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The Association of Monocyte Lymphocyte Ratio and IFN-γ/ IL-4 Ratio on Status of Sputum Conversion in Tuberculosis Patients with Post Intensive Phase

Anak Agung Gede Ocha Rama Kharisma Putra[1], I Ketut Suryana[2], Ida Bagus Ngurah Rai[3], Ni Wayan Candrawati[4], Ida Ayu Jasminarti Dwi Kusumawardani[4], I Gede Ketut Sajinadiyasa[4], Ni Luh Putu Eka Arisanti[4]

[1]Resident, [2]Associate Professor, [3]Professor, [4]Assistance Professor, Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Udayana University, Denpasar, Indonesia

Abstract

Background: Conversion status post-intensive phase of treatment in patients with tuberculosis (TB) is an important thing in determining the choice of the next treatment plan. Alternative parameters need to be studied to determine the factors that contribute to this status. Potential parameters thought to have a role are Monocyte Lymphocyte Ratio (MLR) as a hematological marker and Interferon Gamma/Interleukin-4 (IFN-γ/IL-4) as a molecular marker of cytokines and chemokines. **Objective:** analyzed the association between MLR and IFN-γ/IL-4 ratio on status of sputum conversion in TB patients with post-intensive phase. **Method:** The design of this study was cross-sectional with consecutive sampling, which was conducted in the period March to July 2021. The data used in this study included MLR, IFN-γ /IL-4 ratio, and sputum smear conversion. The statistical tests used included chi-square, fisher's exact test, and logistic regression with $p < 0.05$. **Result:** Low MLR (98.2%) and high MLR (55.6%) scores, both had positive sputum conversion (OR = 44.8; CI 4.169 – 481.452; $p = 0.001$). Meanwhile, the positive sputum conversion showed low IFN-γ/IL-4 ratio (97.8%) and high IFN-γ/IL-4 ratio (80%; OR = 11.25; CI 1.169 – 108.280; $p = 0.036$). There was a significant association between low MLR and sputum conversion positive (OR = 27.103; CI 2.289 – 320.883; $p = 0.009$). Meanwhile, IFN-γ/IL-4 ratio and sputum conversion did not have a significant association (OR = 5.248; CI 0.414 – 66,454; $p = 0.201$). **Conclusion:** there is a significant association between MLR, IFN-γ/IL-4 ratio, and the combination of MLR and IFN-γ/ IL-4 ratio on sputum conversion in TB patients with post-intensive phase.

Keywords: *IFN-γ, IL-4, intensive phase, MLR, sputum conversion*

Corresponding author:
Anak Agung Gede Ocha Rama Kharisma Putra
Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Udayana, Jl. PB. Sudirman, Dangin Puri Kelod, Denpasar, Bali 80232, Indonesia
Mail: ramakharisma90@gmail.com

Introduction

Tuberculosis (TB) is still a global health problem. The World Health Organization (WHO) in 2016 estimated that 10.4 million people experienced various manifestations of TB and

mortality reached 1.7 million people[1]. On the other hand, TB is the number one cause of death from a single infectious agent more than HIV/AIDS globally. Indonesia became one of the 5 countries with the largest TB incidence in 2017 along with India, China, the Philippines, and Pakistan[2]. Accuracy of treatment and continuity of therapy is the urgency of the problems faced by Indonesia in the era of directly observed treatment short-course (DOTS). Antituberculosis drugs (ATD) are an integral therapy modality that is available with a combination of at least four drugs for a minimum of 6 months. The pathogenesis of pulmonary TB or treatment of TB can trigger the manifestation of hematological disorders such as red blood cell changes, imbalance of granulocyte cells (neutrophils, basophils, and eosinophils), and platelets, monocytosis, and changes in lymphocyte levels[3].

In supporting efforts to eliminate TB by 2030, research on an effective biomarker as an indicator for rapid monitoring and evaluation of the response to TB therapy that can facilitate success and the development of treatment strategies becomes crucially applied[4, 5]. Acid-fast bacilli (AFB) sputum status after 2 months of TB therapy is currently still used as a marker of response to therapy and recovery. AFB smear examination and mycobacterium tuberculosis (MTB) sputum culture still have limitations. The length of time required to obtain culture results has an impact on diagnostic evaluation and treatment being less efficient. AFB smear examination also has limitations as a treatment evaluation. Most TB patients are unable to cough with sputum production after 2 months of therapy. This is because the clinical cough has improved and difficulties in the expectoration process of sputum. In addition, there are not a few cases of smear-negative sputum, such as cases of TB in children, TB/HIV patients, and individuals with severe immune disorders[4, 6].

Knowledge of the hematological manifestations of tuberculosis infection is important as a basis for determining pathogenesis. Previous studies have shown that myeloid cells are host cells for the growth of MTB bacteria. Lymphoid cells are cells that play a major role in components of the immune system against tuberculosis. Therefore, the levels of monocytes and lymphocytes called the Monocyte Lymphocyte Ratio (MLR) can describe the status of the immune system against infection[7]. In peripheral blood components, the MLR ratio reflects the immune clearance (efficiency) mechanism and can assess the severity and progression of TB disease[8]. Changes in normal MLR values can be caused by MTB infection that can alter a subset of hematopoietic stem cells or directly infect bone marrow mesenchymal stem cells[9]. MLR inactive TB infection has a significantly higher value than normal individuals and this is associated with the severity of the lesions in TB[10].

Specific biomarkers of TB pathogens, especially cytokines and chemokines as key molecules that regulate the immunological response, have been extensively studied, especially on their potential role as diagnostic and prognostic biomarkers in tuberculosis. The current biomarkers are not reliable as indicators in predicting the clinical outcome of MTB infection, especially in the treatment aspect[4]. Interferon-gamma (IFN-γ) is one of the cytokines that have a crucial role in the protective response

of cell-mediated immunity against TB so that it can be developed as a non-sputum biomarker. IFN-γ is secreted by activated T cells (Th1) and has clinical implications for the formation of granulomas and the elimination of MTB bacteria through the activation of macrophages towards the M1 phenotype[11]. The utilization of IFN- γ in MTB infection is currently used in the diagnosis of infection through Interferon Gamma Release Assays (IGRA)[12]. On the other hand, IL-4 is a principal cytokine produced by Th2 cells that acts as a cofactor in the activation of humoral immunity by stimulating proliferation and differentiation in B-cells and T-cells. In addition, IL-4 has an anti-inflammatory mechanism and contributes to the survival of MTB bacteria in the face of the immune system[13].

Based on the background of these problems, the authors want to evaluate the MLR and IFN-γ/IL-4 ratio as an easy biomarker but have never been done in monitoring and evaluating the conversion status of AFB with post-intensive phase ATD.

Method

Participants in this study were bacteriologically confirmed pulmonary TB patients receiving intensive phase of ATD therapy. Participant inclusion criteria included participants diagnosed with tuberculosis who had a bacteriological diagnosis at the time of initial diagnosis, had completed the intensive phase of ATD, and were age over 18 years old. Participant exclusion criteria included TB patients with comorbid malignancies, heart disease, SLE, Sarcoidosis, RA, liver fibrosis, and Alzheimer's and patients receiving immunosuppressant or corticosteroid therapy. Participants had filled out an informed consent form before this research was started.

The study design in this study used a cross-sectional design using a consecutive sampling technique. The number of participants in the study was 66 participants, where the time of data collection was carried out in the period March to July 2021. The data used in this study included MLR, IFN-γ/IL-4 ratio, and sputum smear conversion.

MLR is the absolute number of monocytes compared to the absolute number of lymphocytes, data obtained from the results of a complete blood count at the end of the intensive phase of treatment. The MLR value is displayed based on the median value, the minimum value, and the maximum value after the normality test on the data distribution is performed. The MLR value is also searched for the cut point value based on the ROC cut point value. The IFN-γ/IL-4 ratio is a comparison of the value of the proinflammatory cytokine IFN-γ to the anti-inflammatory cytokine IL-4, the data obtained from the results of blood serum examination at the end of the intensive phase of treatment, examined using the enzyme-linked immunosorbent assay (ELISA) method. IFN-γ/IL-4 ratio based on median value, minimum value, and maximum value after normality test on data distribution. The value of the IFN-γ/IL-4 ratio is also searched for the value of the cut point based on the value of the ROC.

Active TB was patients with pulmonary TB with clinical symptoms, radiological features, and microbiological evidence (TCM sputum/AFB sputum) showing signs of active TB. Clinical symptoms of active TB are typical symptoms of TB infection, namely coughing up phlegm for 2 weeks or more, coughing up blood, fever or

chills for more than 1 month, night sweats without physical activity. Radiographic features of active TB are radiological examinations with X-Ray in the thoracic region with the anterior (chest) facing the film and the rays will be directed from the posterior (back). Sputum results of patients with pulmonary TB: The results of the examination of sputum samples from patients with pulmonary TB to confirm the causative bacteria, using AFB sputum staining or molecular rapid tests. The molecular rapid test for TB is a molecular rapid test using the Xpert MTB/Rif method. Examination of AFB Sputum: Examination of sputum (phlegm) for the diagnosis of pulmonary TB, using Ziehl – Neelsen (ZN) staining. Interpretation of sputum examination results, namely if 2 times positive, or 1 time positive, 1-time negative, is called bacteriologically confirmed TB. If the sputum is negative twice, then a radiological evaluation (thorax photo) is carried out, if the radiological is suggestive of tuberculosis, it is called clinically confirmed TB.

Descriptive statistical analysis that aims to describe the characteristics of the subject based on the MLR ratio and the IFN-γ/IL-4 ratio. Normality test using Kolmogorov-Smirnov is used to analyze whether the data that has been collected has a normal distribution or not. Bivariate analysis was conducted to determine the comparative association between MLR levels or the ratio of IFN-γ/IL-4 and pulmonary TB sputum results. Because the independent variable has a categorical scale and the dependent variable has a categorical scale, a comparative test was conducted using the Fisher Exact test. Multivariate analysis with logistic regression was conducted to determine whether there was an association between MLR and the ratio of IFN-γ/IL-4 to pulmonary TB sputum results. Statistical analysis was declared significant if $p < 0.05$.

Result

Characteristic of participant

The subjects of this study had a mean age of 41.17 ± 14.67 with 44 (66.6%) of the male. There is diversity in the level of education and type of work of the subjects of this study. 11 (16.7%) subjects had an elementary education level or equivalent. Then for Middle school/high school/diploma or equivalent, 9 subjects (13.6%), 36 subjects (54.5%), and 3 (4.5%) subjects, respectively. The rest of, research subjects have undergraduate education status. Subjects' occupations consisted of 22 subjects (33.3%), employees 7 (10.6%), 17 subjects (25.8%), and 20 subjects (30.3%).

All patients from the beginning had a positive initial status on the Molecular Rapid Test sputum examination. About 63 subjects (95.5%) were given ATD in the first category while the rest were in the second category. In the research subjects, there were 45 subjects (68.2%) who had comorbidities. Types of comorbidities possessed by the subject included HIV in 6 subjects (27.3%), diabetes mellitus in 11 subjects (50.0%), asthma in 1 subject (4.5%), COPD in 1 subject (4.5 %), hypertension in 1 subject (4.5%), and chronic renal failure in 2 subjects (9.1%). The status of the final sputum examination in the subjects showed that as many as 61 subjects (92.4%) had undergone conversion. The nutritional status of the research subjects included no malnutrition in 54 subjects (81.8%), while 12 (18.2%) were malnourished.

