inhaling the smells of the feces of the lesion or powder from the bodies and scales of the lesions and appears as a result of the presence of cells called Allergens in the respiratory system, causing a type of cough, shortness of breath and asthma, [4]. The second type is caused by the toxic proteins that the toxins contain in some insects, which push the body to form antibodies, as in the sensitivity to stings from bees or wasps, [1][5]; 5 - Envenomization: The pest secretes toxins that are injected into humans or animals and cause severe pain or damage that may reach death. The toxin injection process is carried out in several ways, including [1][2][6]:

By the bite: As in the case of the Assassin bugs or the female Black Widow Spider, which secretes a toxin in the wound that causes painful irritation,

By stinging, as in bees, wasps, wasps, and some ants and scorpions, and at the end of the abdomen of these pests there is a stinging machine that they use to bite what annoys them or attacks their nests.
Fig -1: Note of an ant biting one of the victims.

Fig -2: Symptoms of fire ant sting.

The secretion of inflammatory fluids to the healthy skin, as in some types of red-burning ants, which secrete formic acid as a spray on the enemies.

Fig -3: Formic acid is released by the red ant when Confronting the enemy.
Fig -4: Formic acid is sprayed on the back of the neck

By contact: like the blister beetles, they cause an irritating effect if they touch the skin of a human or animal.

6- Dermatosis: they occur in two ways: The first method is a result of external intrusion on the human body and its bite, so it absorbs its blood, which results in serious diseases such as sucking lice, bed bugs and fleas.

Fig -5: Flea and skin infections caused by bed bugs
Head lice

*Pediculus humanus capitis*

Body lice *Pediculus humanus corporis*

: Trench Fever It may be called a fever Caused by bacteria *Rickettsia Quintana*, Lice transmit them with blood or feces

Relapsing Fever

The cause of the disease is similar to bacteria and it is called *Spirochaeta recurrentis*. It is transmitted by lice while feeding on human blood and causes an increase in body temperature, which occurs in people who are always infected ,

The second method: as a result of attacking the tissues of the human body, as in mosquitoes and other types of mites where they dig tunnels inside the skin causing severe infections, as in the Scabies Mites (Scabies Mites: *Sacoptes scabiei*) that causes cases of scabies *Acariasis*,

Examples of the life cycle of some pathogenic pests and the appropriate measures needed to control them without harm the environment

Flies

Phylum: Arthropoda

Class: Insecta

Order: Diptera

Family: Muscidae

*Musca domestica*

Family: Sarcophagidae

*Sarcophaga carnaria*

Family: Calliphoridae

*Calliphora vicina*

Family: Phlebotominae

*Phlebotomus papatasi*,

Habitat:

The breeding centers for flies are the place of waste, containers, animal pens, natural fertilizers and other places where organic waste collects,

Living and Nutrition:

Both sexes (male and female) feed on sugar secretions, decomposed organic waste and dirt, and the larvae feed on leftovers in the garbage and decomposing corpses where they live,

Life Cycle: The life cycle of flies passes through four roles (egg - larva - pupa - adult). The female lays her eggs in decomposing organic matter as well as in litter and dirt, which hatch from the worm-shaped larvae that have no legs, which in turn into pupa from which the adult stage of flies emerges After that, the adult stage produces about ten generations during the year, and is active throughout the year and lasts for a life cycle of 8-30 days, depending on the availability of appropriate conditions,

Measures to control flies:

1- Integrated control of larvae of flies

$\$ Preventive control: One of the best control methods is to completely eliminate places of reproduction and pay attention to cleanliness, and it is summarized as follows:

$\$ Not leaving food and vegetable remains exposed to reduce the formation of foci for laying fly eggs.

$\$ Emphasizing that containers are free of waste, that they do not accumulate for periods of more than (12) hours, and that they are properly disposed of immediately.

$\$ Use containers with a lid so that it is closed well after putting garbage bags in it and so as not to help the reproduction of flies.

$\$ Disposal of slaughterhouse waste in a healthy and sound manner that is not a fertile environment for flies to breed.

Chemical control:

- If the containers cannot be emptied during the 12-
hour period, they are sprayed with lime chlorine powder (calcium hypochlorite 35% or 65%).

- Spraying empty containers before distribution and after emptying them with suitable organophosphorous pesticides mixed with Citronella oil (to reduce their odors).

- The use of spraying with larger particles using MIST BLOWER devices, as it left a layer of the pesticide on the target surfaces to combat the adult stages of the flies in public places.

- Periodically spraying the waste disposal sites with the recommended pesticides to prevent the reproduction of fly larvae.

**Integrated control of the adult stage of flies:**

**2-1: Mechanical control of flies**

- Coating the containers with lubricant materials that do not interact with liquids, in order to ensure the ease and speed of emptying the containers, as well as their cleanliness of any residues that may stick to them.

- Emphasizing the existence of a sufficient number of electrical and pheromone traps to control the extreme stages of flies in public health stores.

- The use of adhesive tapes in restaurants and supermarkets to combat the adult phases of flies, provided that they are placed out of sight of consumers and replaced daily to reduce densities.

- The use of adhesive tapes on the upper inner sides and frames of containers that work to enhance the attraction of flies to them or get rid of them after gathering on these tapes inside the container.

**2-2 Biological control of flies**

Using pheromone traps, as they contain an attractive substance that attracts large numbers of flies (5;6;10).

**2-3: Chemical control of flies**

- Using baits in markets, slaughterhouses, and waste places.

- The use of tapes impregnated with pesticides.

- Use of the safest pesticides to control the adult stages of flies in places of rest and gatherings by using vacuum spraying with ULV micro-spray devices in places where flies gather in the early morning.

**Cockroaches: Cockroach**

Kingdom: Animalia

Phylum: Arthropoda

Class: Insecta

Order: Blattodea

1- Family: Ectobiidae

1- *Supella Longipala* Brown striped cockroach

2- *Parcoblatta pensylvanica* Cockroach wood

2- Family: Blattellidae

1- *Periplaneta Americana* American cockroach

2- *Blattella orientalis* Oriental cockroach

3- *Blattella germanica* German cockroach

Habitat:

The order of cockroaches includes many famous numbers, including (the American cockroach, the German cockroach, the oriental cockroach, the Australian cockroach, the Egyptian cockroach and the brown belt cockroach) and it is called a household pest because it lives near a person in his home, in the kitchen, the restaurant, the store, the sanitary facilities, the sinks, and behind the water pipes, And in the food preparation and storage rooms, in clubs, cinemas, cafes, and other different stores that are close to a person or his place of residence.[1][2]

**Life cycle:** Insects with a gradual incomplete development, that is, they go through three roles (egg - nymph - adult). The eggs are placed in groups in a special protective bag called the egg sac, and this bag either remains attached to the end of the abdomen in the female or is placed in appropriate places, and sometimes the eggs remain inside the female, then the female gives birth to nymphs, and the incubation period for eggs varies according to species and according to temperature.
Reasons that lead to an increase in cockroaches:

1. The presence of food leftovers inside the kitchen.
2. The accumulation of waste inside and outside the home (it has been proven to scientists that this insect does not stay long in clean homes).
3. The cockroach insect activity increases in dark and damp places, especially in rooms and homes that suffer from leakage of drinking water and sewage water.
4. The presence of cracks in the walls and floors of old houses and buildings, as this insect moves from one building to another by this method.

Procedures for controlling cockroaches: The integrated pest management program includes the following:

§ Monitoring the possible places of infection before carrying out the treatment to know the type of pest and the places of infection.

§ Follow up the affected places after the treatment to see the success of the used control method.

§ The use of multiple means in the control to put the cockroach’s problem under control, such as:

1- Preventing the introduction of the pest and following good hygienic methods (constant and careful cleaning, taking care to raise garbage regularly and put it in special waste bags that are closed tightly).

2- Treating cracks and holes in building walls, especially in sewer openings, and repairing water pipes to prevent moisture.

3- Taking care of foodstuff stores and using the correct preservation method.

4- Putting sticky and attractive traps for cockroaches, or using electric traps, using insect growth regulators, using low-toxic “public health” insecticides, using boric acid powder in wet places where cockroaches live. This acid affects as a slow-acting infectious poison and has no toxic effect on animals, it is also characterized by being a repellent to cockroaches, which gives it a great scope for use as food bait.

Fig -6: Treating cracks and holes and treating stains in The chemical control of cockroaches.
**Scabies mite classification**

- **Kingdom:** Animalia
- **Phylum:** Arthropoda
- **Class:** Arachnida
- **Subclass:** Acari
- **Order:** Sarcoptiformes
- **Family:** Sarcoptidae
- **Genus:** Sarcoptes
- **Species:** scabiei

This type *Sarcoptes scabiei* attacks both humans and mammals (dogs, horses, mules, donkeys, goats, sheep and rodents). Each type of scabies mite specializes in a host that causes it to have scabies, itching and skin infections, and the infection is transmitted from person to person, from animal to person and from human to animal.\(^6\)\(^8\).

**Life cycle and nutrition of a human scabies (Sarcoptes scabiei var. hominis hering)\(^1\)\(^6\)\(^8\):** Its life cycle takes between (10-19) days and may exceed that in some species to reach a month, and adult female can live for (70) days. The female digs tunnels in the skin a depth of one centimeter or more to lay eggs and feed on dead skin cells and secretions of live skin. She does not use human skin except as a container to incubate her eggs - and the eggs remain in these tunnels, for a period ranging between (10-17) days. The human skin injury may last for more than a month, but the sensation of severe skin irritation begins after this period, especially at night.

They lay between (60-100) eggs in the last five weeks of their life. After 3-7 days the eggs hatch to larvae with three pairs of legs and leave the tunnel and dig another tunnel (surface pocket) in the stratum carenum and then they moult into nymphs and become adult mites after approximately three weeks in the same place. Males and females mate, and the fertilized female leaves and digs another tunnel to lay her eggs,

**Protection,\(^2\)\(^7\):**

- v It is necessary to ventilate the bedrooms and work on exposing the pillows and blankets to direct sun whenever possible and for the longest possible period.

- v It becomes necessary in hospitals for the patient to use his own pillows and change the bed linen on a daily basis, as it is one of the most popular ways of transmitting infection due to the difficulty of periodically disinfection, as it is public places that the patient uses after another.

- v Using the artificial sun in the event that the sun does not enter the dwelling by purchasing a set of lamps (ultraviolet and infrared rays, while operating them in closed rooms, and this greatly contributes to reducing the number of Mites.

**Treatment\(^1\)\(^6\):** The treatment aims to finally get rid of the parasites that cause the disease, therefore all individuals in the home must be treated to prevent spread or recurrence by using materials that eliminate parasites and be in the form of topical paints and are the following alternatives:

- § Benzyl Benzoate 25% solution. Apply the entire skin of the body from the neck to the feet before going to sleep daily for 3 days.

- § Cream permethrin (Permethrin 5%). Apply the whole body well before sleeping, from the neck to the feet, between the fingers and in the folds of the skin, and leave it for 8 - 14 hours (until the morning), then wash the body well. And it is used in this way for a week. It is preferable that the skin be dry before treatment.

- § As for children, it is preferable to use sulfur preparations such as 10% sulfur gel. And recovery takes place within 4 weeks of treatment, and it should be noted that the itching can continue for weeks after eliminating the parasites.

**Conclusion**

Measures to be taken when implementing the control program:

- v Identify the types of pathogenic pests.
v Identify the characteristics of the pest such as (habits, life cycle, needs and hates of the pest).

v Take rapid steps to exclude the pest from the area if possible.

v Determine the ways of entering the pest to a site and its hiding places.

v Availability of all means and tools with the work team before starting the implementation of the control program.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required

References


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Knowledge, attitude and Behavior of the Moroccan Population During Covid-19

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Abstract

Background: Since December 2019 the world has experienced a significant spread of the Covid-19 pandemic. The purpose of this study is to investigate the impact of the coronavirus disease (COVID-19) on the mental health of the population.