On examination of the subjects' blood cells, the median of monocytes and lymphocytes were 0.5 (0.21 – 1.31) and 1.87 (0.53 – 107), respectively. The ratio of these two cells, known as the MLR, has a median of 0.26 (0 – 1.12). In the cytokine examination of the subjects, the medians of interferon-gamma and interleukin 4 were 0.87 (0.07 – 22.45) and 0.12 (0.04 – 0.85). The ratio of the two, namely IFN-γ/IL-4, has a median of 6.85 (0.74 – 299.37). The overall data on the characteristics of the research subjects are presented in Table 1.

Correlation of MLR and IFN-γ/IL-4 on sputum AFB positive in tuberculosis patient with post-intensive phase

MLR participants are divided into 2, namely <0.596 and ≥ 0.596. Based on the analysis, it was found that the majority of participants had MLR <0.596 with a positive sputum conversion of 98.2%, and most of the MLR participants ≥0.596 with a positive sputum conversion of 55.6% (OR = 44.8; p = 0.001). Meanwhile, the results of the measurement of IFN-γ/IL-4 ratio were categorized into 2, namely low <20,844 and high ≥20,844. The majority of participants had IFN-γ/IL-4 ratio <20,844 values with sputum conversion positive as much as 97.8% and those with IFN-γ/IL-4 ratio ≥20,844 values with sputum conversion positive as much as 80.0% (OR = 11.25; p = 0.036; table 2).

The results of the analysis of the combination of MLR and IFN-γ/IL-4 ratio for sputum conversion showed that 44 participants had MLR <0.596 and IFN-γ/IL-4 ratio <20.844 and had positive sputum conversion. In addition, 17 participants who had MLR 0.596 and IFN-γ/IL-4 ratio 20,844 also had positive sputum conversion (p = 0.003). Multivariate logistic regression analysis showed that subjects with MLR <0.596 had the possibility of sputum conversion after intensive therapy 27.103 times compared to MLR subjects 0.596, with the probability range in the population ranging from 2,289 to 320,883 times. Meanwhile, subjects with an IFN-γ/IL-4 ratio <20,844 had a probability of sputum conversion after intensive therapy 5,248 times compared to subjects with an IFN-γ/IL-4 ratio of 20,844, with a probability range in the population ranging from 0.414 to 66,454.

The final result showed that MLR was the only predictor that was independently associated with sputum AFB conversion status in patients with active pulmonary TB after intensive phase therapy. The results of this study also showed that MLR <0.596 had no interaction with the IFN-γ/IL-4 ratio <20.844 in predicting AFB sputum conversion status so that the combined OR value of the two predictive factors could not be determined.

Table 1. Characteristic of participant

Characteristic	n = 66
Age (years)	41.17 ± 14.67
Sex	
Male	44 (66.7)
Female	22 (33.3)
Education	
Elementary school	11 (16.7)
Junior high school	9 (13.6)
Senior High School	36 (54.5)
Diploma	3 (4.5)
Bachelor	7 (10.6)
Profession	
Entrepreneur	22 (33.3)
Employee	7 (10.6)
Does not work	17 (25.8)
Other	20 (30.3)
GeneXpert	
Positive	66 (100.0)
Negative	0 (0.0)
ATD category	
1	63 (95.5)
2	3 (4.5)
Comorbid	
Yes	45 (68.2)
No	21 (31.8)
Comorbid type	
HIV	6 (27.3)
Diabetes mellitus	11 (50.0)
Asthma	1 (4.5)
COPD	1 (4.5)
Hypertension	1 (4.5)
Chronic kidney disease	2 (9.1)
AFB	
Positive	5 (7.6)
Negative	61 (92.4)
Status konversi	
Yes	61 (92.4)
No	5 (7.6)
Nutritional Status	
Normal	54 (81.8)
Malnutrition	12 (18.2)

Cont... **Table 1. Characteristic of participant**

Monocyte	0.5 (0.21 – 1.31)
Lymphocyte	1.87 (0.53 – 107.00)
IFN-γ	0.87 (0.07 – 22.45)
IL-4	0.12 (0.04 – 0.85)
MLR Low High	 57 (86.4) 9 (13.6)
IFN-γ/IL-4 Low High	 47 (71.2) 19 (28.8)

Note: HIV = human immunodeficiency virus; COPD = chronic obstructive pulmonary disease; AFB = acid fast bacilli; IFN-γ = interferon gamma; IL-4 = interleukin 4; MLR = monocyte lymphocyte ratio.

Table 2. Corelation of MLR and IFN-γ/IL-4 ratio on sputum conversion in tuberculosis patient with post intensive phase

Variable	Sputum Conversion		95% CI	OR	p
	Yes	No			
MLR <0.596 ≥0.596	 56 (98.2) 5 (55.6)	 1 (1.8) 4 (44.4)	4.169 – 481.452	44.8	0.001*
IFN-γ/IL-4 ratio <20.844 ≥20.844	 45 (97.8) 16 (80.0)	 1 (2.2) 4 (20.0)	1.169 – 108.280	11.25	0.036*

Note: MLR = monocyte lymphocyte ratio; IFN-γ = interferon gamma; IL-4 = interleukin 4; OR = odd ratio; *significant <0.05

Discussion

Various studies have shown that MLR is reported to be significantly increased in TB patients. This is because each component of the MLR can contribute to the severity of TB. Monocytes in TB patients will experience increased production in response to an existing infection[14]. On the other hand, lymphocytes in TB patients may decrease because peripheral lymphocytes will be recruited to the site of infection[15]. The study of Wang et al showed that there was a significant difference between the

MLR of patients with active TB and the MLR of patients who had completed TB treatment[7]. Other studies have also shown that MLR can be used as an indicator of the effectiveness of the use of ATD[16].

The IFN-γ/IL-4 ratio describes the balance between the response of Th1 cells and Th2 cells to MTB infection[17]. Th1 cell responses through the production of IFN-γ describe the activation of immune cell responses in the mechanism of phagocytosis and MTB destruction, while Th2 cell responses through the production of IL-4 indirectly describe the activation and inhibition of macrophage phagocytosis[18]. The ratio between Th1:Th2 can describe the antimicrobial response, an increase in Th1 response accompanied by a decrease in Th2 response is associated with antimicrobial activity and good outcome, and conversely, a low Th1 response with a high Th2 response is thought to be associated with active TB conditions and poor outcome[19]. Indirectly, the equilibrium of Th1:Th2 is measured by the ratio between IFN-γ/IL-4 which is an integral cytokine, and prototype of Th1 and Th2, respectively[20].

The study of Feng et al found that IFN- levels were significantly correlated with conversion status, the higher the IFN-γ levels, the greater the likelihood of conversion of AFB sputum in the first 2 months of therapy[21]. Another study found that high IL-4 indicates a poor prognosis[22]. Th1 response in patients with active TB was significantly increased compared to non-TB patients before intensive therapy and high Th1 levels were predictive of a good outcome on radiological findings. However, in these studies, measurement of IFN-γ or IL-4 was performed before the intensive phase. The difference in findings between this study and those studies could be due to the difference in the timing of the measurement of the IFN-γ/IL-4 ratio, in this study the measurement was carried out at the end of the intensive phase. A high IFN-γ/IL-4 ratio at the beginning of the intensive phase indicates high macrophage activation and active TB status. High macrophage activation correlates with high TB bacteria elimination ability, so a high IFN-γ/IL-4 ratio at the beginning of the intensive phase is associated with successful conversion at the end of the intensive phase. In contrast, by the end of the intensive phase, the patient had been on treatment. Successful treatment will reduce the number of TB germs so that the patient will experience sputum conversion from smear-positive to smear-negative. The decrease in the number of TB germs will also lead to reduced macrophage activation, as indicated by a low IFN-γ/IL-4 ratio[23].

Previous studies have emphasized the potential of applying hematological parameters as diagnostic markers to predict the course of TB disease, the presence or absence of active TB infection, and the response to ATD. However, research that discusses the correlation between these hematological parameters and the outcome of ATD therapy is still limited[24]. The phenomenon of increasing IFN-γ/IL-4 along with treatment success was not found in the TB patient population with HIV-positive status. This is because in this population there is an alteration of the immune system response[4]. Atopic conditions also cause alteration of the immune system, where there is a significant decrease in Th1 levels in the blood even though the patient has active TB. In this study, patients with a history of atopy were not excluded, thus possibly causing

a nonsignificant association between the IFN-γ/IL-4 ratio and conversion status in multivariate analysis[23].

Conclusion

The characteristics of pulmonary TB patients after intensive phase therapy were having a mean age of 41.17 ± 14.67 years (26 to 56 years); in men 66.6%; with a conversion status of 92.4%. There is an association between MLR and sputum smear conversion status of pulmonary TB patients after intensive phase therapy. If the MLR value <0.596, the possibility of sputum conversion after intensive phase therapy is 44.8 times compared to the MLR value of ≥ 0.596. There is an association between the ratio of IFN-γ/IL-4 with sputum smear conversion status of patients with pulmonary TB after intensive phase therapy. If the value of IFN-γ/IL-4 <20,844 then the possibility of sputum conversion after intensive phase therapy is 11.25 times compared to the value of IFN-γ/IL-4 ≥ 20,844. There is an association between the combination of MLR and the ratio of IFN-γ/IL-4 with sputum AFB conversion status after intensive phase therapy.

Ethical Approval: We have conducted an ethical approval based on the Declaration of Helsinki with the registration of research at the Health Research Ethics Committee in Sanglah General Hospital, Denpasar, Indonesia.

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Conflict of Interest: The authors declare that they have no conflict of interest.

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Table and Legend

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A Case Report

Rare Finding of a Triallelic Pattern at The DYF387S1 Locus in the Population of Rajasthan, India

Anand Kumar[1], Rajesh Kumar[1], Ginni Kumawat[2], Akansha Dixit[3], Rahul Kaushik[3], Vijaya Rani Singh[3]

[1]Assistant Director, [2]Junior Scientific Assistant, [3]Forensic Scientific Assistant, DNA Division, State Forensic Science Laboratory, Jaipur, Rajasthan, (India)

Abstract

This study reported a sexual assault case where Y-STR DNA profile was tested for the confirmation of male DNA. Within the DNA profile of the sample of accused, a tri-allelic pattern was detected at locus DYF387S1. Since this locus doesn't exist in any of the commercially available Y-STR amplification kits, So, the confirmation of this tri-allelic pattern was done by re-extracting and amplifying the extracted DNA by using Y-Filer Plus amplification kit (Thermo Fischer Scientific, CA, USA—Thermo) followed by separation of amplicons on Genetic Analyzer 3500xl.The allelic patterns of case sample belong to Type-2 pattern of tri-allelic outcome because peak heights were in balanced manner. This region is very much prone towards any structural mutation which could be either addition or deletion of allele, so for the forensic point of view this locus should be used carefully for kinship analysis.

Keywords: *Forensic Science, Locus DYF387S1, Tri-allelic pattern, Mutation.*

Introduction

DNA Fingerprinting, one of the best and fast technologies of today's scenario for criminal investigation is based on autosomal and Y-STR analysis. Its discovery is one of the most fascinating scientific breakthroughs ever. It has a vital function in forensic science and the criminal justice system, and is not restricted to laboratory study. Since its discovery, DNA fingerprinting has endured rapid technological improvements. This has become the most powerful technique globally for judicial system to assist both in the conviction of the criminal and the exoneration of the innocent. The remarkable capability of DNA technology as an identification tool has brought a massive change in criminal justice[(1)].

In cases related to sexual offence, there is always a struggle between victims and criminals. Even if the criminal does not leave sperms behind, it is possible to have stains of any body fluid and hairs of accused on clothes of victim as well as at

Corresponding Author:
Anand Kumar
anandfsl@gmail.com, anand.fsl@rajasthan.gov.in
https://www.researchgate.net/profile/Anand_Kumar144, https://orcid.org/0000-0001-5162-1374?lang=en ,
Contact details: Phone No. - +919414238142

crime spot[2]. In the same manner, after a murder incident, even if the criminal cleaned the blood, latent blood stains would be identified using special methods like Teichman tests, RSID (Rapid Stain Identification Series) Test for Human blood and ABA Card Hematrace. Biological samples are used in forensic science because each and every individual has its own genetic characteristic which is inherited from father and mother both.

Short tandem repeats (STRs), also known as microsatellite or simple sequence repeats, are short repeated DNA sequences with 16 bp[3]. Their scattered parts account for about 3% of human genome. However, their distribution within the chromosome is not uniform and are less common in the sub-telomeres region of chromosomes[4]. Only about 8% of STRs are found in coding region whereas others are found in non-coding regions. In humans, highest density of STR is present at the chromosome-19[4]. On an average, STR is present in the human genome at every 2,000 bp[5]. The most common STRs present in humans are A-rich units: A, AC, AAAN, AAN, and AG (N=C or G or T) [6]. The most commonly used STR loci are 100-500 bp in length, which are shorter than the smallest VNTR loci. More than 100,000 STR exist in human genome[7]. Some STRs have been characterized specifically for forensic DNA profiling. STRs can be grouped into different types based on different repeat units. On the basis of nucleotide, STRs are classified into mono-, di-, tri-, tetra-, penta- and hexa- nucleotide repeats. On the basis of repeat structure, STRs are classified into perfect repeats (simple repeats), only one repetitive unit, and imperfect repeats (compound repeats)[8].In forensic inferences, autosomal short tandem repeats (STR), Y-STR markers and X-STR markers are the main tool of DNA profiling. In 1997, 13 autosomal STR loci were used by the FBI laboratory which forms the backbone of the U.S. National DNA Database as CODIS (The Combined DNA Index System).These 13 CODIS STR loci are used by other countries around the globe as U.S has its own DNA database - The Federal DNA Database Unit (FDDU) [9]. United Kingdom develop their population data by NDNAD (National DNA Database)[10] whereas Europe has its own DNA database- ENFSI(The European Network of Forensic Science Institutes) [11]. Several states in India also have their population data based on the forensic casework[12],[13],[14], [15], [16], [17].

Autosomal short tandem repeat (STR) markers are used to establish identity of missing persons, paternity relations and linking accused to crime scenes. Y-STR is especially obtained from male Y chromosome and used in patrilineage study in forensics. These Y-STRs provide a weaker analysis than the autosomal STRs as the Y chromosome is inherited from the father and is only found in men in any paternity cases.

DYF387S1 is a Y chromosome Short Tandem Repeat (Y-STR) used in forensic genetics and included in the Y chromosome haplotype reference database (https://yhrd.org). It is a rapidly mutating, multi-locus Y-STR marker. There are two paralogs within the palindromic sequence, which is the major region of structural variation.

Among the 27 Y-STRs available in the Y-Filer Plus PCR amplification kit, five Y-STR viz. DYF399S1, DYF387S1, DYS526a, DYF403S1a, DYF404S1Y-STRs are known for their high

mutation rate[18].

In our study, a three peak pattern at the locus DYF387S1 which is known as tri-allelic pattern has been reported. Despite the fact that tri-allelic pattern are limited in occurrence, the data present on the STR base (http://www.cstl.nist.gov/biotech/strbase) specified that tri-allelic pattern is found unusually in the DYF387S1 Y-STR locus. Chimerism or structural mutations like deletion, duplication or gene conversion are the causes of Tri-allelic pattern[19].Tri-allelic patterns are of two types - Type-1 which is more often, as the size of peaks are imbalance, because of somatic mutations in alleles at heterozygous loci resulting in chimerism and Type-2 which has balanced peak intensity and is characteristic of duplication on the same chromosome or translocation or trisomy (Down's syndrome)[20].

Material and Method

Samples

The sample was received from district police for the DNA examination in a sexual assault case. Sample was processed at DNA division, State Forensic Science Laboratory, Jaipur, Rajasthan for routine examination. Blood of reference sample was collected for the DNA examination with written consent of the donor. Blood samples are routinely collected on FTA card in the state.

Direct Amplification and Genotyping

A Micro-Punch of 1.2mm was taken from the centre of blood stained area on FTA card. Increasing the size of punch can cause inhibition at the time of amplification. DNA was amplified by using Y Filer^{TM} Plus PCR Amplification kit (Thermo Fisher Scientific, CA, USA-Thermo). This kit is a six dye (Blue, Green, Yellow, Red, Purple and Orange) short tandem repeats (STRs) multiplex assay that amplifies 27 Y-STRs on DNA strand. 25µl of reaction mixture was added on the micro-centrifuge tube for amplification. The Y Filer^{TM} Plus PCR Amplification kit was especially developed to increase the sensitivity to extract maximum information from the samples. Multiplexing reaction was performed on Veriti^{TM} thermal cycler (Thermo) according to the manufacturer's protocol. Separation of amplicons were performed by capillary electrophoresis in 3500xL Genetic Analyser (Thermo) in standard polymer POP4 (Performance Optimized Polymer). GeneMapper^{TM} ID-X Software v1.6 was used to analyse the data.

Quality Standards

Human Identification Professional Services (HIPS) by Thermo Fisher Scientific CA, USA has validated the DNA division of State Forensic Science laboratory. As per the laboratory internal standards, quality of analysis were revealed through positive and negative controls.

Result and Discussion

Tri-allelic patterns have been identified at a single locus in phenotypically normal individuals during autosomal STR genotyping for forensic purpose[21]. The tri-allelic pattern on FGA locus which is commonly used in forensic inference was also observed [22]. They concluded the tri-allelic pattern at FGA locus of alleles 20, 23 & 25.The size of these alleles were 251.58, 263.43 and 271.49 base pairs, respectively and was probably a result

of duplication at this locus.

Genotyping of Y-STRs usually shows mono- or a di-allelic pattern. One of the double-copy locus, DYS385a/b has shown three or four alleles during genotyping[23]. The two samples used in the present study showed that sample 1 has six alleles (12, 13, 14, 17, 18, 21) whereas sample 2 has five alleles (13, 18, 19, 20, 21) in DYS385a/b locus. Analysis of Sample 1 showed more compatibility with AGCU Data Y30 Kit as compared to Y filer Plus and PowerPlex Y23 kits and the amplification of DYS385a/b locus along with six balanced peaks. Whereas results of sample 2 and 3 showed more compatibility with Yfiler Plus and PowerPlex Y23 kits as compared with those of the HG19+14Y kit which showed five peaks at locus DYS385a/b. These three samples were alike and sequenced, and the sequencing results showed similarity with that of the genotyping results. This confirmed five- and six- banded pattern at DYS385a/b locus.

Table-1 : Statistical representation of Electropherogram

PEAKS	Statistical Parameters			
	Data Point	**Size**	**Height**	**Peak height Ratio**
38	6547	295.88	3829	0.9515
39	6590	299.73	3730	0.9515
40	6633	303.52	3784	0.9515

Another locus DYF387S1 due to its high tendency towards structural mutation like deletion, duplication and gene conversion generally showed high genetic diversity as compared to other Y STR markers. Two alleles that are closely linked possibly resulted in rare tri-allelic pattern, so consideration of this locus for kinship analysis should be taken carefully. It implies that the population is genetically characterized in Rajasthan. Further, it is likely probable that powerful, excessive throughput genotyping methods like Next Generation Sequencing (NGS) should be used for advanced study.

In our study, the tri-allelic pattern on the locus DYF387S1 STR markers of Y-filer plus kit in the population of Rajasthan is found. After repeatedly analysis of respective DNA sample, tri-allelic peaks were observed repeatedly in the electropherogram (Figure-1). Repeats of DYF387S1 marker alleles were found as 38,39 and 40. The peak data point, size, height and peak height ratio were found

as; allele 38 (Data point-6547, size-295.88, height-3829, peak height ratio-0.9515), allele 39 (Data point-6590, size-299.73, height-3730, peak height ratio-0.9515) and 40 (Data point-6633, size-303.52, height-3784, peak height ratio-0.9515) (Table-1). This analysis indicates the presence of Type-2 tri-allelic pattern because the alleles 38, 39, 40 present in the electropherogram shows balanced signal. This is a pioneer study on Tri-allelic pattern at locus DYF387S1 in Indian population especially in Rajasthan state which provides a new aspect in the inference of paternity cases in forensic science.

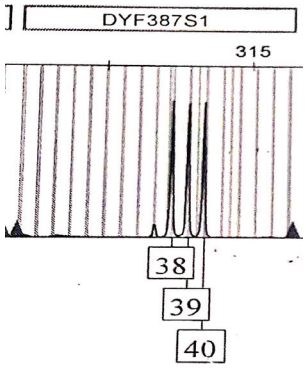

FIGURE-1: Tri-allelic pattern found on DYF387S1

Acknowledgment

Authors are grateful to the Director, State Forensic Science Laboratory, Jaipur, Rajasthan for encouraging the study.

Conflict of Interest

The authors declare that they have no conflict of interest

Compliance with ethical standards:

As per the declaration of Helsinki, written informed consent was obtained for the study.

Funding:

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Fall from Tree: A 14 Year Study

Ashesh Gunwantrao Wankhede[1], Himanshu Sharma[2]

[1] Professor & HOD, [2]Demonstrator, Department of Forensic Medicine and Toxicology, Late Baliram Kashyap Government Medical College, Jagdalpur, District Bastar, Chhattisgarh

Abstract

Background: Tribal of Bastar district of Chhattisgarh have a unique bondage of culture, food supply with the forests and trees of the region, during collection incidences of fall from trees occurs many times resulting in injuries including fatal ones, study has undertaken to prevent and suggestion for adequate implementation of treatment to specific injuries sustained during their fall.