Method: This cross-sectional study was conducted in Morocco and was administered to a sample of 702 respondents. The subject was assessed using a questionnaire containing the following information: Personal demographic characteristics, knowledge and awareness of COVID-19 outbreak, Attitude towards COVID-19 outbreak, Behavioral change in relation to COVID-19 outbreak, Patient Health Questionnaire (PHQ-4) screening questions for anxiety and depression, and finally a questionnaire related to people at risk of psychological harm from social isolation during the COVID-19 pandemic, data collection began three weeks after confinement began and lasted for five weeks, from April 10 to 08 Mai.

Results: 702 participants responded to the survey. The descriptive analysis of the database showed that the majority of respondents were male (69.3%), aged 20 to 30 years (46.15%), with university diploma (61.25%) and employed (63.53%). Knowledge differed considerably by level of education; however, Attitude differed significantly according to gender and educational level. Correlations between the knowledge, attitude, behavioral behavioural, PHQ-4 and the psychological harm score shows that the variables “attitude, behavioural and Psychological harm” are significantly correlated with the PHQ-4 score, the higher the latter are the greater the last is high. In addition, the “Knowledge” variable is also significantly correlated. The greater the knowledge, the smaller the PHQ-4 score.

Conclusion: The covid-19 pandemic is a public health problem

Keywords: Covid-19; Morocco; Knowledge, Attitude; PHQ-4

Background

The COVID-19 outbreak has been rapidly transmitted and aroused enormous attention globally and which was originated from a wet market in Wuhan, Hubei province, China in early December 2019¹. The outbreak caused by SARS-CoV-2 was officially labelled a pandemic on March 12th, 2020 by Word Health Organization. Due to the disease being transmitted via close contact between persons, extreme social distancing measures have been used to curb its spread.

The Moroccan health authorities announce the country’s first novel coronavirus case: A Moroccan man arrived from Italy in February, importing the virus. The Moroccan government reacted decisively to the threat of COVID-19 pandemic, declared a state of emergency, and imposed a strict one-month curfew on 20 March

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and extended it until 20 May 2020 before proceeding to the post-lockdown period. Epidemics and pandemics are a periodic phenomenon. People in the community face several challenges during such periods. Lack of awareness often leads to an unconcerned attitude, which may adversely affect the preparedness to meet these challenges. Impacts of these epidemics and pandemics are often intense, which may adversely affect the mental well-being of a given population. The fear and anxiety related to epidemics and pandemics also influence the behaviour of people in the community. Few published studies have examined the mental health impacts of COVID-19 and mandatory lockdown contextual factors.

An Italian study found that lower self-discipline and perceptions of the lockdown measures as a limitation on personal freedom, were related to higher stress and a greater likelihood of violating governamental social isolation rules. Also, in Italy, another study explores the role of psychological flexibility and its inverse, inflexibility in moderating the effects of the pandemic and lockdown context of mental health outcomes. A study reports that having a family member infected with COVID-19 is related to higher anxiety. Further studies mentioned that being an informal (e.g., parent) or formal (e.g., healthcare worker) caregiver, or a victim of domestic violence, are strong risk factors for adverse mental health outcomes during lockdown.

Furthermore, other studies showed that limited social capital decreased income during the pandemic or being a refugee or an undocumented migrant are associated with greater negative mental health outcomes. Lastly, some study reports that older and younger people report more adverse mental health impacts from lockdown-related socializing restrictions (e.g., unable to receive visitors if living alone or hospitalized, and closure of schools and entertainment facilities).

**Materials and Methods**

This cross-sectional study was conducted in Morocco and was administered to a sample of 702 respondents. The subject was assessed using a questionnaire containing the following information: Personal demographic characteristics (age, gender, educational qualification and working status); knowledge and awareness of COVID-19 outbreak (Will you be cured if you are affected by COVID? Does all infected cases result in death? What are your personal measures against the outbreak? Using a mask, Hand washing, Avoiding indoor and crowded places, others); Attitude towards COVID-19 outbreak (Deliberately cancelled or postponed social event, such as weeding ceremony, travelling, meeting friends, Taken time off work, Reducing the amount of time going outside, Reducing the amount of using public transport, Kept away from crowded places); Behavioral change in relation to COVID-19 outbreak (Deliberately cancelled or postponed social event, such as weeding ceremony, travelling, meeting friends, Taken time off work, Reducing the amount of time going outside, Reducing the amount of using public transport, Kept away from crowded places); Patient Health Questionnaire (PHQ-4) screening questions for anxiety and depression (Feeling nervous, anxious our edge? Not being able to stop or control worrying?).

Little interest or pleasure in doing things? Feeling down, depressed or hopeless?), and finally a questionnaire related to people at risk of psychological harm from social isolation during the COVID-19 pandemic (Do you live alone, Are you unemployed or have you lost your income during the pandemic, Are you a person with caretaking responsibilities, including childcare during extended school closures, Are you addicting to drugs or alcohol, Are you suffering from domestic violence, which is likely to be made worse with quarantine).

**Statistical Analysis**

The responses should be coded as follows:

- Not at all, scored at 0
- Several days, scored at 1
- More than half the days, scored at 2
- Nearly every day, scored at 3

Add the scores for each question together to give a possible total score from 0 to 12, with categories of psychological distress being:

- Scores 0-2 = None
- Scores 3-5 = Mild
Scores 6-8 = Moderate
Scores 9-12 = Severe
Anxiety subscale = Sum of items 1 and 2 (score range 0 to 6)
Depression subscale = Sum of items 3 and 4 (score range 0 to 6)

The Data collected was entered in excel sheet and was analysed using SPSS, P value > 0.05 was considered statistically significant.

Descriptive were calculated for statistics sociodemographic characteristics, knowledge and awareness of COVID-19 outbreak, Attitude towards COVID-19 outbreak, Behavioral change in relation to COVID-19 outbreak, Patient Health Questionnaire (PHQ-4) screening questions for anxiety and depression and a questionnaire related to people at risk of psychological harm from social isolation during the COVID-19 pandemic, Percentages of response were calculated according to the number of respondents per response with respect to the number of total responses of a question.

One-way ANOVA was used to find the association of knowledge, attitudes and behavioral change, Patient Health Questionnaire (PHQ-4) and people at risk of psychological harm from social isolation towards COVID-19 in relation to different age groups and different literacy rate levels, test t student was used to find the association of items in relation to gender and Occupational status, and we used Pearson Correlation to find the correlation between the 5 items.

**Results**

702 participants responded to the survey. The descriptive analysis of the database showed that the majority of respondents were male (69.3%), aged 20 to 30 years (46.15%), with university diploma (61.25%) and employed (63.53%). Of the respondents 98% had heard about COVID-19 outbreak whereas only 4.27% doesn’t believe that the outbreak is serious.

However 94.59% knew that COVID-19 outbreak was caused by a virus whereas 28.63% think that the disease is fatal. 64.39% reported that the disease is preventable whereas only 10.97% though that the disease is not contagious. Altogether 54.70% felt that Moroccan government has taken enough steps to eradicate the disease.

Regarding behavior change in relation to COVID-19, 70.80% (497) of the respondents had not cancelled or postponed any social event, 71.08% (499) had taken time off work and 90.3% (632) had reduced the amount of time going outside.

However, 85.75% (602) had reduced the use of public transport and 66.24% (465) had kept away from crowded places. Concerning the measures taken by respondents against the outbreak, we found that 86.18% (605) used mask, 99.72% (700) washed hands, 65.53% (460) avoided indoor and crowded places, and 98.29% (690) were overly worried so they increased the amount of cleaning or disinfecting things that might be touched such as door knobs or hard surfaces.

For the questionnaire related to people at risk of psychological harm from social isolation, 53.70% live alone, 71.08% unemployed or have you lost your income during the pandemic, 30.70% are a person with caretaking responsibilities, including childcare and 57.55% suffering from domestic violence, and 43.20% of participant are a severe psychological distress.

The results of our study show that the level of education differed significantly in knowledge among respondents at p=0.004 (Least significant difference= 0.34). Attitude differed significantly according to gender and educational level.
**Table 1:** Association of knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 with gender using Students t test.

<table>
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<th>Gender</th>
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*Significant at p < 0.05

**Table 2:** Association of knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 with age group using one way ANOVA

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### Table 2: Association of knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 with age group using one way ANOVA

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<th>Knowledge Score</th>
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*significant at p < 0.05

### Table 3: Association of knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 with occupational status using Students t test

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<td></td>
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</tr>
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<td>5,58</td>
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<td>5,57</td>
<td>0,787</td>
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<tr>
<td>Attitude score</td>
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<td>Total</td>
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<td>Psychological score</td>
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*significant at p < 0.05
Table 4: Association of knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 with educational level using one way ANOVA.

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Effectif</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
<th>P value</th>
<th>Least significant difference</th>
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<td>12</td>
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<td>702</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Attitude score</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
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<td><strong>Behavioral score</strong></td>
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<tr>
<td><strong>PHQ-4 score</strong></td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td><strong>Psychological score</strong></td>
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<td></td>
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</tr>
<tr>
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<td>Total</td>
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</tbody>
</table>

*significant at p < 0.05
Table 5: Correlation between knowledge, attitude, behavior, psychological harm from social isolation and PHQ-4 using Pearson correlation test

<table>
<thead>
<tr>
<th></th>
<th>Knowledge score</th>
<th>Attitude score</th>
<th>PHQ-4 score</th>
<th>Psychological score</th>
<th>Behavioral score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge score</td>
<td>-</td>
<td>-0,566**</td>
<td>-0,284**</td>
<td>0,558**</td>
<td>0,362**</td>
</tr>
<tr>
<td>Attitude score</td>
<td>-0,566**</td>
<td>-</td>
<td>0,637**</td>
<td>-0,342**</td>
<td>-0,366**</td>
</tr>
<tr>
<td>PHQ-4 score</td>
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<td>0,637**</td>
<td>-</td>
<td>0,195**</td>
<td>0,168**</td>
</tr>
<tr>
<td>Psychological score</td>
<td>0,558**</td>
<td>-0,342**</td>
<td>0,195**</td>
<td>-</td>
<td>0,781**</td>
</tr>
<tr>
<td>Behavioral score</td>
<td>0,362**</td>
<td>-0,366**</td>
<td>0,168**</td>
<td>0,781**</td>
<td>-</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)

The table 5 of correlations between the knowledge, attitude, behavioral, PHQ-4 and psychological harm score shows that the variables “attitude, behavioral and Psychological harm” are significantly correlated with the PHQ-4 score, the higher the latter are the greater the last is high. In addition, the “Knowledge” variable is also significantly correlated. The greater the knowledge, the smaller the PHQ-4 score.

**Discussion**

Epidemics and pandemics are tough periodic phenomena in which a given population community face a several changes in their wellbeing, mental health and behaviors.

In order to control the outbreak COVID-19 infection, health authorities and governments all around the world have employed measures, Chinese health authorities was the first country have employed rapid public health measures, including intensive surveillance, epidemiological investigation and closure of markets on January 1, 202012. To discuss our findings, published articles concerning mental health related to previous outbreaks and COVID-19 outbreak have been considered.

In 16 March 2020, Moroccan government and health authorities has proceeded to lock down cities and isolated people in their houses. This new way of living have an immense impact in all the living area especially in the mental health of the Moroccan community.

This study attempted to evaluate the awareness, attitude, anxiety and perceived mental healthcare needs in the society. Isolation may be protective and preventive in many circumstances, previous experiences mentioned an increase of mental distress during this events have been described13.

69, 3% of the respondents were male, half of responses came from persons aged between 20-30 years. Almost all the answers knows the origins of COVID-19, aware of the situation. 14, 5% do not have any idea if is the disease fatal. More than the half of respondents were satisfied with measures taken by the government.

In the previous outbreak situations, it is necessary to create a health education awareness during pandemics: epidemics for effective prevention of disease spread14. Our findings showed that the Moroccan population were aware about the danger of COVID-10, for that, more the three quarter of the respondents used masks, hand washing, avoiding crowded places, ceremonies, events, etc. This recommendation was already described in the literature in previous outbreaks15,16. The use of masks and sanitizers increased since the onset of COVID-1917.

This level of awareness may be affected by the educational level; our results showed that just 0, 85% of
the respondents were illiterate, 1, 43% have a primary education and 1, 71% have middle level education. 97% were graduated from high school or have a university diploma.