Objective: The objective of the study was to identify and analyze the injuries sustained by the tribals and local of the Bastar region in fall from tree, and to suggest measures to prevent the injuries sustained during fall from tree

Material and Method: A data of postmortem reports of all cases of deaths occurred in 14 years (2009 to 2012), due to fall from tree, which had been bought to the mortuary of Forensic Medicine department.

Results: Out of total of 99 cases evaluated, it consisted predominantly of male population of the age 31-40 years, Maximum number of fall h from the Imali(*Tamarindus indica*) tree- 32 cases. Maximum cases were found in the year 2015- 13 cases. Maximum cases occurred in the Month of February 16 cases. Maximum injuries from fall were on Head region 79 cases with brain contusion predominant 23 cases. Chest injury sustained stood second 69 cases with rib fracture predominant 31 cases. Abdomen region 32 cases with liver injury predominant 11 cases. Upper limb injury 32 with radius/ulna fracture predominant 6 cases. Lower limb region 54 cases with femur fracture predominant 8 cases.

Conclusion: The significant number of injuries including fatal ones needs to be prevented. Adequate tree climbing programs and modernized equipment distribution need to do by forest department and state government, specialized Trauma center for head and chest injury need to be established at block level of the Bastar region

Keywords: *Tribal, Injury, Age, Tree, Hemorrhage, Fracture*

Corresponding Author:
Himanshu Sharma
Demonstrator, Department of Forensic Medicine and Toxicology Late Baliram Kashyap Government Medical College
Jagdalpur, District Bastar Chhattisgarh -494001
Mobile Number- +91 7587265259,
email- himanshusharma0912@gmail.com

Introduction

Bastar region is the country of tribes, about 70% of the total population of the Bastar region is tribal, which represents about 30% of total tribal population of Chhattisgarh. The trees are a most

vital part of tribal culture in Bastar, as they provide all resources to the tribal from food, medicine, oil, fertilizers. Main trees are like palm tree sap, plant is called sulfi (*Caryota urens*) tree in Chhattisgarh, the fermented sap (sulfi) is a favorite drink amongst the tribal of Bastar. Sal (*Shorea robusta*) tree is of great significance for the tribals of Bastar, each part of it is utilized like fruits for pharmaceutical in treatment of excessive salivation, epilepsy, chlorosis, dental problems etc.; leaves for smoking, perfume, fertilizer; seeds for burning oil. Lac trees for resins, chind (*Phoenix sylvestris*) for making jaggery; other trees include imali (*Tamarindus indica*), jamun (*Eugenia jambolana*), aam (*Mangifera indica*) which tribal used directly as the part of their food and culture. In the collection of fruits, leaves from these tress, sometimes leads to the fall from them, as these tree grow up to to a substantiable heights like sulfi (*Caryota urens*) tree up to 15 meters, sal (*Shorea robusta*) tree up to 35 meters, imali up to 24 meters, aam (*Mangifera indica*) up to 18 meters, jamun(*Eugenia jambolana*) up to 10.5 meters enough to cause severe injuries including deaths. In this study we have tried to co-relate the main trees from which the tribal usually fall and manner of injuries sustained from the fall from these trees. The main objective is that Trauma prevention programs can be conducted by the government authorities to aware the tribal of the injuries that can occur from climbing these particular trees and provide them adequate equipment's for their safety and also the Health authorities for giving adequate training to health care workers for dealing with the type of injury which occur from the fall from trees of this region.

Material and Method

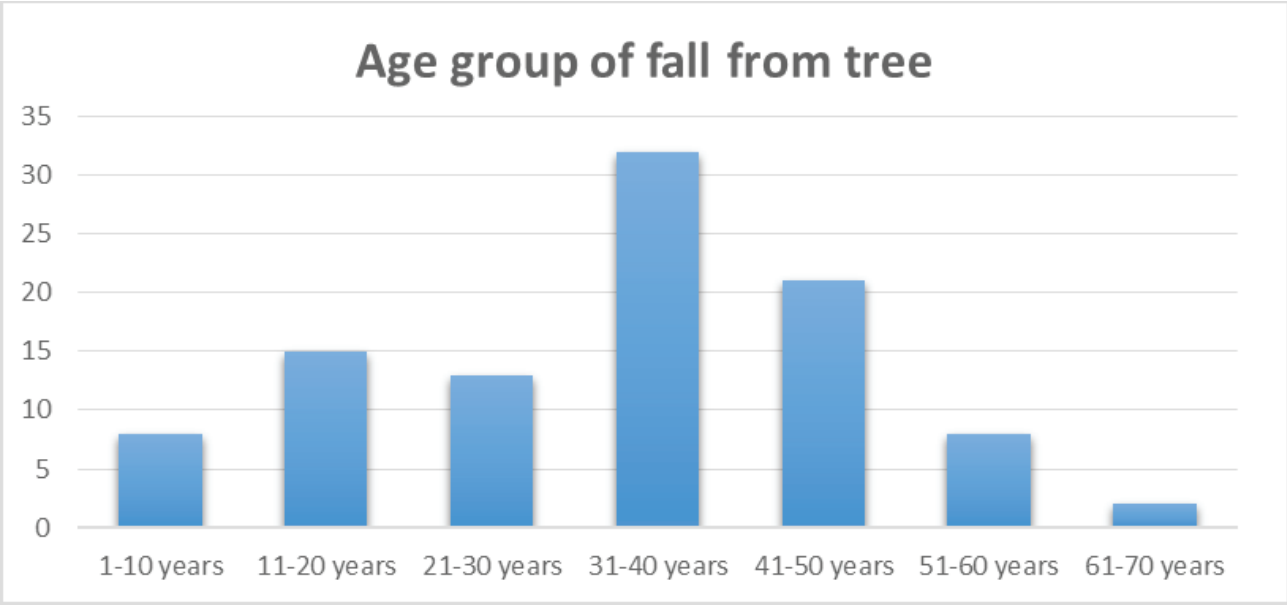
A data of post mortem reports of all cases of deaths occurred due to fall from tree, which had been bought to the mortuary of Forensic Medicine department, Late Baliram Kashyap Government Medical College Jagdalpur, District Bastar Chhattisgarh from 2009 to 2021, total 14 years has been scrutinized and evaluated. In each case a detailed examination was done on type of body region in which injuries were inflicted and type of injury occurred.

Results

In the study conducted it was found that total 99 cases of deaths were reported in the period of 14 years i.e., 2009 to 2014. The following the finding found out in the study.

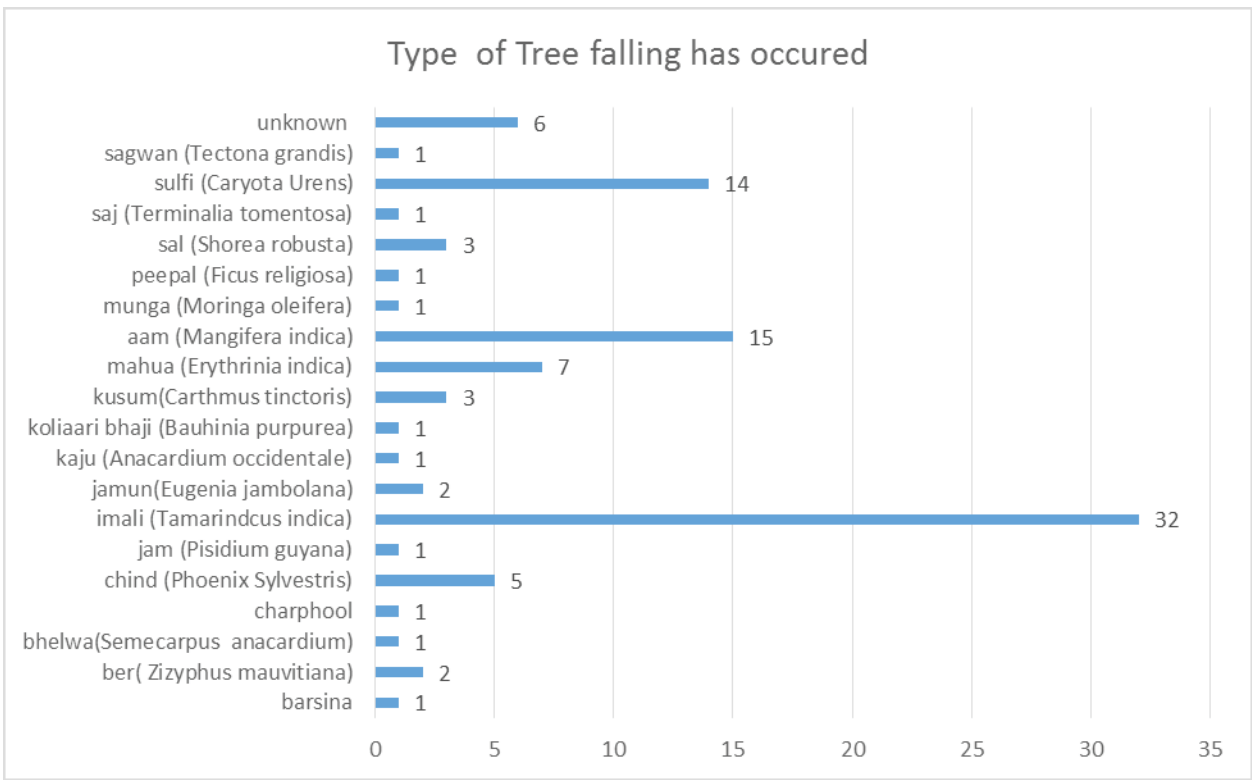
1. Sex Ratio in fall from tree: Male- 94 cases, Female-5 cases.

2. Age Group in cases of Fall from tree: It was divided in to 10-10 years age group e.g., 1-10 years,11-20 years etc. Maximum number of cases were found in the age group of 31-40 years i.e., 32 cases and Minimum number in 61-70 years i.e., 2 cases. [Graph 1]



Graph 1

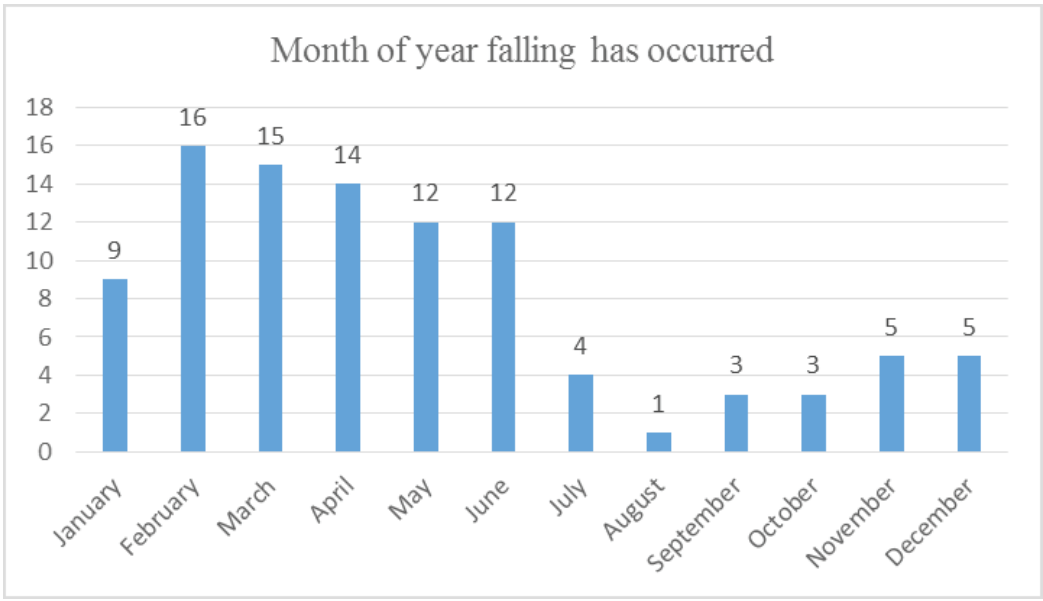
3. Type of Tree from which fall has occured: A total of 22 tree variety have been identified in the study from which the fall has occurred, Maximum number of fall has found from the imali (*Tamarindus indica*) tree- 32 cases followed by aam (*Mangifera indica*) tree-15 cases, sulfi (*Caryota urens*) tree- 14 cases respectively. [Graph 2]



Graph 2

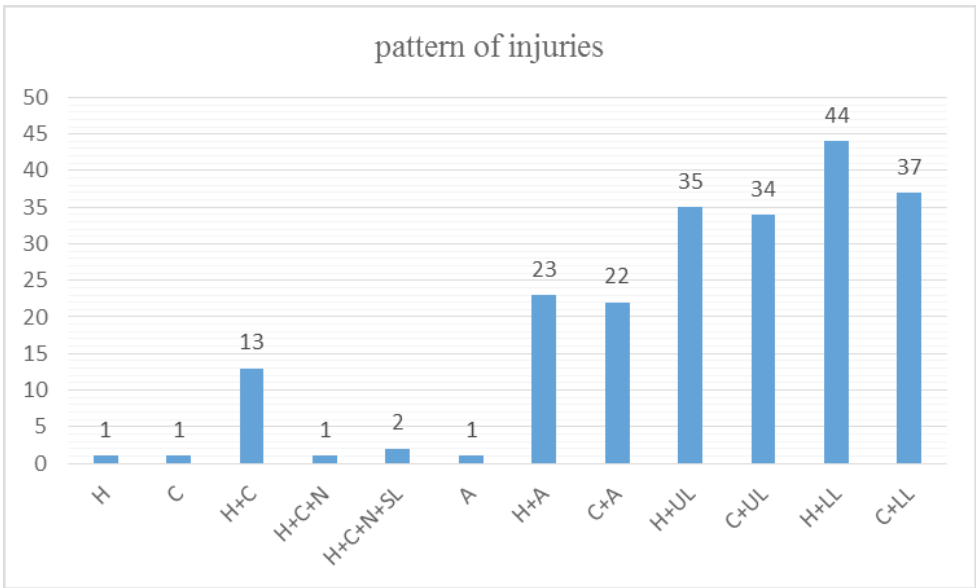
4. Year of Cases Reported: In detailed analysis of the cases reported, Maximum number of cases were found in the year 2015- 13 cases, 2018-12, 2019,2020,2021-11,2014-9, 2011-8, 2016-7,2012,2017-6, 2013-4, 2009-1 case.

5. Month of reported cases in the period of 2009-2021: In detailed analysis of the cases reported, it was found that maximum number of cases occurred in the Month of February-16 cases followed by March -14, April- 12 cases. [Graph 3]



Graph 3

6. Pattern of injury and regions inflicted: On detailed analysis of the cases of fall from tree reported from 2009-2021, it was found that body region in which maximum injury occurred during fall from tree in this region was in Head + Lower Limb = 44 cases, followed by Chest + Lower Limb=37 cases, Head + Upper Limb = 35 cases respectively. [Graph 4]

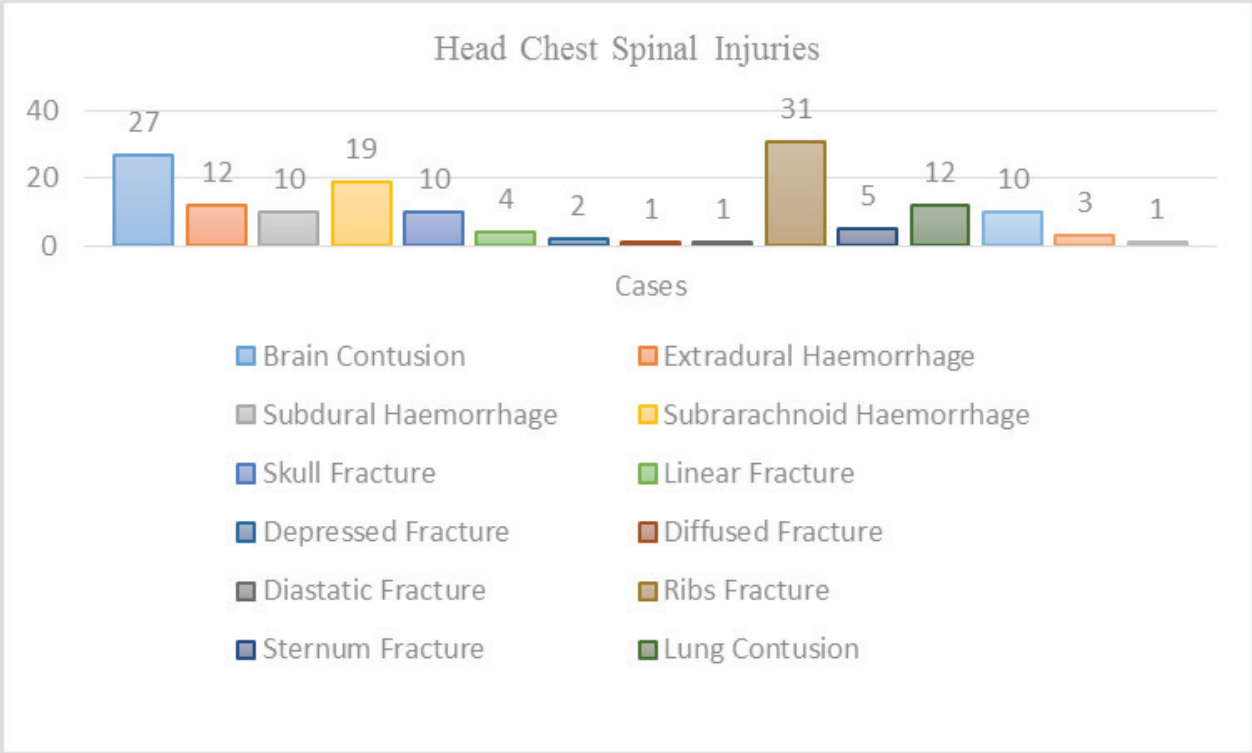


Graph 4

H=Head; C=Chest; H+C=Head and Chest; H+C+N=Head Chest Neck; H+C+N+S/L=Head Chest Neck Sacral/Lumber; A=Abdomen; H+A=Head Abdomen; C+A=Chest Abdomen; H+UL=Head Upper Limb; C+UL=Chest + Upper Limb; H+LL=Head Lower Limb; C+LL=Chest Lower Limb

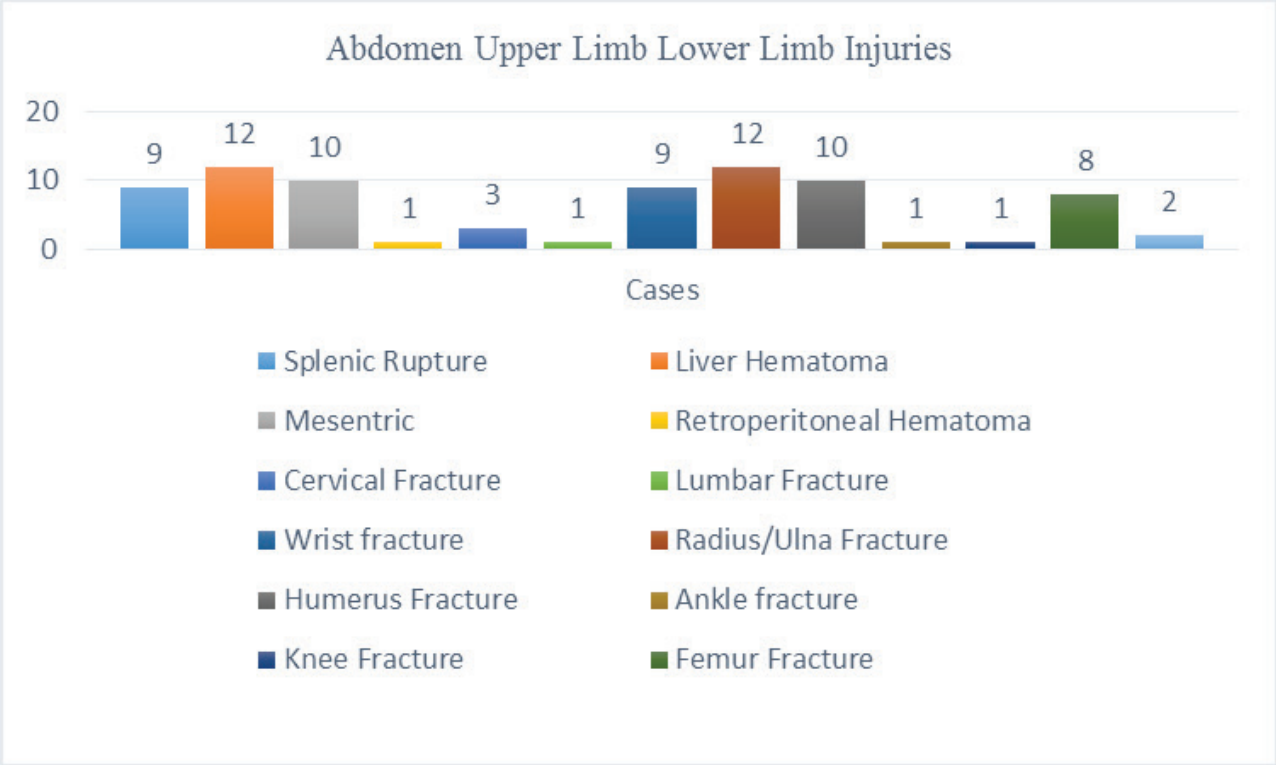
7. Type of Injury to regions inflicted:

i. Head Chest and Spine: Head:- 79 cases had head injury out of 99 cases, Brain Contusion-27, Extradural Haemorrhage-12, Subdural Haemorrhage-10, Subarachnoid Haemorrhage-19, Skull Fracture-10, Linear Fracture-4, Depressed Fracture-2, Diffused Fracture-1, Diastatic Fracture-1. Chest Injury:- 69 cases had chest injury out of 99 cases, Ribs Fracture-31, Sternum Fracture-5, Lung Contusion-12, Hemathorax♥-10. Spinal Injury:- 9 cases had spinal injury, Cervical Fracture-3, Lumbar Fracture-1 [Graph 5]



Graph 5

ii. Abdomen, Upper Limb and Lower Limb:- Abdomen:- 32 cases had abdomen injury out of 99 cases, Splenic Rupture-9, Liver Hematoma-12, Mesentric-10, Retroperitoneal Hematoma-1. Upper Limb:- 32 cases had Upper Limb injury out of 99, Wrist fracture- 9, Radius/ Ulna Fracture- 12, Humerus Fracture- 10. Lower Limb:- 54 cases had Lower Limb injury out of 99 cases, Ankle fracture -1, Knee fracture -1, Femur fracture- 8, Tibia/Fibula fracture-2 [Graph 6]



Graph 6

Discussion

Ersoy et al. had reported that males more commonly were subjected to injuries (92.6%) and the injury rate (29.8%) was highest between 51-60 years of age[1]. Wani et al. have reported maximum injury in age group 31-40 years[2]. Ahmed SR et al. had reported maximum injury in age group 31-40 years[3]; Lado DK had reported maximum injury in age group 11-16 years with males predominating 3.5:1[4]. In our study we have found males mainly subjected to injury(94.9%), the injury rate was highest between 31-40 year of age group.