Working people represented 63, 25%. Previous studies showed that education level, employment and age have an influence on knowledge18.

Our study showed that most people reduced the amount of using public transportation and kept away from crowded places, despite these attitudes, many people ignore the importance of social distancing and isolation, so they had not cancelled or postpones any social event, and had not taken any time off work. Our findings are approximatively similar to James Rubin et al study19.

The current situation cause mental health problems such as stress, anxiety, depressive symptoms, insomnia, anger and ear14. Our results demonstrated than 35, 9% of the respondents showed a score of two (PHQ4) for anxiety and feeling nervous. In the other hand, 33% have no control to stop worrying, 43% are feeling down depressed nearly every day (score 3). These results joined previous studies about the effect of outbreaks in mental health20, 21.

In addition, to live alone could exercise a huge impact of the mental health; our results showed that 53.7% of the participants live alone. Loneliness is a subject unpleasant effect on mental and physical health could lead to premature death and rates comparable to obesity and smoking22, 23.

**Conclusion**

The Covid-19 pandemic had a negative impact on the mental health of the population during the period of containment.

Loneliness or more almost the fact of going through containment alone is a subject that has unpleasant effects on the mental and physical health of the population.

**Ethical Clearance:** The procedures were carried out in accordance with the recommendations of the internal Ethics Committee of the Ibn Tofail University Kenitra. This procedure were examined and approved by the Committee.

**Availability of data and materials:** The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests.

**Funding:** This work is funded by the PPR-B-Mokhtari-FS-UIT-Kénitra project.

**Authors’ contributions:** All authors contributed equally, all authors read and approved the final manuscript.

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**References**


The Injury among Elderly in Indonesia: Analysis of the 2018 Indonesian Basic Health Survey

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² Researcher, Center of Research and Development of Humanities and Health Management, Ministry of Health, Jakarta, Indonesia

Abstract

The elderly are one of the vulnerable groups. This study was aimed at analyzing descriptive statistics of the incidence of injury in the elderly in Indonesia. The data derived from the 2018 Indonesia Basic Health Survey. The analysis was performed statistically descriptive. The analysis was carried out with a sample of 85,358 elderly. The results show that in all types of characteristics the highest proportion of injuries was lower limb injury, followed by upper limb injury. The incidence of lower limb injury in the 60-69 age group was higher than in any other age group. Meanwhile, upper limb injuries were more common in the 70-79 age group. The incidence of injury in various locations in males was higher than in female elderly, except at the location of head and stomach injuries which have the same proportion. The proportions of abrasions and sprains were most common in the 70-79 age group, male, senior high school, and the middle wealth status. The proportion of blisters/bruises affects the elderly in urban areas, in contrast to sprains which are more common in rural elderly. In all age groups, the most common incidence was abrasions/bruises, followed by sprains, with the largest proportion in the 70-79 age group. The public servant/army/police have the highest proportion of abrasions/bruises than other work types. It was concluded that the highest proportion of injuries were lower limb injuries, followed by upper limb injuries. Meanwhile, the most common types of injuries experienced by the elderly are abrasions/bruises.

Keywords: injury, elderly, big data, community health, public health.

Introduction

WHO states that the elderly are one of the vulnerable groups. Other vulnerable groups are children, pregnant women, people who are malnourished, and people who are sick or have immune disorders¹. Trends show that the proportion of elderly people is increasing and requires more attention. This condition is a result of the development of better health²,³.

Indonesia’s population dynamics have also shifted to the elderly population group. This is evidenced by the increasing life expectancy in Indonesia. Life expectancy in 2010 is 69.81 years old. Then that number increased to 70.90 years old (male 69.09 years old, female 72.8 years old) in 2016. Finally, the life expectancy rate of 70.90 years old shows that babies born in 2016 can live to the age of 70 years old⁴,⁵.

Injury/physical trauma base on the health reflection means any permanent or semi-permanent disturbance of structure or function of any part of the body caused by an external agency. Such agency may be mechanical, thermal, chemical, electrical, or radiational. The term may also be applied to damage caused by infecting organisms or to psychological trauma⁶. Geriatric trauma patients are less likely to be injured than younger people. Moreover, they are more likely to have fatal outcomes⁷.

Falling is one of the problems that often occur in the elderly where it is related to changes in the function
of disease organs and the environment. About 30% of the elderly have experienced falls within one year. Various types of injuries incurred due to falls can be mild to severe, such as head injuries, soft tissue injuries to fractures. It is estimated that about 1% of elderly people who fall have a fracture of the femur column, 5% have fractures of other bones such as ribs, humerus, pelvis, and others. About 5% have soft tissue injuries and fractures. Based on the background description, this study aims to analyze descriptive statistics of the incidence of injury in the elderly in Indonesia.

Materials and Methods

The data source used in this research was the 2018 Indonesian Basic Health Survey. The 2018 Indonesian Basic Health Survey was a national scale survey conducted by the Indonesian Ministry of Health. The unit of analysis in this study was the elderly (≥ 60 years old). With the multi-stage cluster random sampling method, it was found that as many as 85,358 elderly respondents. The incident of injury was the proportion of injuries to the elderly population in the last 12 months that resulted in disrupted daily activities. The analysis was carried out by statistical descriptive by observing the distribution by province and demographic characteristics of the elderly. The demographic characteristics of the elderly who were involved were age group, type of place of residence, gender, education level, occupation type, and wealth status.

Results and Discussion

Table 1 presents the proportion of injuries in the elderly by demographic characteristics. Characteristics include classification of the elderly according to age group, type of place of residence, gender, education level, occupation type, and wealth status.

Based on demographic characteristics, the largest proportion of injury incidence is experienced by the female elderly, middle elderly, and those who live in urban areas. Meanwhile, based on the education level and occupation type, the elderly with no education or never going to school and not working suffered the most injuries. The proportion of injury incidence was almost even in all status of wealth.

The parts of the body affected by injury are classified according to ICD-10. Respondents can experience more than one part (multiple injuries). The classification of the injured body parts is grouped into the head (including the eyes, nose, ears, mouth, face, and neck), chest (covering the front of the body from the top of the waist to the bottom of the neck including the sternum), back (covering the back of the body from above waist to lower), neck including the spine, stomach (covering the body from below the waist, front and back including the genitals and internal organs), upper limbs (covering the upper arms, forearms, back of the hands, palms, and fingers), lower limbs (including thighs, calves, soles, and toes).

Table 1. The proportion of injury among the elderly by demographic characteristics (n=85,358)

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<th>Injury</th>
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<td></td>
<td>%</td>
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<tr>
<td>· 60-69</td>
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</tr>
<tr>
<td>· 70-79</td>
<td>9.4</td>
</tr>
<tr>
<td>· ≥80</td>
<td>8.2</td>
</tr>
<tr>
<td>Type of place of residence</td>
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<tr>
<td>· Urban</td>
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</tr>
<tr>
<td>· Rural</td>
<td>7.9</td>
</tr>
<tr>
<td>Gender</td>
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<tr>
<td>· Male</td>
<td>7.6</td>
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### Table 1. The proportion of injury among the elderly by demographic characteristics (n=85,358)

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<tr>
<td>Farmer</td>
<td>7.3</td>
<td>6.9-7.8</td>
<td>26,683</td>
<td></td>
</tr>
<tr>
<td>Fisherman</td>
<td>7.4</td>
<td>5.0-10.9</td>
<td>492</td>
<td></td>
</tr>
<tr>
<td>Labor/Driver/Maid</td>
<td>8.3</td>
<td>7.2-9.6</td>
<td>5,139</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>8.1</td>
<td>7.1-9.2</td>
<td>5,296</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wealth status</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorest</td>
<td>8.1%</td>
<td>7.6-8.7</td>
<td>19,869</td>
<td></td>
</tr>
<tr>
<td>Poorer</td>
<td>8.4%</td>
<td>7.8-9.1</td>
<td>16,814</td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>8.4%</td>
<td>7.7-9.1</td>
<td>15,586</td>
<td></td>
</tr>
<tr>
<td>Richer</td>
<td>7.5%</td>
<td>7.0-8.1</td>
<td>15,733</td>
<td></td>
</tr>
<tr>
<td>Richest</td>
<td>8.4%</td>
<td>7.8-9.1</td>
<td>17,357</td>
<td></td>
</tr>
</tbody>
</table>

Source: the 2018 Indonesian Basic Health Survey

In all types of characteristics, the highest proportion of injuries was lower limb injury, followed by upper limb injury. The incidence of lower limb injury in the young elderly is higher than in the middle and old elderly. Meanwhile, upper limb injuries were mostly experienced by the middle elderly. The incidence of injury in various locations in males is more than in females except for the head and abdominal injuries which have the same proportion.

Types of injury based on the part of the body that are injured are also divided into abrasions/bruises, wounds/cuts/stab wounds, sprains, fractures, and severed limbs. Table 3 presents the types of injuries among the elderly in Indonesia.

The proportion of abrasions and sprains most often occurs in the middle elderly, male, secondary education, and poor wealth status. The proportion of abrasions/bruises is high in urban areas, in contrast to sprains which are more common in rural residents. At all levels of elderly people, the highest incidence is abrasions/bruises, followed by sprains, where the largest proportion is experienced by the middle elderly. The type of work of public servant/army/police has the highest proportion of experiencing bruises compared to other types of occupation. Injuries suffered by the elderly are also divided into eye injuries, brain injuries, internal organ injuries, burns, and others.
Table 2. The body part of injury among the elderly in Indonesia (n=85,358)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Injured body part (%)</th>
<th>N (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Head</td>
<td>Chest</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· 60-69</td>
<td>14.0</td>
<td>4.3</td>
</tr>
<tr>
<td>· 70-79</td>
<td>15.5</td>
<td>3.7</td>
</tr>
<tr>
<td>· ≥80</td>
<td>17.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Type of place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Urban</td>
<td>16.3</td>
<td>3.7</td>
</tr>
<tr>
<td>· Rural</td>
<td>13.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Male</td>
<td>14.8</td>
<td>4.3</td>
</tr>
<tr>
<td>· Female</td>
<td>14.8</td>
<td>3.5</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· No education</td>
<td>13.6</td>
<td>2.3</td>
</tr>
<tr>
<td>· Didn't graduate from elementary school</td>
<td>15.1</td>
<td>4.1</td>
</tr>
<tr>
<td>· Elementary school</td>
<td>14.0</td>
<td>4.7</td>
</tr>
<tr>
<td>· Junior high school</td>
<td>18.5</td>
<td>6.2</td>
</tr>
<tr>
<td>· Senior high school</td>
<td>18.1</td>
<td>2.4</td>
</tr>
<tr>
<td>· College</td>
<td>13.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Occupation type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Not works</td>
<td>16.9</td>
<td>3.6</td>
</tr>
<tr>
<td>· Public servant/army/policen</td>
<td>9.5</td>
<td>7.7</td>
</tr>
<tr>
<td>· Private sector</td>
<td>5.6</td>
<td>1.8</td>
</tr>
<tr>
<td>· Entrepreneur</td>
<td>12.9</td>
<td>3.7</td>
</tr>
<tr>
<td>· Farmer</td>
<td>10.6</td>
<td>4.5</td>
</tr>
<tr>
<td>· Fisherman</td>
<td>6.3</td>
<td>0.8</td>
</tr>
<tr>
<td>· Labor/Driver/Maid</td>
<td>15.2</td>
<td>4.4</td>
</tr>
<tr>
<td>· Others</td>
<td>23.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Wealth status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Poorest</td>
<td>14.4</td>
<td>3.6</td>
</tr>
<tr>
<td>· Poorer</td>
<td>13.6</td>
<td>3.3</td>
</tr>
<tr>
<td>· Middle</td>
<td>14.6</td>
<td>4.1</td>
</tr>
<tr>
<td>· Richer</td>
<td>13.4</td>
<td>4.6</td>
</tr>
<tr>
<td>· Richest</td>
<td>17.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Source: the 2018 Indonesian Basic Health Survey
The incidence of trauma in elderly patients increases due to physical and psychological changes due to the processes that occur during increasing age. This is a major trigger for increased dependence as well as morbidity and mortality in the elderly\textsuperscript{12,13}.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Type of Injury (%)</th>
<th>N (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blisters / bruises</td>
<td>Cut/ stab wound</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>53.5</td>
<td>19.8</td>
</tr>
<tr>
<td>70-79</td>
<td>54.6</td>
<td>14.2</td>
</tr>
<tr>
<td>≥80</td>
<td>51.6</td>
<td>12.8</td>
</tr>
<tr>
<td>Type of place of residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>55.1</td>
<td>16.5</td>
</tr>
<tr>
<td>Rural</td>
<td>52.0</td>
<td>18.6</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56.2</td>
<td>24.7</td>
</tr>
<tr>
<td>Female</td>
<td>51.7</td>
<td>11.9</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education</td>
<td>50.8</td>
<td>13.8</td>
</tr>
<tr>
<td>Didn't graduate from elementary school</td>
<td>55.9</td>
<td>18.6</td>
</tr>
<tr>
<td>Elementary school</td>
<td>52.3</td>
<td>18.0</td>
</tr>
<tr>
<td>Junior high school</td>
<td>52.0</td>
<td>21.8</td>
</tr>
<tr>
<td>Senior high school</td>
<td>59.2</td>
<td>19.2</td>
</tr>
<tr>
<td>College</td>
<td>56.7</td>
<td>15.9</td>
</tr>
<tr>
<td>Occupation type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not works</td>
<td>53.9</td>
<td>11.5</td>
</tr>
<tr>
<td>Public servant/army/police</td>
<td>67.7</td>
<td>27.2</td>
</tr>
<tr>
<td>Private sector</td>
<td>49.0</td>
<td>24.6</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>57.4</td>
<td>17.8</td>
</tr>
<tr>
<td>Farmer</td>
<td>50.1</td>
<td>24.7</td>
</tr>
<tr>
<td>Fisherman</td>
<td>40.7</td>
<td>29.0</td>
</tr>
<tr>
<td>Labor/Driver/Maid</td>
<td>58.7</td>
<td>26.8</td>
</tr>
<tr>
<td>Others</td>
<td>56.1</td>
<td>20.8</td>
</tr>
<tr>
<td>Wealth status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest</td>
<td>56.5</td>
<td>15.7</td>
</tr>
<tr>
<td>Poorer</td>
<td>54.7</td>
<td>18.1</td>
</tr>
<tr>
<td>Middle</td>
<td>49.3</td>
<td>20.0</td>
</tr>
<tr>
<td>Richer</td>
<td>52.0</td>
<td>16.2</td>
</tr>
<tr>
<td>Richest</td>
<td>54.5</td>
<td>17.7</td>
</tr>
</tbody>
</table>

Source: the 2018 Indonesian Basic Health Survey
In all countries including developing countries such as Indonesia, the growth in the number of elderly people increases rapidly with the increase in life expectancy due to economic and social improvements\textsuperscript{14,15}. Although traumatic injuries are more common in children and young adults, the morbidity and mortality rates due to injury are higher in the elderly than in young adults\textsuperscript{11}. Previous studies in the United States suggested that the proportion of injuries to the elderly population was 14\%, with the main cause being falls\textsuperscript{16}.

Efforts to create a friendly environment for geriatrics need to be done by the central and local governments by compiling various regulations to reduce the risk of injury. The Ministry of Health through the Minister of Health Regulation Number 67 of 2015 has stipulated the implementation of elderly health services at public health center. However, the daily environment in which elderly individuals live and do activities is not entirely regulated by regulations\textsuperscript{17}.

**Conclusions**

Based on the results of the study, the highest proportion of injuries was lower limb injuries, followed by upper limb injuries. Meanwhile, the most common types of injuries experienced by the elderly were abrasions/bruises.

**Acknowledgments:** The author would like to thank the National Institute of Research and Development, the MOH of the Republic of Indonesia, who has agreed to allow the Riskesdas 2018 data to be analyzed in this article.

**Source of Funding:** Self-funding

**Ethical Clearance:** The research had an ethical clearance that was approved by the national ethical committee (ethic number: LB.02.01/2/KE.378/2019). Informed consent was used during data collection, which considered aspects of the data collection procedure, voluntary, and confidentiality.

**Conflict of Interest:** The authors declare no conflict of interest, financial or otherwise.

**References**


Profile of Deaths in HIV Infected Patients: A 5 Year Retrospective Study from Western Maharashtra

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Abstract

This is a retrospective study of deaths in human immunodeficiency virus (HIV) infected patients at Grant Medical college and Sir JJ group of hospitals, Mumbai from July 2000 up to June 2005 to determine statistical distribution with respect to age, sex and occupation, study clinical profile and causes of deaths among the HIV positive cases. For this we analysed the clinical records and autopsy reports of total 11092 deaths occurred during study period; out of these 1466 (13.2%) were HIV positive deaths. Out of those 1466 HIV, maximum cases (54%) were in the age group 31-40 years; Males (78%) clearly outnumbered the female population in the present study. Regarding occupation wise incidence, in 5% cases factory workers were mainly affected. In the present study, clinically pulmonary tuberculosis was found in 40% cases, tuberculous meningitis was found in 21% cases and pneumonia was found in the 15% cases. Pulmonary tuberculosis was the immediate cause of death in 40% cases in the present study. Tuberculous meningitis and pneumonia were also the common causes of death in the present study.

Key WordS: HIV-AIDS, deaths, prevalence, clinical profile, tuberculosis.

Introduction

AIDS is retroviral disease caused by Human Immunodeficiency Virus. It is characterized by retroviral infection and depletion of CD 4+ T- lymphocytes with profound immunosuppression leading to opportunistic infections, secondary neoplasms and neurological manifestations. The first case of AIDS was reported in the summer of 1981 from New York and California in USA with a sudden increase in the incidence of two very rare diseases viz. Kaposi’s sarcoma and Pneumocystis carinii pneumonia in homosexuals and young heroin addicts. Since the first case report of AIDS in India in 1986 and the first autopsy report in 1988, the prevalence and seropositivity for HIV has been increasing every year, India is reported to have 3rd largest HIV incidence in world, its prevalence in India constitutes 2.1 million people living with HIV as per 2014 data. Despite the disease’s spread in India, very few reports on the prevalence and pathology of AIDS have been published. Therefore we attempted to assess the relative prevalence with respect to age, sex and occupation, clinical profile and autopsy analysis of HIV positive cases.

Aims and Objectives

To determine statistical distribution with respect to age, sex and occupation and study clinical profile among the HIV positive cases died during the study period. To
analyze post mortem findings and causes of deaths among the HIV positive cases subjected to autopsy during study period.

**Material and Methods**

For the present study, we retrospectively analysed the clinical records and autopsy reports of HIV positive cases from July 2000 up to June 2005 presented at Grant Medical College and Sir JJ group of hospitals, Mumbai which is the largest state government hospital in state of Maharashtra. In the institution in total 11092 deaths occurred during study period; out of these 1466 were HIV positive deaths.

**Observations and Discussion**

**Table No.1: Total HIV positive Deaths in Study Period**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Deaths</th>
<th>HIV positive Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 (July to December)</td>
<td>1310</td>
<td>166</td>
</tr>
<tr>
<td>2001</td>
<td>2240</td>
<td>280</td>
</tr>
<tr>
<td>2002</td>
<td>2135</td>
<td>262</td>
</tr>
<tr>
<td>2003</td>
<td>2076</td>
<td>289</td>
</tr>
<tr>
<td>2004</td>
<td>2254</td>
<td>284</td>
</tr>
<tr>
<td>2005 (January to June)</td>
<td>1077</td>
<td>185</td>
</tr>
<tr>
<td>Total</td>
<td>11092</td>
<td>1466</td>
</tr>
</tbody>
</table>

Table No. 1 showing year wise distribution of HIV positive deaths. In the present study, the total deaths occurred were 11,092 from July 2000 to June, 2005. Out of these, 1466 (13.2%) were HIV positive deaths.

**Graph No.1: Age Wise Distribution of HIV Positive Deaths**

As can be seen in Graph No.1 The total number of HIV positive deaths in the 1st decade of life were 38, in the 2nd decade were 56, in the 3rd decade were 250, in the 4th decade were 790, in the 5th decade were 180 and after the 5th decade were 152. These findings are consistent with study conducted by Sanaei – Zadeh where seropositive cases belonged to the age group between 20 to 40 years.
Graph No.2: Sexwise Distribution Of HIV Positive Deaths

Graph No.2 showing sex wise distribution, out of the 1466 cases studied, 324 were females while 1142 (78%) were males. These findings matches with study conducted by Daniel Resnick et al ⁶; while similar study conducted by M. P. Pradeep Kumar et al ⁷ observed the prevalence equal among the both sexes in autopsy population, this might be due to smaller study population (11 cases) in later study.

Graph No.3: Occupation Wise Distribution Of HIV Positive Deaths

Graph no 3 showing occupation wise distribution of HIV positive deaths. In the present study, 23 cases were government servants, 80 cases were factory workers, 41 cases were drivers, 17 cases were students, 31 cases were prisoners, 9 cases were not working and in 1265 cases data were not available. In a study by Sankaran ⁸ showed that the high-risk group belonged to- sex workers, migrant workers, truck drivers, intravenous (IV) drug abusers and street dwellers.

Graph No.4: Clinical Profile Of HIV positive deaths

Graph No.4: Clinical Profile Of HIV Positive Deaths
Graph no 4 shows the pattern of clinical findings in the HIV positive cases studied. Pulmonary tuberculosis was found in 589 cases, abdominal tuberculosis in 73 cases, candidiasis in 80 cases, tuberculous meningitis in 301 cases, pneumonia in 217 cases, acute gastroenteritis in 72 cases, skin infection in 6 cases, malignancies in 7 cases and in 121 cases other diseases were found. These findings are consistent with study conducted by N Kumarasamy et al \( ^9 \) about the clinical presentation in HIV infected patients.

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>No. of Cases</th>
<th>% (n=1466)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary TB</td>
<td>589</td>
<td>40.18</td>
</tr>
<tr>
<td>Abdominal TB</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>217</td>
<td>14.80</td>
</tr>
<tr>
<td>TB Meningitis</td>
<td>301</td>
<td>20.52</td>
</tr>
<tr>
<td>A.G.E.</td>
<td>72</td>
<td>04.91</td>
</tr>
<tr>
<td>Malignancies</td>
<td>07</td>
<td>0.48</td>
</tr>
<tr>
<td>Multiple Injuries</td>
<td>10</td>
<td>0.67</td>
</tr>
<tr>
<td>Burns</td>
<td>4</td>
<td>0.28</td>
</tr>
<tr>
<td>Others</td>
<td>193</td>
<td>13.16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1466</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table No 3 showing the pattern of causes of death in all the HIV positive cases studied. Thus pulmonary tuberculosis, as a cause of death was found in 589 cases, abdominal tuberculosis in 73 cases, pneumonia in 217 cases, tuberculous meningitis in 301 cases, acute gastroenteritis in 72 cases, malignancies in 7 cases, multiple injuries in 10 cases, burns in 4 cases and other causes of deaths were found in 193 cases. These findings matches with studies of Lanjewar et al\(^ {10} \) and Amarapurkar et al\(^ {11} \).

**Conclusion**

The present study concludes as, the study includes 1466 HIV positive cases admitted to hospital for treatment and died due to AIDS. Maximum cases (54%) were in the age group 31-40 years. Males (78%) clearly outnumbered the female population in the present study. AIDS was found in 78% case in males and in 22% cases in females. Regarding occupation wise incidence, in majority of cases (86%) data was not mentioned in clinical records. However, from amongst the data available, in 5% cases factory workers were mainly affected. In the present study, clinically pulmonary tuberculosis was found in 40% cases, tuberculous meningitis was found in 21% cases and pneumonia was found in the 15% cases. Pulmonary tuberculosis was the immediate cause of death in 40% cases in the present study. Tuberculous meningitis and pneumonia were also the common causes of death in the present study.
Source of Funding: None

Ethical Clearance: Nil.

Conflict of Interest: Nil

References


4. Lanjewar DN, Jain PP, Shetty SR. Profile of Central Nervous System Pathology in AIDS; an Autopsy Study from India. 1988; 12; 309 – 313.