Negin et al. had reported that maximum number of injury sustained from fall from coconut to be 239 cases followed by Mango tree 151 cases out of 1107 cases[5]. In our study maximum number of injuries sustained from fall from Imali tree 32 cases followed by Mango tree 15 cases out of 99 cases.

Turgut et al. had reported that the majority of injuries were to the skin and subcutaneous tissue (37.4%) and head(73.1%) and subarachnoid hemorrhages(50%)[6]. Wani I et al. had reported maximum injury in upper limb, with splenic laceration 8 cases, liver trauma 3 cases and mesenteric tear 1 case[2]. Ahmed SR et al. had reported maximum injury in abdomen 18 cases with splenic injury 7 cases, liver laceration 4 cases, mesenteric laceration 1 case out of 60 cases[3]. Tabish SA et al. had reported most patients had multiple injuries with head injury predominating (54.02%) in it Brain contusion-23 patients, Extradural/ Subdural hematomas- 15, Subarachnoid-4, Depressed fracture-7, linear fracture-15 patients In chest injury Hemothorax-11, lung contusion-7, rib

fracture-6, In abdominal injuries total 15 injuries in it splenic injury-7, Liver injury-5, In limb fractures total 23 injuries in it femur fracture-11, tibia/fibula fracture-7 patients[7]. Lado DK et al. have reported most injuries from fall from mango tree were in upper limbs 40% followed by lower limb 20%, head injury 16.6%[4]. In our study out of 99 cases we have thoroughly examined maximum injuries from fall was on Head region 79 out of 99 cases, in its brain contusion were maximum 26 cases followed by Subarachnoid hemorrhage 19 cases; Chest injury sustained stood second 69 out of 99 cases in it rib fracture were maximum 31 cases followed by Lung contusion 12 cases; in Abdomen region 32 out of 99 cases in it liver injury were maximum 11 cases followed by spleen injury 8 cases; in Upper limb injury 32 out of 99 cases in it radius/ulna fracture were maximum 6 cases followed by humerus fracture 2 cases; in Lower limb region 54 out of 99 cases in it femur fracture were maximum 8 cases followed by tibia/fibula fracture 2 cases.

Conclusion

The significant number of injuries including fatal ones needs to be prevented, stopping the tribal and locals of the Bastar region from climbing trees is not possible as their culture, tradition and food is totally connected with the trees, the best method will be providing the tribal and locals with adequate training by the forest departments of the districts, the state government should provide them harness and other climbing equipment's and programs should be regularly conducted in the villages, towns and tribal communities. The health department should provide trauma handling training mainly for head injuries, chest injuries to the health workers posted at the block levels so that in time injuries can be managed before bringing to tertiary healthcare.

Ethical Clearance: Not Applicable

Source of Funding: Self

Conflict of Interest: Nil

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Type of Article: Original Research Paper

Death Due to Domestic Violence in Imphal: A Retrospective Study of 10 Years

Nani Gopal Das[1], Thoidingjam Bijoy Singh[2]

[1]Medical Officer, Agartala Government Medical College & GBP Hospital, Agartala, Tripura,
[2]Professor, Regional Institute of Medical Sciences, Imphal, Manipur

Abstract

Introduction: Death due to domestic violence is an issue throughout the country and the world and Manipur is not an exception. Violence ranges from mental torture to physical and ultimately to death. Victims are man to man, man to women and women to men but the majority of cases, women are the most sufferers along with morbidity and mortalities. This retrospective analysis is targeted to dig out the actual scenario of the state.

Objective: To find out the socio-demographic profile of domestic violence death cases, different mode of killing, motives, patterns of injuries & cause of death etc.

Materials and Methods: A descriptive retrospective autopsy based study of deaths due to domestic violence is conducted in the Department of Forensic Medicine, Regional Institute of Medical Sciences, Imphal Manipur during the period from the year 2004 to 2013.

Results: In this study a total of 61 cases of domestic violence deaths out of 4313 cases of postmortem during the study period is analysed in various medico-legal aspects. The maximum deaths were among males and reported against the 2nd & 3rd decade's age group and land disputes and personal violence were the common reason for such fatalities.

Conclusion: The study has demonstrated that deaths out of domestic violence are of increasing trend in all format of society all over the state. Strict legislation and appropriate implementation existing law and order is need of the hour and further laws are to be adopted to curb this menace of the society is required.

Key words: *Domestic; violence; weapon; motive; intimate partner; victim; injury; death.*

Introduction

Domestic violence is also known as domestic abuse, spousal abuse, battering, family violence, dating abuse, and intimate partner violence (IPV). Domestic violence is an age old social evil which remained hidden from the eyes of the society for long. In India, it came out to be human rights issue in the late 1980s due to the alarming increase in

Corresponding author
Nani Gopal Das,
Medical Officer, Agartala Government Medical College & GBP Hospital, Agartala, Tripura

number of dowry deaths that have been experienced in judicial system. Violence against human beings is a serious problem concerning human rights violation. In the last two decades, violence against human beings has emerged as the most burning issue throughout the world. Violence against women can be physical, sexual, psychological, and threat of physical or sexual violence. But such violence has not solely limited to women only. It is a pattern of behavior which involves the abuse by one person against another in an intimate relationship such as marriage, cohabitation, dating or within the family. It has repeatedly been identified as a major cause of morbidity and mortality in developing countries. Not unusual for violence to remain undetected until a women dies and the reason being receiving more and more sufferings considering the typical Indian society where women are always at the receivers end and their financial dependency on the male counterpart . Death due to familial violence is observed even among blood relatives like father-son, between brothers and sister in connection monetary and property disputes. This present study has been taken up to find out the prevalence and magnitude of the deaths due to domestic violence itself leaving all other means of homicidal deaths prevailing in the state of Manipur.

Materials and Methods

A descriptive retrospective study in a tertiary health care centre (RIMS) at Imphal on the cases of medico-legal autopsy brought during the period of 10 years i.e. from the year 2004 to 2013. Detailed history of the cases was collected from the accompanying relatives by psychological autopsy, investigating Police Officers. Detailed postmortem examinations were performed and findings correlated with the history and the cases were analyzed accordingly. Cases where no proper history is available were excluded from the study.

Results

During our study period from January 2004 to December 2013, a total of 3000 medico-legal autopsies were conducted out of which 61 (2.03%) deaths comprised of deaths out of domestic violence. The proportion of deaths was highest in 21-30 years (32.78%) followed by 31-40 years (18.32%) and 41-50 years (16.39%) age groups. Of these cases, fatalities were almost same in both the genders i.e. males comprising of 31(50.81%) cases whereas females were 30(49.18%) cases. Most of the victims were married (75.40%) and rural preponderance was observed in majority of deaths (59.01%). In our observation most of them were from Meitei families (68.85%) followed by Muslims (18.03%) and Christianity followers (11.47%). As per modified Prasad's classification of socioeconomic status, major proportion of victims were from low class (52.45%) followed by low middle class (32.78%), middle class (13.11%) and upper class (1.63%). Intimate partner violence i.e. between husband and wife were observed almost half of the cases (44.26%) followed by between nephew, in laws & cousins (24.59%), and similar data found between brothers (14.75%) and father & son (14.75%). In this study we observed incidence of fatalities were more in joint type of families (54.09%) and remaining cases among nuclear families (45.90%). Blunt weapons (36.06%) were used more commonly followed by sharp variety of weapons (21.31%). We observed the most commonly injured

body part were the head (49.18%) followed by neck (18.03%), abdomen (11.47%), chest (9.83%) and others. Incidents occurred in most of the instances in victim's residence (45.90%) and in the hospital (32.78%). Previous history of violence was present in 62.30% cases. The common motives were land and property disputes (36.06%) and, sudden provocation (26.22%), alcoholism (18.03%), dowry related (11.47%) and harassment (8.1%). The cause of death was commonly due to shock and haemorrhage (31.14%), intracranial haemorrhage (24.59%), injury to the vital organs (21.31%), and burn shock (9.83%).

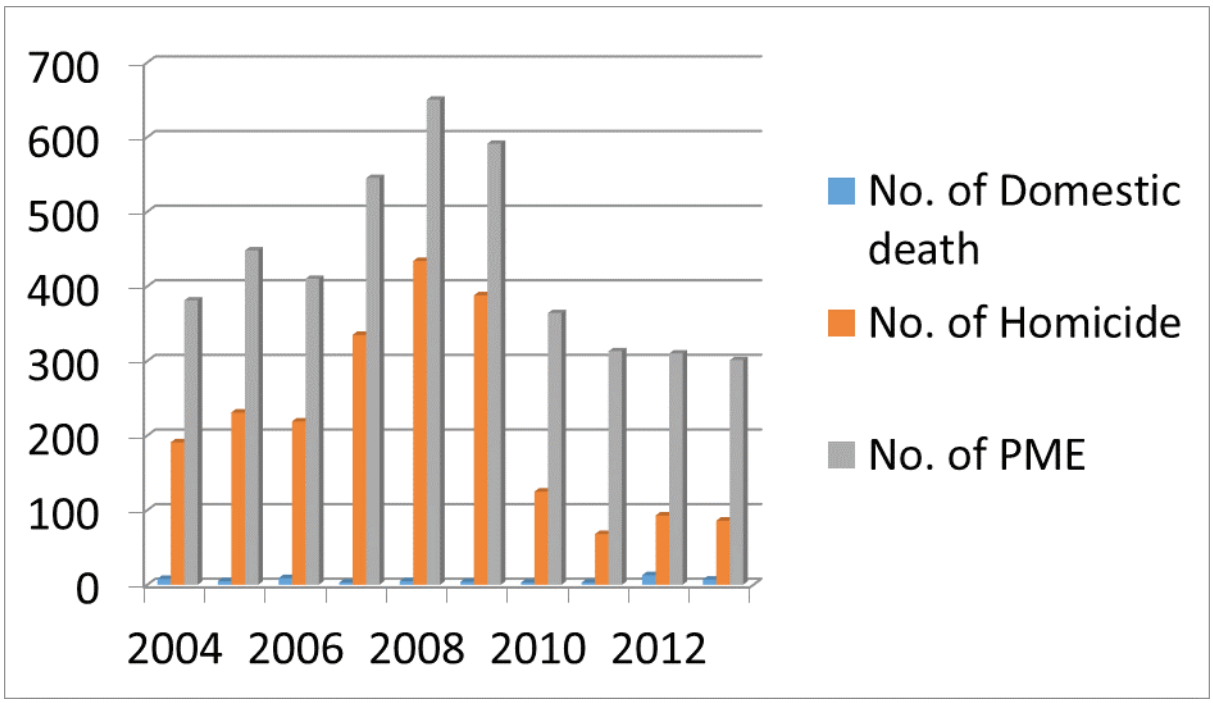

Figure No.01: Bar diagram showing year wise distribution of postmortem, homicide and domestic violence deaths.