Social Anxiety and Interpersonal Relationship of Women with PCOD

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Abstract

Every women needs a peaceful life that includes healthy mental health and physical health. Any The kind of disturbance in these health may affect their happiness in their lives. One such disease is the Polycystic ovary syndrome (PCOS/PCOD), it has become the major disease that affected the millions in the recent years. Generally, it is caused by the hormone irregularities which is due to the production of high level of male hormones. The symptoms affects the self esteem and relationship which results in anxiety and relationship issues in women. Especially, these women step into social anxiety and Interpersonal relationship issues. Social anxiety includes the symptoms of anxiety, fear of facing social situations, meeting new people and doing daily routine is front of others. The Interpersonal relationship is the bondship maintained with the people around us. The women with PCOD breaks the bond and fall as the victim for the relationship issues. The aim of the study is to compare and evaluate Social Anxiety and Interpersonal relationship among PCOD Women and Women without PCOD. By using convenience sampling women aging from 22 to 45 years were identified. The tools which are intended to used for present study are social anxiety questionnaire for adults and Relationship assessment scale. Results were analyzed using SPSS 20 version. The results reported that there is no correlation between the Social Anxiety and Interpersonal Relationship. And Significance difference existed between the PCOD Women and Healthy Control and indicated Moderate level of Social Anxiety in PCOD Women and Healthy controls and High level of Interpersonal Relationship in PCOD Women and Moderate level of Interpersonal Relationship in Healthy Women.

Keywords: PCOD women, social anxiety, Interpersonal relationship, Healthy Controls.

Introduction

Every individual needs a healthy life that makes them to stay happy and satisfied. As the interpretation of this, arises the disorders that makes destructive changes among the lives of people who get affected with disorders. In this way, Women are exposed to various disorders and one among them is Polycystic ovary syndrome (PCOS) which is the common endocrine disorder that affects 5% - 10% of women of reproductive age. These women undergo wide spectrum of signs and symptoms that are associated with the disturbances of reproductive, endocrine and metabolic functions. Obesity and Insulin resistance act as the basic physiopathological features in patients with PCOS. Several investigators reports that the mental well-being of Polycystic ovary syndrome women are reduced due to the symptoms of infertility, hirsutism and acne that occurs in them. While other investigators specifies that PCOD women suffer with low level of quality of life (QOL), impaired emotional well-being and reduction in the level of sexual satisfaction. Women with PCOS also reported for increased level of depression and psychological distress which are due to the physical appearance of hyperandrogenism also adding obesity, hirsutism, cystic acne, seborrhea and hair loss that influencing feminine identity. This endocrine disorder is most common in women which shows its prevalence rate as 15% - 20% among the infertile women whereas it shows higher prevalence of 6% - 10% in obese women who are of reproductive age group.
In Worldwide, Polycystic ovary syndrome (PCOS) affects approximately 7% of women of reproductive age group and stands as a complex genetic disease. The main clinical features of this heterogeneous disorder are menstrual irregularities, subfertility, hyperandrogenism and hirsutism. PCOS women had reported to have anxiety or depressive disorders when they are compared with general population in the Cross-sectional epidemiological studies. Women with PCOS also exhibit various symptoms that includes amenorrhea, oligomenorrhea, hirsutism, obesity, infertility, anovulation and acne which results with symptoms of depression, marital and social maladjustment and impair sexual functioning. In Women with PCOS, the prevalence of depression is high and it varies from 28% to 64% where as the prevalence of anxiety ranges from 34% to 57%. Specifically women with PCOS are identified to be at an increased risk of social phobia and suicide attempts. The reasons for higher prevalence of anxiety and depression among the women with PCOS are found to be complex. It is stated that physical symptoms experienced by PCOS women are likely to be the cause of psychological distress. On the other hand, acne, hirsutism and BMI have been associated to increased symptoms of psychological distress. This proves that multiple factors contribute in women with PCOS for the high prevalence of both anxiety and depression. Social Anxiety disorder which is also referred to as Social Phobia, is a fear which is persistent that appears in an individual for one or more social situations where embarrassment may occur and the fear or anxiety is out of proportion to the threat that is posed by the social situation which is as determined by the cultural norms of the person. Many patients with PCOS exhibited depression and anxiety that may coexist along with the other mood disorders that includes obsessive compulsive disorder, Somatization, social phobia and panic disorder. Women who are suffering from hirsutism, tend to exhibit psychotic symptoms more often and show increased levels of anxiety and tension. Patients who indicated the symptoms of hyperandrogenemia are more prone to social phobia and also experience serious problems of identity. Interpersonal relationship is the social and emotional interaction between which corresponds the two or more individuals in an environment. The challenges to feminine identity that includes hirsutism, menstrual problems create a major effect on mood, relationships and psychological wellbeing.

Method

Objectives of the Study

The aim of the present study is to compare Social Anxiety and Interpersonal Relationship among PCOS Women.

The Objectives are:

1. Describe the level of Social Anxiety and Interpersonal Relationship of PCOS Women and Healthy Women.
2. Compare the level of Social Anxiety and Interpersonal Relationship of PCOS Women and Healthy Women.

Hypotheses:

1. There will be a significant difference between PCOS Women and Healthy Controls in Social Anxiety.
2. There will be a significant difference between PCOS Women and Healthy Controls in Interpersonal Relationship.
3. There will be a significant relationship between Social Anxiety and Interpersonal Relationship.

Sample

The samples for this study was PCOS Women and Healthy Women. A total of 26 participants were identified from the Hospital of Tamil Nadu state for the present study. Of the total 26 samples, 13 each were PCOS Women and Healthy controls. The age range of the samples were 25 to 45 years with a mean age of 35 years. The Convenience sampling design was used for the present study.

TOOLS

1) Social Anxiety Questionnaire for adults (SAQ-A30)(2010)
2) Relationship Assessment Scale (1988)
SOCIAL ANXIETY QUESTIONNAIRE FOR ADULTS (SAQ-A30)

This was developed by Caballo, V. E et.al. It consists of 30 items that helps in measuring the level of Social Anxiety. Respondents should answer each item using a 5-point scale ranging from “1” representing no unease, stress or nervousness and “5” representing very high or extreme unease stress, or nervousness.

RELATIONSHIP ASSESSMENT SCALE

This scale was developed by Hendrick, S. S. A 7-item scale designed to measure general relationship satisfaction. Respondents should answer each item using a 5-point scale ranging from 1 (low satisfaction) to 5 (high satisfaction).

RESEARCH DESIGN: Exploratory research design was followed for the present study.

The inclusion criteria were:

- Women diagnosed with PCOD from the Private Hospital.
- Women without PCOD in Healthy condition.
- Women in the age group between 25 to 45 years.
- Women belonging to Cuddalore district, Tamil Nadu.

The exclusion criteria were:

- Women with other psychiatric illness
- Women with other Chronic physical illness
- Adolescents diagnosed with PCOD

PROCEDURE:

The subjects were collected with few personal data and then they completed Social Anxiety Questionnaire for adults (SAQ-A30)(2010) and Relationship Assessment Scale (1988). The subjects were instructed not to omit any statements.

Statistical Analysis

Data was analyzed with the SPSS for Windows Version 20. Mean and Standard Deviation was used to compare groups and Independent ‘t’ test was used to test significant difference between groups. Pearson correlation was also used to test the significant relationship between the variables.

Results and Discussion

The data collected analyzed and the results are discussed accordingly.

| TABLE 1: Shows the Correlation between the Variables – Social Anxiety and Interpersonal Relationship. |
|-----------------------------------------------|------------------|------------------|
| VARIABLES GROUPS                     | SOCIAL ANXIETY | INTERPERSONAL RELATIONSHIP |
|                                  | r    | sig    | r    | sig    |
| PCOD WOMEN VS HEALTHY WOMEN         | 0.173 | NS     | 0.173 | NS     |

Above table shows that there is no correlation between Social Anxiety and Interpersonal Relationship. This indicates that there is no relationship between Social Anxiety and Interpersonal Relationship.
TABLE 2: Shows the Mean Value and Standard Deviation Social Anxiety and Interpersonal Relationship for PCOD Women and Healthy Women.

<table>
<thead>
<tr>
<th>VARIABLES GROUPS</th>
<th>SOCIAL ANXIETY</th>
<th>INTERPERSONAL RELATIONSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>MEAN</td>
</tr>
<tr>
<td>PCOD WOMEN</td>
<td>13</td>
<td>92.6</td>
</tr>
<tr>
<td>HEALTHY WOMEN</td>
<td>13</td>
<td>74.4</td>
</tr>
</tbody>
</table>

It can be inferred from the table 2 that PCOD Women and Healthy Women differ significantly in Social Anxiety and Interpersonal Relationship. The significant difference is beyond 0.05 level. By closely looking at the mean score of Social Anxiety, it is interpreted as Moderate for PCOD Women and Healthy Women. And the Mean score of Interpersonal Relationship is interpreted as High for PCOD Women and Moderate for Healthy Women. With respect to the mean difference between PCOD Women and Healthy Women, the significant difference was seen in the Social Anxiety and Interpersonal Relationship.

TABLE 3: Shows the t-value for the comparison Groups (PCOD Women and Healthy Women) in Social Anxiety and Interpersonal Relationship.

<table>
<thead>
<tr>
<th>VARIABLES GROUPS</th>
<th>SOCIAL ANXIETY</th>
<th>INTERPERSONAL RELATIONSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-value</td>
<td>sig</td>
</tr>
<tr>
<td>PCOD WOMEN VS HEALTHY WOMEN</td>
<td>2.408</td>
<td>0.024</td>
</tr>
</tbody>
</table>

*Significant at 0.05, 0.01 level

The table – 3 with the t – value shows that there is significant difference in the groups. As interpreted the Social Anxiety is Moderate for both PCOD Women and Healthy Women. This might be due to life situations they undergo each day. Though several studies reported that women have high level of Social Anxiety, in the present study it is Moderate due to smaller sample group. And the Interpersonal Relationship is interpreted as High for PCOD Women and Moderate for Healthy Women. This indicates that, PCOD have better satisfactory relationship compared to the Healthy Women. Overall, PCOD women get into many other psychological problems as the results of the symptoms of the Polycystic Ovary Syndrome which has to be assessed and treated for their better wellbeing.

Based on specific literature, Anxiety levels, psychological distress which includes the feelings of depression and social fears are particularly at the higher level with PCOS women. And many other studies reported for the proportion of the PCOS...
women occurs with clinically suitable psychopathology and impaired emotional well-being 12, 17, 18, 19. Sonino and his colleagues also showed in their study that anxiety disorders are common among PCOS women and impairment of mental function may occur in these women 20. These women are at high risk of psychological ill health that brings down their quality of life. Stress Stands as one of the mechanisms that influence psychological disorders through hypothalamic-pituitary-adrenal axis and circadian pattern 21. Hence, there are multifactors that contribute to the psychological ill health of the PCOD women that has to be identified and taken into consideration at the initial stage for treatment to reduce the severity of those distresses.

**Conclusion**

The Study revealed the Level of Social Anxiety and Interpersonal Relationship between PCOD Women and Healthy controls. The results indicates that there is no correlation between the Social Anxiety and Interpersonal Relationship. PCOD Women and Healthy Controls showed significant difference in Social Anxiety and Interpersonal Relationship and reported Moderate level of Social Anxiety in PCOD Women and Healthy controls and High level of Interpersonal Relationship in PCOD Women and Moderate level of Interpersonal Relationship in Healthy Women.

**Ethical Clearance**- Taken from Doctoral committee constituted by the University

**Source of Funding**- IMPRESS, ICSSR, New Delhi

**Conflict of Interest** - Nil

**References**


Reading Man Flap for Sacral Pressure Ulcer Reconstruction

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Abstract

Background: The treatment of pressure sores represents a great challenge to health care professionals. Although, pressure ulcers management requires a multidisciplinary approach, the soft tissue defects requiring reconstruction are mainly considered for surgical repair. Local myocutaneous and fasciocutaneous flaps can provide stable coverage of pressure sores.

Aim of Study: To evaluate the versatility and outcomes of “reading man flap” in the reconstruction of sacral pressure sores.

Patients and Method: Between April 2015 to January 2017, ten patients with sacral pressure sore were treated by using Reading man flap. The patient’s ages were ranging between 35-65 years (mean 53), 6 of them were males, and 4 were females. All of them were subjected to local wound care and management without considerable benefit. We exclude those patients with poor medical status and patients with severe contracture and spasticity. The diameter of the sacral pressure sores ranging from 4cm to 7cm (mean 5.5cm).

Results: The “reading man flap” technique was seen to be a useful, versatile and simple flap for coverage of pressure sores, with no postoperative complications in 8 of our patients during the follow up period. The other 2 patients, one of them developed partial flap necrosis (treated conservatively), and the other one developed recurrence after 2 months.

Conclusion: The “reading man flap” was found to be a versatile and easily performed technique for closure of small to medium sized sacral pressure sores.

Key words: sacral pressure sore, reading man flap, local flap.

Introduction

Bed sore or pressure sore is regarded as one of the major global health problem that require an interdisciplinary team for its management. Pressure sore by definition is an area of localized soft tissue ischemic necrosis caused by prolonged pressure higher than the capillary pressure with or without shear, related to posture which usually occurs over a bony prominence. Pressure ulcer can affect different sites of the body. About 3-4% of all hospitalized patients may develop pressure ulcer. Pressure sore incidence has been estimated to be 2.7-9% in acute care setting, while in long term its incidence reach up to 2.4-23%. Pressure sore care and management is expensive, in united states the treatment cost can be ranging from $6,000 to $60,000 depending on the stage of pressure ulcer, The complications and the recurrence rates are the major problems in pressure sore reconstructions. (7% to 62%)[^1,2,3,4,5,6].

One of the commonly seen pressure ulcer in patient with unrelieved pressure position is sacral pressure sore; of course not only pressure is only factor in pressure sore

[^1]: DOI Number: 10.37506/mlu.v21i3.3041
pathogenesis. Shear, friction and moisture play role in pathogenesis of pressure sore. Sacral pressure sore can be treated by using skin graft when the defect is small or when the defect is due to short-term disables. One of the most common flaps used for sacral pressure sore reconstruction are the flaps based on gluteus maximus muscle like V-Y flap. Other flaps which can be employed for treatment of sacral bed sore are vertical and transverse lumbosacral flap that based on the lumber perforating vessels [7,8,9].

In this study we are evaluating the use of “reading man flap” for sacral pressure sore reconstruction.

**Patient and Method**

Ten patients presented to us with complaint of sacral bed sore between April 2015 to January 2017 and they were surgically treated using “reading man flap” technique. Patient’s data are shown in table 1 below.

All the patients included in this study were subjected to preoperative medical assessment. Those patients with severe spasticity, patient with poor medical condition, and finally those patients with recurrent sacral pressure sore were excluded from this study. Preoperative general condition care was done including correction of hemoglobin level, maintenance of albumin above 3 g/dl and control of blood glucose. Wound care was done using local dressing and local antibiotic (silver sulphadiazine cream twice daily), and all the patients were provided with pneumatic mattress and their family instructed to reposition their patient every one hour. Preoperative informed consent was taken from all patients.

<table>
<thead>
<tr>
<th>No</th>
<th>gender</th>
<th>age</th>
<th>Size of defect(after debridement)</th>
<th>Main cause of pressure sore</th>
<th>Associated medical condition</th>
<th>Duration of sore before presentation</th>
<th>Stage of the sore</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>55yr</td>
<td>5*4 cm</td>
<td>CVA</td>
<td>DM, IHD</td>
<td>5 months</td>
<td>IV</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>60yr</td>
<td>4*3 cm</td>
<td>fracture neck femur</td>
<td>DM</td>
<td>7 months</td>
<td>III</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>65yr</td>
<td>6*6 cm</td>
<td>fracture neck femur</td>
<td>HPT, IHD</td>
<td>8 months</td>
<td>IV</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>35yr</td>
<td>5*3 cm</td>
<td>paraplegia</td>
<td>/</td>
<td>3 months</td>
<td>III</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>60yr</td>
<td>6*4 cm</td>
<td>CVA</td>
<td>DM, HPT</td>
<td>6 months</td>
<td>IV</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>52yr</td>
<td>6*5 cm</td>
<td>fracture neck femur</td>
<td>DM</td>
<td>4 months</td>
<td>IV</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>56yr</td>
<td>7*6 cm</td>
<td>CVA</td>
<td>HPT, IHD</td>
<td>6 months</td>
<td>IV</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>52yr</td>
<td>5*4 cm</td>
<td>fracture neck femur</td>
<td>DM</td>
<td>6 months</td>
<td>III</td>
</tr>
<tr>
<td>9</td>
<td>M</td>
<td>45yr</td>
<td>6*6 cm</td>
<td>paraplegia</td>
<td>/</td>
<td>4 months</td>
<td>III</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>50yr</td>
<td>5*5 cm</td>
<td>paraplegia</td>
<td>DM</td>
<td>5 months</td>
<td>IV</td>
</tr>
</tbody>
</table>

\*F=female, M= male, yr=year, CVA=cerebrovascular accident, DM=diabetes mellitus, IHD=ischemic heart disease.

**Operative Technique**

All operations were done in prone position without local injection of adrenaline. After finishing of draping and disinfection, the pressure sore bursa was sprayed by methylene blue dye to stain it and demarcate it. After that wound excision was done by sharply excising all necrotic and dead tissue. The bursa and all dead tissue were removed till we reached a healthy tissue. After finishing of soft tissue debridement, the underlying bone was evaluated for the presence of any necrotic part which was removed up to healthy normal bone tissue. Hemostasis was secured by using bipolar cautery and for bleeding from the bone; the hemostasis was
secured using a bony wax. After finishing of wound debridement the wound was measured, and the wound ends cut into circular or semicircular shape. After that we began marking of reading man flap. First, we have to choose the area of maximum extensibility and then the central limb of unequal z-plasty was marked as a line that pass tangential to ulcer margin, its length should be 50% more than the diameter of the ulcer. We marked another limb of the z-plasty which will be at 60° angle to the central limb; the resultant flap will represent the quadrangular flap (f1) that will close the ulcer. The third line of z-plasty is drawn from the other end of the central limb which lies tangential to ulcer, and it is located at 45° to the central limb. The resultant flap will represent the triangular flap (f2) which will be used to cover the defect site of quadrangular flap (f1) as shown in figure(1).

The operation starts by incising the skin and subcutaneous tissue along the previously marked limb of unequal z-plasty. The incision is gradually deepened to include the underlying deep fascia. First, we raised the quadrangular flap (f1) from its underlying muscle, then this flap was transposed to close the ulcer, drain tube (redivac suction tube) was placed, then the flap was sutured by deep dermal interrupted 3/0 polyglycolic suture and the skin then closed with minimum tension using 3/0 silk suture.

Then, the triangular flap (f2) was raised from its underlying attachment to the muscle and transposed to close the donor site of quadrangular flap and sutured in the same manner as quadrangular flap figure (2) (3). The wound was dressed by using antibiotic impregnated gauze with a second layer of dry gauze. The dressing fixed in its position using medical adhesive plaster. Patients and their families instructed to change the position of the patient between lateral and prone position and continue using air mattress bed.

The patients were discharged home after 5 days postoperatively. At day 15-20, the sutures and the suction drain was removed. At 21-day postoperatively patients were allowed to sleep in supine position. Position change by family was kept during follow up period which was extended till 4-8 month postoperatively.

Figure 1. Planning of reading man flap
Figure 2 Transposition of the flaps

Figure 3: Intraoperative planning of reading man flap: (A) planning of reading man flap. (B) elevation of the flaps. (C) transposition of the flap. (D) after suturing of the reading man flap with suction drain insertion.
Results

Eight of our patients had uneventful postoperative course without any complication like flap necrosis, wound infection, wound dehiscence or hematoma. During follow-up period none of these 8 patients had pressure sore recurrence and the flap provided durable coverage of the sore. One of our patient, had flap congestion with partial necrosis at the tip of the triangular flap (f2). This patient was kept on conservative local wound care and the wound healed by secondary intention with no subsequent sequelae.

In one of our patient, the pressure sore recurred after 2-months of operation at the same site and this patient was scheduled for later on surgical reconstruction.

Discussion

The “reading man flap” was first described by Mutaf m. et al. as new surgical technique that used for closure of circular defect. Reading man flap is unequal z-plasty (60°-45°) fasciocutaneous flap, it depends on using of adjacent skin laxity to close the defect. It was first described to close circular defect in face and calf region [10].

In this study “reading man flap” technique was used to close sacral pressure sore in ten patients. Eight out of ten patient had shown smooth and uneventful postoperative result with complete closure of defect without any flap congestion or necrosis. Also there was no recurrence of sacral pressure ulcer in those eight patients during the follow-up period which was extended up to 8 months postoperatively. One of our patient had developed flap congestion which was noticed on first postoperative day and this patient ended with partial flap

Figure 4. A. preoperative marking. B. At the end of reading man procedure. C. After stiches removal.
necrosis. We attributed this complication to incorrect planning, since this patient was the first case in this series. In this patient central limb of z-plasty was not more than 50% of the defect size, this lead to narrow base quadrilateral flap which closed under tension ending in flap congestion and partial necrosis. Fortunately, this complication not affected the final closure of the ulcer, since wound healed by secondary intention. The other patient had recurrence of the same ulcer after 2 month of the operation, this patient had poor compliance with our postoperative instructions regarding frequent patient repositioning.

Our results are in general consistence with Marius Roatis et al. Where they used the reading man flap technique in five patients with lumbar and sacral pressure sore and defect (4 patients with skin malignancy and one patients pressure sore). Their results were satisfactory and the entire wound healed uneventfully. Only one patient had slight wound dehiscence which was healed by secondary intention.

“Reading man flap” technique showed to be reliable and easy method for reconstruction of small to moderate size sacral defect, depending on the principle of z-plasty which involved creation of two transposition flap that interdigitate with each other’s [12]. In classical z-plasty, the flaps have identical angle degree, while in the reading man flap technique; the angles of z-plasty are unequal. This will enable us to have two different designed flap, one of them is quadrangular design (60°) which is transposed to close the defect, and the other flap had triangular design (45°) which is used to close the donor site of the quadrangular flap, in such case no skin graft is used as seen when using classical rotational fasciocutaneous flap to close the sacral pressure ulcer were skin graft is used to close the donor site of the flap [13].

Fasciocutaneous flap use for pressure ulcer reconstruction have many advantages:

v Preservation of the underlying muscle is important to ambulatory patients.

v Local flap is ideal alternative for skin defects of the size in our study.

v It is a simple and safe procedure with minimal invasion and preserves the underlying donor tissues for further reconstruction, if needed.

v The technique is simple, less donor site morbidity, and provides functional and esthetical reconstruction of the defect.

Both Daniel and Faibisoff had investigated the normal soft tissue coverage of pressure point in autopsy specimen’s, and they observed that all pressure points in human body are covered by skin and subcutaneous tissue and not by muscle [9,14].

Although it seems that using of musculocutaneous flap for pressure sore reconstruction provide mass of cushioning tissue over the pressure area and its use improve the surgical outcome, but it has many disadvantages. Musculocutaneous flap need extensive dissection and blood loss, it require more tedious surgical manipulation than fasciocutaneous flap, more risk of injury to the pedicle which lead to complete loss of flap, and using of musculocutaneous flap is not recommended for ambulatory patients, since this lead to functional loss. In addition by atrophy with time will lose its function as cushion to absorb the pressure. Also we believe that using musculocutaneous flap as first choice will increase donor site morbidity and decrease the options available for later on treatment of recurrent cases (as low as 3-6% and as high as 33-100%) [3,15,16].

In a study which was conducted by Philip E. Thiessen et al., they found no difference between musculocutaneous and fasciocutaneous flap used for pressure sore reconstruction in relation to rate of infection, hematoma, seroma, dehiscence, and need for secondary procedure. Also they found no significant statistical difference in the recurrence of pressure sore that were treated whether by musculocutaneous or fasciocutaneous flap [16].