Table no.01: Socioeconomic status

Socioeconomic status	Number of Cases	Percentage (%)
Low Class	32	52
Low Middle Class	20	32
Middle Class	8	13
Upper Class	1	3
	Total 61 cases	100%

Table no. 02: Relationship between Accused & Victims

Relationship Between Accused & Victims	No of cases	Percentage (%)
Husband and Wife	28	45.90
Brother and brother	16	26.22
Father and Son	12	19.67
Father and Daughter	2	3.2
Mother and Son	1	1.6
Others(Nephew, In-laws, Cousins,etc)	2	3.2
	Total 61 cases	100%

Table No. 03: Causes of death in Domestic Violence Deaths

Cause of death	No of cases	Percentage (%)
Shock and Haemorrhage	19	31.14
Intracranial Haemorrhage	15	24.59
Injury to the Vital Organs	13	21.31
Burn Shock	6	9.8
Others(Poisoning,etc)	8	13.11
	Total 61 cases	100%

Table No.04: Motives behind Domestic Violence

Motives	No of cases	Percentage (%)
Land & property disputes	22	36.06
Sudden provocation	16	26.22
Alcoholism	11	18.03
Dowry related	7	11.47
Harassment	5	8.1
	Total 61 cases	100%

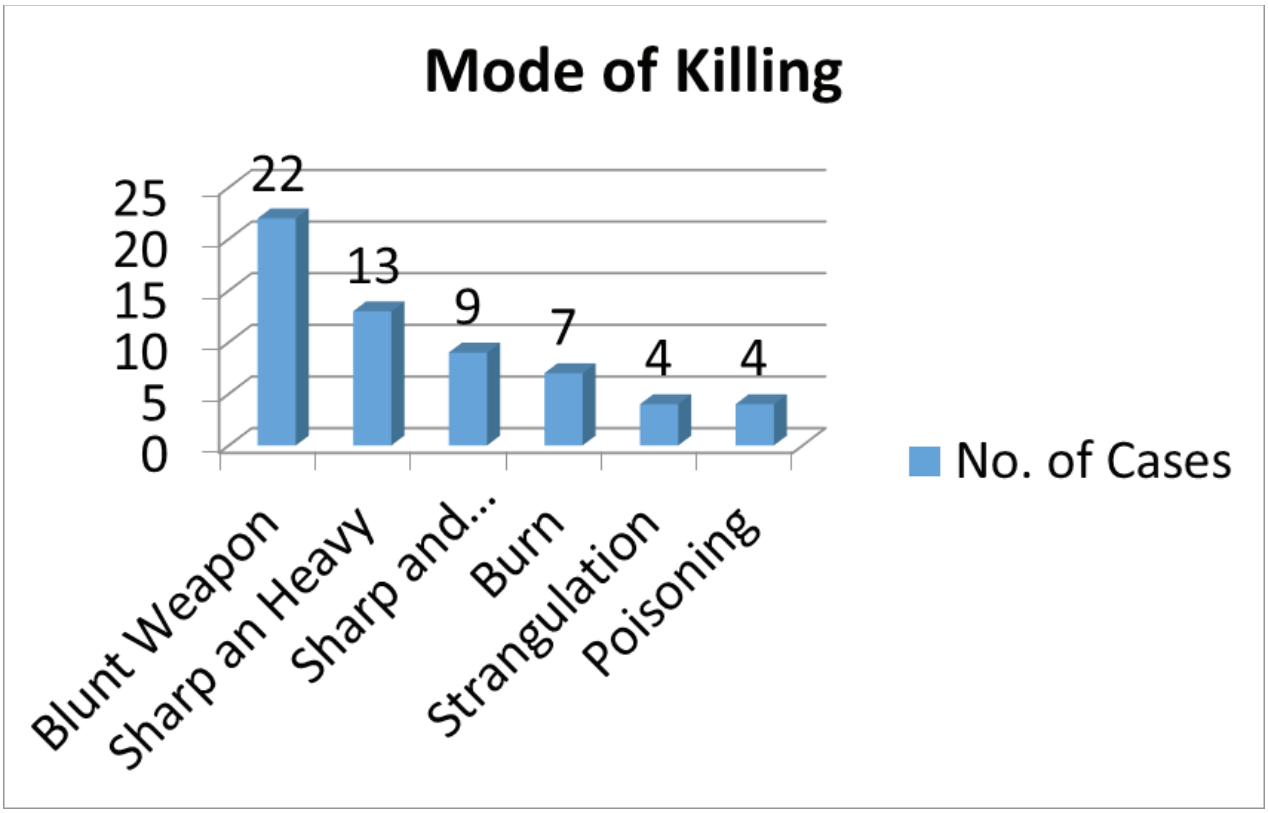

Figure No.02: Mode of killing

Discussion

In this present study we observed that in Manipur, murders often took place in families bound together by feelings of very close association & even son and mother. Violence against women has been on the increase in Nigeria and statistics says that 50% of women have been battered by their intimate partners i.e. husbands[1]. In our study, 50.82% of victims were women and trends are almost same as above mentioned study. Different socioeconomic conditions like spouse's lower education, poverty and economic hardship, household overcrowding, husband's substance abuse and women, who grew up witnessing violence in their own homes, are more likely to report experiencing domestic violence. In the present study, the highest incidence is seen in the age group of 21-30 years[2], alcoholism and drug abuses are closely related as reported by different authors[2, 3,4,5,6]. The common underlying motive of crimes in Manipur were land & property dispute (36%)and sudden provocation (26%) followed by alcoholism(18%) which might e due to development process and urbanization in this state as observed by Fimate L[7] . Rao SP et al[10] in their study in Andhra Pradesh state found that financially dependent members of the family were the common victims and similar observation was there in our study. In a study by Stephen LC et al[8] observed that young age, heavy drinking pattern, personality disorder marital conflict, economic stress are common factors favoring the occurrences of violence as seen in our present study. In the USA, female intimate partners are more likely to be murdered with a firearm than all other means

combined[9]. But in this present study, blunt weapon is the commonest means of committing crime as it will be easily available at the scene of crime.

Conclusion

The findings in this study highlights that there is increasing trends in incidence of mortality as a result of domestic violence in Manipur and females outnumbered the males. Intimate male partners are mostly the main accused in cases of female deaths and here comes the need of increase education amongst women making them more watchdogs by human right commissions. Strict implementation of legislation at government level relating to dowry related crimes would helpful to prevent incidence of domestic violence. Counseling strategies include validating the domestic violence victim's disclosure, educating her about the dynamics of abuse, assessing current danger , helping for formulate the safety plan, facilitating access to needed resources.

Ethical Clearance: Taken from Institutional ethics committee.

Source of Funding: NIL

Conflict of Interest: NIL

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Is Continuous Noninvasive Hemoglobin Monitoring Estimates Timing for Detection of Anemia During Operation better than Clinicians

Saif Othman Aziz[1], Ali Shawqi Saadoon[2]

[1]M.B.Ch.B./ Al-Immamein Al-Kadhimaein Hospital / Al-Karkh Health Directorate/ Ministry of Health and Environment, [2]Consultant in Anesthesia and Intensive Care / M.B.CH.B., F.I.C.M.S Anesthesia/ Baghdad teaching Hospital / Medical city Health Directorate/ Ministry of Health and Environment/ Bagdad / Iraq

Abstract Background

Blood loss is a common surgical complication, but patient complications and healthcare costs can be exacerbated by needless blood transfusions. Non-invasive and continuous monitoring of hemoglobin concentrations is possible with the Radical-7 Pulse CO- Oximeter. These determined values are identical to those obtained by blood sampling for hemoglobin concentrations, and the technique enables continuous monitoring over time of changes in Hemoglobin levels. **Aims of Study:** to investigate whether noninvasive, continuous, and real-time monitoring of Hemoglobin could estimate the timing for further Hemoglobin measurements more accurately than clinicians' discretion during surgery. **Patients and Methods:** 54 Patients eligible for the study were underwent different surgeries with planned invasive venous blood gas sampling for blood Hemoglobin for hemoglobin measurement while Radical-7 Pulse CO-Oximeter continuously reading Hemoglobin noninvasively during each surgery. Blood samples were obtained 5 min after induction of anesthesia (other samples was taken multiple time during operations according to time of operation). The Conventional venous blood gas measurements were compared with radical 7 co-oximeter obtained at the time of the blood sampling. **Results:** In our study There was no statistically significant differences ($p>0.05$) in mean hemoglobin level, whether measured by SpHb or by conventional laboratory. in addition, Bland–Altman plot was utilized and show no marked difference between invasive and noninvasive method. All these factors signify a good compatibility between the two methods. **Conclusions:** The radical 7 satisfactorily follows hemoglobin shifts and more reliably predicts the required timing for early Hemoglobin management decisions throughout surgery.

Keywords: *Anemia,Hemoglobin, Surgery, real-time monitoring, spectrophotometry, Pulse CO-oximetry*

Corresponding author:
Dr. Saif Othman Aziz
1M.B.Ch.B./ Al-Immamein Al-Kadhimaein Hospital / *Al-Karkh Health Directorate*/ Ministry of Health and Environment
drnihadkhalawe@gmail.com.

Introduction

Anemia is a global health problem, considering that around 25% of the population is affected, with varying degrees of severity [1-3]. The main factors

that cause anemia are iron deficiency, infectious diseases, or genetic factors. Red blood cells and hemoglobin (Hb) concentration levels decrease with anemia, and this leads to a reduction in the function of the blood to transport oxygen to the peripheral tissues. In severe cases, blood transfusion is necessary basing on the Hb measured also daily, normally in the laboratory using a blood sample. Unequivocal several symptoms appear when the compensatory processes activated by the human body are no more sufficient to guarantee the right quantitative of circulating oxygen.

The symptomatology varies according to the severity and type of anemia, but typical symptoms common to all types of anemia include pallor, asthenia, tachycardia, fainting, loss of appetite, nausea, exertional dyspnea**[4-6].**

Anemia can be detected with invasive and non-invasive techniques. Invasive techniques require blood samples; therefore, they can cause discomfort to patients, can be infection-prone, or require laboratory analysis. Non-invasive techniques are fundamental to patients who frequently take blood tests or suffer blood loss; these techniques generally exploit the pallor of some body parts to determine whether a patient is anemic or not [7–9]. Patients who need recurrent blood sampling can benefit greatly from these techniques and then these approaches are of some importance [10,11].