One of the key points that increase success rate of using of “reading man” flap procedure in reconstruction of sacral pressure sore, is the ability to choose the site of maximum skin laxity for our flap. It is better to choose a donor site in an area that had no previous operation or scar, as the presence of a scar will hinder availability and mobility of the flap to close the defect. Also, it is
better to use the “reading man” flap technique for mild to moderate size sacral pressure sore, as large area need more tissue coverage which cannot be provided by using “reading man” flap technique.

Conclusion and Recommendation:

“Reading man flap” technique which is used to reconstruct sacral pressure sore of mild to moderate size showed to be versatile and easy to perform technique, that provide adequate and durable coverage of pressure sore. It enabled us to preform tension free closure of sacral pressure sores with minimum scarring and no donor site morbidity.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: Self.

References


Evaluation of the Epidemiological Activities Surveillance Program for Communicable Diseases at the Primary Health Care Centers in Al-Najaf Governorate

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¹MSC Student, ²Assistant Professor, Middle Technical University College of Health & Medical Technology, Baghdad, Iraq

Abstract

Background: Surveillance of communicable diseases is an important tool for monitoring trends, identifying the target population for vaccination programs, and evaluating programs’ effectiveness to prevent and control target diseases. Materials and Methods: A cross-sectional study, conducted at six health care sectors (Al Kufa sector, Northern sector, Southern sector, Al-Mishkhab sector, Al-Munadhira Sector, and Abbasiya sector), which include 24 out of 48 primary health care centers in Al Najaf governorate, were randomly chosen by multistage sampling technique from all sectors, then randomized samples from each sector. Results: Results shows that studied item subjected to evaluation was with a pass level on degree of “≥ 50% regarding satisfied with the surveillance system. Conclusion: The current study demonstrates which all health centers had a pass level > 50 except three main axes (Data Analysis, Epidemic Preparedness, and Training ) had weak evaluation level.

Keywords: epidemiological activities; surveillance program; communicable diseases; primary health care centers; Al-Najaf Governorate

Introduction

Evaluation is an important part of infectious disease surveillance. The systematic and objective evaluation of monitoring determines the appropriateness, effectiveness and impact of these systems [1].

Infectious disease surveillance is recognized to be the cornerstone of public health decision-making and practice. Surveillance data is essential for monitoring the health status of the population, detecting diseases and starting work to prevent further diseases, and contain public health problems. There is global recognition of the need to strengthen the disease surveillance and response system [2]. Effective control of infectious diseases needs an effective disease surveillance system that provides information to act on priority communicable diseases. It is the basis for public health decision-making around the world. There is global recognition of the need to strengthen disease surveillance and response systems [3].

Several developed countries have established a national infectious disease surveillance system and have stored the collected data in a central data repository. In these countries, the Ministry of Health is directly responsible for coordinating and supporting this system. Various organizations at the local and state level are working with the Ministry of Health to share data [4].

Aim of Study

To evaluate the core activities and functions supporting the communicable disease surveillance system in terms of structure, performance, epidemic preparedness, and response at the level of all health facilities in Al Najaf governorate.

Materials and Methods

This is a descriptive, a cross-sectional study, conducted at six health care sectors (Al Kufa sector, Northern sector, Southern sector, Al-Mishkhab sector, Al-Munadhira Sector, and Abbasiya sector), which include 24 out of 48 primary health care centers in Al
Najaf governorate. were randomly chosen by multistage sampling technique from all sectors, then randomized samples from each sector.

**Data collection technique:** The data collection was made by the use of WHO generic questionnaires for evaluation of the National communicable disease surveillance and response system[3].

**Results**

1- national surveillance manual; Case Detection & Registration

<table>
<thead>
<tr>
<th>Table (1): Observed frequencies, percents, and summary statistics of health facilities with national surveillance manual and “Case Detection &amp; Registration” items for the studied PHCCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health facilities with national surveillance manual</strong></td>
</tr>
<tr>
<td>Is there a national for surveillance at this site?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Observe national surveillance manual ?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Case Detection &amp; Registration</strong></td>
</tr>
<tr>
<td>The existence of a clinical register</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Observed the correct filling of the clinical register during the previous 30 days</td>
</tr>
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<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Do you have a standard case definition for: (each priority disease) ?</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Observed the standard case definition for: (each priority disease)</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Observed the respondent correctly diagnosing one of the country’s priority diseases using a standard case definition</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Table (1) The results indicate that all the health centers have implemented the system of health facilities with national surveillance. so results showed that most of the items achieved good level of evaluation on degree of “All”, and resting on pass level of evaluation on degree of “≥ 50 %”, except the last item of “Observed the respondent correctly diagnosing one of the country’s priority diseases using a standard case definition” which was recorded poor evaluation on degree of “None”.

2-Data Reporting:

Table (2): Observed frequencies, percents, and summary statistics of “Data Reporting” items for the studied PHCCs

<table>
<thead>
<tr>
<th>Data Reporting</th>
<th>Resp.</th>
<th>No.</th>
<th>%</th>
<th>MS</th>
<th>SD</th>
<th>RS%</th>
<th>Ev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you lacked appropriate surveillance forms at any time during the last 6 months?</td>
<td>Yes</td>
<td>8</td>
<td>33.3</td>
<td>0.33</td>
<td>0.48</td>
<td>33.0</td>
<td>&lt; 50%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>16</td>
<td>66.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Presence of correct register of targeted diseases as for Eradication</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>24</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>The Presence of correct register of targeted diseases as for Elimination</td>
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<td>The Presence of correct register of targeted diseases as for Major public health importance</td>
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<td>0.00</td>
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</table>
Table (2) demonstrate this study that that the existence of two items, namely “How do you report (Mail, Fax, Telephone, Radio, Electronic), How can reporting be improved” the content of which does not reflect the nature of the prevailing used in the current means of communication, which depends only on a receipt by hand (i.e. The Courier), and it is an option that does not contain the evaluation system, it was canceled from the evaluation process, and accordingly, the number of items subjected to evaluation became nine, three of which came with a high level of evaluation on the degree of “All”, and one item subjected to pass evaluation on the degree of “≥ 50%”, one item subjected to weak evaluation on the degree of “< 50%”, and the leftover items were subjected to poor evaluation on the degree of “None”.

<table>
<thead>
<tr>
<th>Item</th>
<th>Standard (2)</th>
<th>Other (3)</th>
<th>95.8</th>
<th>None</th>
<th>0.96</th>
<th>None</th>
<th>0.20</th>
<th>96</th>
<th>0.00</th>
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<th>All</th>
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<td>Number of reports in the last 3 months compared to expected number, Weekly</td>
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<td>95.8</td>
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<tr>
<td>Number of reports in the last 3 months compared to expected number, monthly</td>
<td>Standard (2)</td>
<td>24</td>
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<td>Standard (2)</td>
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<td>100</td>
<td>All</td>
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<tr>
<td>Number of monthly reports submitted on time</td>
<td>Standard (2)</td>
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<td>1.00</td>
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<tr>
<td>How do you report (Mail, Fax, Telephone, Radio, Electronic)</td>
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<td>24</td>
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<tr>
<td>How can reporting be improved</td>
<td>Mail</td>
<td>15</td>
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</table>
### 3-Data Analysis:

Table (3): Observed frequencies, percents, and summary statistics of “Data Analysis “ items for the studied PHCCs

<table>
<thead>
<tr>
<th>Data Analysis</th>
<th>Resp.</th>
<th>No.</th>
<th>%</th>
<th>MS</th>
<th>SD</th>
<th>RS%</th>
<th>Ev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed description of data by age and sex</td>
<td>Yes</td>
<td>24</td>
<td>100</td>
<td>1.00</td>
<td>0.00</td>
<td>100</td>
<td>All</td>
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<tr>
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<tr>
<td>Observed description of data by place (locality, village, work site etc)</td>
<td>Yes</td>
<td>21</td>
<td>87.5</td>
<td>0.87</td>
<td>0.34</td>
<td>87.0</td>
<td>≥ 50 %</td>
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<td>3</td>
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<td>Observed description of data by time</td>
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<tr>
<td>Observed line graph of cases by time</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
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<td>0.00</td>
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<tr>
<td>Do you have an action threshold for any of the country priority diseases</td>
<td>Yes</td>
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<td>0</td>
<td></td>
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<td>0.00</td>
<td>None</td>
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<tr>
<td>Observed presence of demographic data at site</td>
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<tr>
<td>Observed rates derived from demographic data</td>
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<td>0.00</td>
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</table>
Table (3) Results shows that the number of items subjected to evaluation with good level on degree of “All” were only two, which namely “Observed description of data by age and sex, and Observed presence of demographic data at site”, and one item subjected to pass evaluation on degree of “≥ 50%”, which namely “Observed description of data by place (locality, village, work site etc)”, and the leftover items were subjected to poor evaluation on degree of “None”, which namely “Observed description of data by time, Observed line graph of cases by time, Do you have an action threshold for any of the country priority diseases, and Observed rates derived from demographic data”.

4-Epidemic Preparedness and Supervision:

Table (4): Observed frequencies, percents, and summary statistics of “Epidemic Preparedness and Epidemic Response “and “Supervision and Training and Satisfaction with Surveillance “ items for the studied PHCCs
Table (4) Results shows that studied item subjected to evaluation was with a weak level on degree of “< 50 %”, which namely “Observed the existence of a written case management”. So studied item subjected to evaluation with good level on degree of “All”, which has namely “Has the health facility implemented prevention and control measures based on local data for at least one epidemic prone disease?”, and leftover item was subjected to evaluation of weak level on degree of “< 50 %”, which namely “Observed supervision report or any evidence for appropriate review of surveillance practices”.

So in table (4) Results shows that studied item subjected to evaluation was with weak level on degree of “< 50 %”, which has namely “How many times have you been supervised in the last 6 months?”, on applying the standard limit for one visit per week, which was classified into three periods, which are eight supervisions per two months. So studied item subjected to evaluation was with a weak level on degree of “< 50 %”, which namely “Have you been trained in disease surveillance and epidemic management?” As well as results shows that studied item subjected to evaluation was with a pass level on degree of “≥ 50 %”, which namely “Are you satisfied with the surveillance system?”

**Discussion**

Regarding case detection and registration, the study found that most studied PHCCs had a clinical register with concentrate the correct filling of the clinical register during the previous 30 days, except the last item namely “Observed the respondent correctly diagnosing one of the country’s priority diseases using a standard case definition” which was recorded poor evaluation on degree of none. This result is disagreement with published study findings conducted in Baghdad[8], which found that all the study centers had no correct register of targeted diseases as for (Eradication, Elimination, Epidemic prone, and Major public health importance). In addition to that, the number of reports in the last 3 months compared to the expected number, (i.e. the standard) weekly, was (96.0%) for studied PHCCs. To the best of our knowledge, there is no similar previous study, but in comparison with a study conducted in Babylon governorate (Kareem and Alalawe, 2020), which found that all PHCCs (100%) concerning a weekly report form is available and implemented.

The results of this study indicated that all PHCCs (100%) were the description of data by (age, and sex), and at the same time, there is demographic data at the site. These results agreed with the findings similar study was done in Baghdad[8], which found that all the health facilities (100%) were the description of data by (age, and sex), and had demographic data at the site.

In this study, all PHCCs (100%) had no action threshold for any of the country’s priority diseases. This result is in agreement with the finding another study conducted in Mosul[6] which found that only (12.1%) of the health centers had an action threshold for any of the country’s priority diseases.

The results of this study indicated that only (13.0%) of the studied PHCCs having an observed the existence of a written case management, which scoring poor evaluation by the proposed scales. This result is in agreement with a previous study done in Sudan[9] which found that all the health centers (100%) had no written case management protocol for 1 epidemic-prone disease.

As for the epidemic response, this study showed that all PHCCs (100%) had implemented prevention and control measures based on local data for at least one epidemic-prone disease. This result disagrees with the finding study conducted in Sudan[9], which found that all the study centers had no implemented prevention and control measures based on local data for at least one epidemic-prone disease.

The results of this study indicated that (42.0%) of studied PHCCs have supervision report or any evidence for appropriate review of surveillance practices. This result disagrees with the finding study done in Wasit[10],
which found that (96.1%) of the health centers had on supervision report or any evidence for appropriate review of surveillance practices.

In this study, the percent of relative sufficiency of the number of meetings has these health facilities conducted with community members in the past six months was (45.2%), which scored with poor evaluated. This result differs from another similar study conducted in Baghdad[8], which found that the mean score of the number of meetings has these health facilities conducted with the community members in the past six months was (4.08%). Finally, this study has revealed that all studied PHCCs (100%) concerning observed the minutes or report of at least 1 meeting between the health facility team and the community members within the six months. This result is in agrees completely with the finding study done in Nigeria[11].

The results of this study indicated that (43.17%) of studied PHCCs having a times that had been supervised in the last 6 months, which has scored poor. This result disagrees with the finding study done in Wasit[10], which found that (66.5%) of the health centers had on supervision report or any evidence for appropriate review of surveillance practices.

The current study demonstrates that only (25.0%) of studied PHCCs have members trained in disease surveillance and epidemic management, which has scored poor level by a proposed evaluation. This result disagreed with the finding study conducted in Tanzania[12], which found that all the health centers (100%) have no members trained in disease surveillance and epidemic management. A possible explanation for this result is the failure to periodically hold training courses or seminars by the public health department in the governorate for workers in communicable disease units about the epidemiological surveillance system.

The current study demonstrates satisfaction with the surveillance system in studied health centers revealed that (75.0%) were satisfied with the surveillance system, which had scored pass degree (i.e. ≥50%). This result differs from another similar study conducted in Baghdad[8] which found that only (20%) of the study samples were satisfied with the surveillance system.

Regarding opportunities are there for the integration of surveillance activities and functions, the study showed that (16.7% and 8.3%) of studied PHCCs were required for training and personnel, respectively. These results asymptotical from a previous study done in Wasit[10], which found that only (9.8%) of the health centers had training opportunities, and (25.5%) of PHCCs had adequate personnel.

Conclusions

1. The current study demonstrates which all health centers had a pass level > 50 except three main axes (Data Analysis, Epidemic Preparedness, and Training) had weak evaluation level.

2. The national surveillance manual for communicable diseases was present in all surveillance units at health facilities.

Conflict of Interest: None

Source of Findings: None

Ethical Clearance: None

References


An Analysis of Blood Grouping Discrepancies: Study From Tertiary Hospital based Blood Bank in Vadodara

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1Associate Professor, Deptt of Pathology, SBKSMIRC, Sumandeep University, 2Assistant Professor, Department of Transfusion Medicine SBKSMIRC, Sumandeep University

Abstract

Background:- ABO and Rhesus blood group system is considered as clinically significant blood group systems in transfusion practice. A feature of the ABO system is the regular occurrence of anti A and anti B in the absence of the corresponding red cell antigen. A Discrepancy exists when results of forward testing does not match with reverse testing. Blood donors and patients must be correctly ABO and Rh grouped because transfusing ABO incompatible blood transfusions which may lead even death of patient.

Aims and Objectives To assess the incidence and cause of blood grouping discrepancies in Blood Bank at Tertiary care teaching hospital during Jan 2019 to December 2019.

Methods: Forward and reverse grouping were performed on blood samples from inpatients, outpatients and donors during the study period. ABO discrepancies were studied with their clinical details to group their discrepancies and resolve them with suitable steps.

Results: A total of 10,048 (patients and donors) who satisfied inclusion criteria were included and ABO typed among which there were 55 discrepancies were observed (15 donors and 35 patients). The problem in patients was due to expression of weak antigens. The problem in patients were due to clinical conditions, the most common being autoimmune haemolytic anaemia.

Conclusions: The ABO blood group discrepancy reported in present study is 0.49%. The study helped to determine the incidence and causes of discrepancy encountered in tertiary care hospital. Discrepant results should be recorded, and resolved by suitable measures and correct ABO & Rh Blood group should be released to avoid any mismatched transfusions.

Key words: ABO discrepancy, Blood transfusion, Rhesus group.

Introduction

ABO and Rhesus blood group system, also known as Major Blood group system is reported to be one of the most important clinically significant Blood Group system. Blood donors and patients needs to be correctly ABO and Rh grouped because transfusing ABO -incompatible blood may result in transfusion reaction which may lead even to death of patient. (1)

For ABO Blood group of an individual it is important to do both cell grouping (forward typing) and serum grouping (reverse typing). In forward grouping, the unknown test cells are antigen typed against known group A and group B cells.

Both forward and reverse typing results must match to confirm the true ABO type of an individual. (2)

ABO typing needs to be performed correctly for the safety of patient and to avoid adverse transfusion reactions. The risk reported due to acute haemolytic transfusion reaction because of incompatible blood components is about 100 times more than the risk reported due to transfusion transmitted infections. (3)
In ABO discrepancies forward blood group does not match with the reverse blood group. In such cases interpretation of final ABO Blood group type must be delayed till the discrepancy is resolved. In clinical emergencies, generally group O negative Red Blood Cells are transfused to save the life of patient.

### Table 1: ABO Discrepancies are Classified Into Four Types.

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Missing or weak antibodies.</td>
</tr>
<tr>
<td>Group 2</td>
<td>Missing or weak antigens.</td>
</tr>
<tr>
<td>Group 3</td>
<td>Rouleaux formation and pseudo agglutination</td>
</tr>
<tr>
<td>Group 4</td>
<td>Miscellaneous.</td>
</tr>
</tbody>
</table>

### Aims and Objectives

To analyse the blood grouping discrepancies reported in Teaching hospital based blood bank during Jan 2019 to December 2019.

### Material & Methods

A retrospective study was carried out in Dhiraj Blood Bank attached with SBKSMIRC, Vadodara, from January 2019 to December 2020. An analysis of ABO discrepancy was done on patients and Donors samples. Forward and reverse grouping were performed on blood samples from inpatient, outpatient and donors.

Inclusion criteria: All patients and donors samples with EDTA or citrated anticoagulated blood for forward grouping and clotted blood sample for reverse grouping.

Exclusion criteria: Hemolysed samples and clotted samples of newborn upto 3 months of age for reverse grouping.

The protocol used by blood bank includes following determinations:

ABO Rh (D) group, ABO group is determined by ABO gel grouping card which contains antisera A antisera B impregnated in gel columns for forward grouping and neutral gel cards for testing expected antibodies with A and B red cells in reverse grouping. (Tulip Anti A Anti B Anti D Control Reverse diluents gel card for gel card grouping were used)

Antibody screen testing for unexpected antibodies for RBCs transfusion with antiglobulin test incubated at 37° C

The blood bank standard operating procedures and Quality manual mandates that all results are compared with patients records filed in blood bank.

ABO discrepancies were detected on comparing the patients forward blood group results with reverse blood group results.

For A subgroup anti A lectin is used. Dolichos biflorus in the diluted state, which reacts with A1 and A1B red cells but not with A2 and A2B cells. If red cell agglutinate the person is subgroup A1. If no agglutination takes place, person is A2.

IgM alloantibodies such as Anti-Lea, Anti P1, Anti-M, and Anti N may cause a serum mediated discrepancy with reverse ABO grouping cells. Antibody screen and identification are needed in such cases, followed by selection of blood that lacks antigen.

Discrepancies were solved according to discrepancy type protocol.
Results and Discussion

In present study on ABO discrepancy 10,048 (Patient and Donor) who satisfied inclusion criteria were included and ABO typed. There were 0.49% discrepancies observed. 15 were of donors and 35 were of patients.

In donors incidence of discrepancies were found to be 15 out of 10,048. Out of 15 discrepancies there were only males in age group of 21-30 years.

Among 15 cases on grouping them on the type of discrepancies 10 out of 15 cases were found to be major category. Group 2 comprises 13.3% of total (2 out of 15) and group 4 only 20%, (3 out of 15).

No discrepancy came to group 3 category in donors.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Groups</th>
<th>Causes</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group 1</td>
<td>Weak expression of Rh antigen</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak expression of B antigen</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Group 2</td>
<td>Bombay blood group A2B</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weak expression of antibody</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Group 3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Group 4</td>
<td>ICT Positive</td>
<td>4</td>
</tr>
</tbody>
</table>

In Patients: Forward and reverse typing were done on both inpatient and outpatient and those which showed discrepancies were resolved by suitable measures.

Out of 6664 Patients 35 (0.52%) patients showed discrepancy.

Among patients discrepancies were found to be more in females (71.4%) than in males (28.57%). Among the 35 patients age group distribution of discrepancy were calculated and found to be more in age group of 0-9 years i.e. 20 out of 35. This is mainly due to absence of/reduced development of antibodies in infants > 3 months old.
Table 3: Types of discrepancies in patients

<table>
<thead>
<tr>
<th>Cases</th>
<th>Causes</th>
<th>No. of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Neonates</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Weak expression of antigen</td>
<td>10</td>
</tr>
<tr>
<td>Group 2</td>
<td>Subgroups</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Weak expression of antibody</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Infection</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Malignancy</td>
<td>2</td>
</tr>
<tr>
<td>Group 3</td>
<td>Multiple myeloma</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Abnormal plasma proteins</td>
<td>2</td>
</tr>
<tr>
<td>Group 4</td>
<td>AIHA</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DCT/ICT Positive</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>ITP</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Pregnancy.</td>
<td>2</td>
</tr>
</tbody>
</table>

The present study was designed to determine the incidence and causes of all ABO discrepancies detected in tertiary care hospital blood bank. Blood Donors and patients must be correctly ABO and Rh grouped because transfusing ABO incompatible blood may result in transfusion reaction which may lead to death of patient\(^{(1)}\).

**Discrepancies in Donors**

Findings of this one year study showed that in donor population the causes of discrepancies were very much different from that of patient population. In donors major cause were found to be weak expression of antigen/antibody whereas in patients the problem involved atypical antibodies and acquired antigens creating blood group changes.

In donors it was found that most common discrepancy was weak expression of antigen (mainly Rh) and weak antibody. In study by Srikrishna et.al found that about 1 in 1000 persons face the problem of weak D phenotype which are reported as Rh negative in some blood banks/Laboratories. hence uniform and consistent standards for reporting are required\(^{(6)}\)

Other observation was discrepancies in donor population mostly seen in age group of 21-30 years and in patient population was found in age group of 0-9 years. Reason may be due to age limit in donors which contributes to maximum donors in this age group and thus increase in incidence of discrepancies.

In patient population females are found to have more incidence of discrepancies (57.1%) than males. Reason is exposure to antigens in pregnancy, pregnancy related transfusions, predominant occurrence of autoimmune disease in female patients. There are 20 cases in the age group.

The acquired B phenotype arises in vivo in patients with bacterial infections when bacteria produces deacetylase enzymes which chemically alters terminal sugar of A antigen (N acetyl D Galactosamine) so that it resembles B determining galactose. In present study one case of infection was reported which included Gram negative sepsis.
There was one case of multiple myeloma who showed elevated levels of globin chains which result in rouleaux formation.

Leukaemia is another important condition for ABO discrepancies. Reason for discrepancy is hypogammaglobulinemia.

Similar case has been reported by Lenz and curie with a patient who had long history of pneumonia who showed discrepancy in forward and reverse typing by not showing reaction with B cells even after extended incubation. the cause of this is hypogammaglobulinemia which result in immunodeficiency(7)

Subgroups comprise of major part of group 3 discrepancy 2 out of 35-. Among subgroups there were more incidence of A2 and A2B groups --two- cases and Bombay group-one case-. These were corrected by suitable lectins.

AIHA and multiple transfusions are leading cause of ABO Discrepancy, autoantibody in AIHA can be warm/cold which are coated on red cells that produce positive coombs test result. This may promote weak agglutination in forward grouping, resulting in ABO discrepancy. Although AIHA may present with an ABO-Rh typing discrepancy, accurate blood group identification usually can be determined without specialized techniques.

Conclusion

The incidence of ABO Discrepancy in present study reported was 0.49%. The incidence reported in donor population was 15 of 50 and in patents incidence of ABO discrepancy reported was 35 out of 50. For safe blood transfusion to patients, it is imperative that all blood group discrepancies must be resolved correctly.

Ethical Clearance: Taken from ethical committee SBKSMIRC

Source of Funding: Self
Conflict of Interest: Nil.

References
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- Material and Methods
- Findings
- Conclusion
- Discussion
- Acknowledgements
- Interest of conflict
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