A great effort has been done in recent years to improve non-invasive tool accuracy. Non- invasive devices can be made portable, cheap, and easy-to-use and offer great advantages in rapid pre-diagnosis and self-monitoring, As is already the case in other medical disciplines that can benefit from the extensive use, as an example, of the image analysis, sound or signal analysis and artificial intelligence techniques [12,13]. In the current clinical pathway for anemia detection during intraoperative blood loss, an invasive Hb measurement is performed at the clinicians' discretion.

Requiring clinicians to determine anemia is energy-consuming and often inaccurate. Attention must be paid not only to the patient's vital signs, blood volume in the surgical field, cotton pads, and cell savers but also ongoing hemostasis procedures. The discretion of the clinician is totally subjective and is largely dependent on their clinical experience [14]. Moreover, Hb measurements are often omitted during intraoperative blood loss. Traditional Hb measurements such as the auto analysis of blood cells and CO-oximetry analysis require blood samples, the collection of which is invasive, time-consuming and intermittent.

Considering the absence of anesthesia nurses in most hospitals in China, anesthesiologists must send the blood sample in person, which often results in delays or is omitted in favor of completing more important work. Consequently, transfusion is often performed without any objective indications, which may result in unnecessary blood transfusions in patients lacking the necessary indications or delayed blood transfusions in bleeding patients [15].

In particularly in the emergency room, perioperative and critical care settings, rapid and on-going assessment of total hemoglobin is crucial, to quantify blood loss and/or the need for transfusion [16].

In addition to the above, trauma related hemorrhagic anaemia is rarely diagnosed by physical examination alone but typically includes measurement of blood haemoglobin, one of the most frequently ordered laboratory tests [17, 18]. The need for resuscitation to achieve adequate tissue perfusion is established by the patient's history, on-going bleeding, and clinical signs of hypovolemia. Hemoglobin and hematocrit measurements, the conventional means to confirm hypovolemia, are not always immediately available at the point-of-care and hemodynamic monitoring may not detect relevant blood loss. If treatment is delayed pending laboratory results or diagnostic studies, patient outcome can be affected [19–21]. For example, the rapid determination of blood haemoglobin levels is essential, for the triage of patients in emergency departments [22], and tracking of changes in haemoglobin, to detect occult bleeding, has the potential to be lifesaving during critical care.Therefore, in the hospital setting, there is growing interest in rapid and continuous techniques for measuring haemoglobin and changes in haemoglobin.

Recently, noninvasive technologies have been developed that allow haemoglobin to be measured immediately without the need for intravenous access or having to take venous, arterial, or capillary blood. Moreover, with these technologies' haemoglobin can be continuously measured in patients with active bleeding, to guide the start and stop of blood transfusions and to detect occult bleeding.

Among other benefits, the reduction of the costs borne by the national health systems and powering the medical and healthcare services can also be considered important.

Noninvasive rainbow SET technology

Advanced rainbow SET sensors utilize multiple wavelengths of light to measure total hemoglobin (SpHb), Pleth Variability Index (PVi), oxygen content (SpOC). carboxyhemoglobin (SpCO) and methemoglobin (SpMet) noninvasively and continuously.

Pulse CO-Oximetry (Radical 7, Masimo, Irvine, CA, USA) is a multi wavelength spectrophotometric technique providing continuous, noninvasive monitoring of total Hb (SpHb). The method is based on measurement of the differential optical density of seven different wavelengths of light passing through the finger and has received Food and Drug Administration 510(k) clearance.

SpHb may be able to inform physicians of decreases in hemoglobin concentrations in a timely and accurate manner, preventing unnecessary diagnostic blood draws and offering detailed clinical evidence for transfusion decisions during surgery [23].

The aim of this study:

To investigate continuous noninvasive hemoglobin monitoring estimates timing for detection of anemia during operation better than clinicians.

Patients and Methods

A prospective cross-sectional study, conducted at Baghdad Teaching Hospital/ Medical City and kadhimiya teaching hospital from 15 of October 2019 to the first of October 2020.

54 patients were included in the study. From each patient written informed consent was obtained.

The purpose and procedures were explained to all participants, and they were given the right to participate or not, verbal and written consent was taken with reassurance that interpret gained will be kept confidentially.

Participants

patients underwent operation such as laparotomy, vascular surgery, gynecological surgery, surgeries were more likely to be associated with a sufficiently large blood loss volume to trigger anemia.

The inclusion criteria

1. ASA l _ ll.
2. patients aged from 16 to 80 years who were scheduled for such surgeries mentioned above.
3. for whom the estimated blood loss was more than 250 ml of their total blood volume.

The exclusion criteria

1. Peripheral vascular disease.
2. An inability to use their upper extremities for SpHb monitoring.
3. preoperative anemia (Hb < 10 g/dl).
4. coagulation disorders (INR > 1.5 times the normal value).

Interventions:

In the SpHb monitoring, an adhesive sensor (R2-25a), connected to the Radical-7® Pulse CO-Oximeter (software version V7740, Masimo Corp., Irvine, CA), was placed on the proximal third of the nail bed of the second, third, or fourth finger of the hand on the side opposite to the cuff of NIBP monitoring before the induction of general anesthesia. If the perfusion index which is an indicator of localized perfusion was <1%, then the sensor position was recalibrated by switching the monitor off and on. After the SpHb was stable for at least 5 min after anesthesia induction, the baseline SpHb was registered. A blood sample was drawn via VBG to achieve a time matched invasive Hb concentration. As an alarm threshold, a SpHb level of 1 g/dl lower than the baseline was set. After 2hr from the end of operations hemoglobin also monitored noninvasively (radical-7) and routinely laboratory test.

Statistical Analysis

The collected data was handled and analyzed by IBM© SPSS© (Statistical Package for the Social Sciences) Statistics Version 23. Independent samples T- test and was used for numerical and normally distributed data. Pearson correlation was done comparing between the two methods of hemoglobin measurement and Bland–Altman plot-was used to investigate the agreement between the methods. All analyses were done with 95% confidence intervals (CI). P-values less than 0.05 were considered statistically significant throughout this study.

Results

The mean age of the study sample was 47.13± 17.2 years, with 23(42.6%) males and 31(57.4%) females.

Table (1): Basic characteristics of the study sample

Variables	Mean	SD
Age	47.13	17.2
Gender	**Number**	**%**
Male	23	42.6
Female	31	57.4
Surgery field		%
Obstetrics and gynecology	17	31.5
Orthopedics	16	29.6
Abdominal	15	27.8
ENT	5	9.3
Urology	1	1.9
Total	54	100.0

There were no statistically significant differences in mean hemoglobin level, whether measured by Sphb or by conventional laboratory, at baseline the Sphb results were lower by only -0.10 g/dl, other readings showed slightly higher values of Sphb, and maximum mean difference recorded postoperatively by 0.12 g/dl.

Table (2): Distribution of hemoglobin levels according to method of measurement

Variables	Sphb	Lab	Difference	P-value
	Mean± SD	Mean± SD	Mean	
Baseline	11.75±1.2	11.85±1.1	-0.10	.659
15 min	11.55±1.2	11.54±1.3	0.01	.975
30 min	11.46±1.3	11.39±1.2	0.08	.746
Postoperative	11.91±1.1	11.79±1	0.12	.572
Total	11.67±1.2	11.64±1.1	0.03	.817

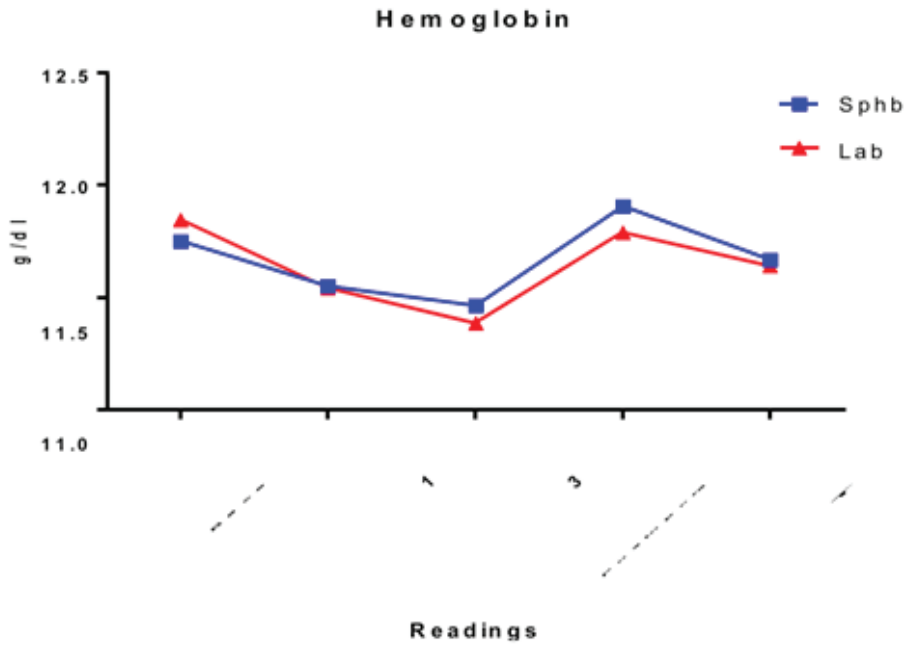

Figure (1): Line graph illustrating the hemoglobin level follow-up and differences between Sphb and Lab

There were statistically significant correlations between the two methods at each investigation interval, lowest postoperatively (r= 0.690), and highest at 15 minutes (r= 0.848). Total correlation was 0.784 with a p-value <.001. As shown in Table (2) and figure (2).

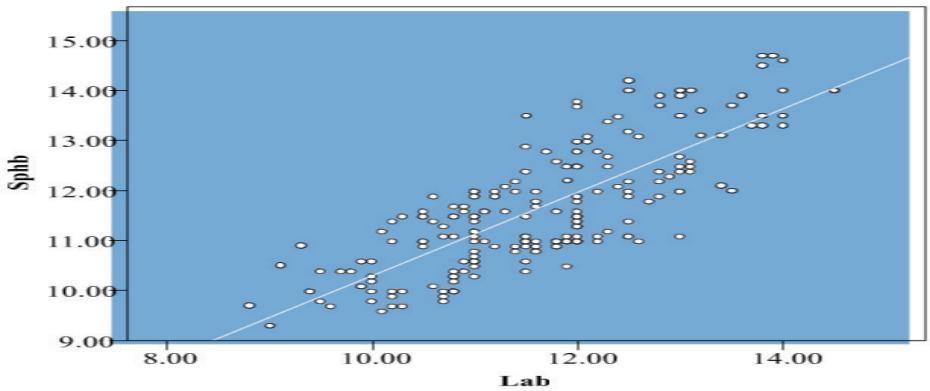

Figure (2): Scatter plot illustrating positive correlation between total Sphb and laboratory values.

To further compare between the two measurements, Bland–Altman plot was utilized, and figure (3) illustrates that the bias was only -0.03 g/dl, there are no points outside the ±1.96 standard deviation, and in addition the distribution of points was almost equal both above and below the mean bias. A very strong agreement between the two measures favors both variables.

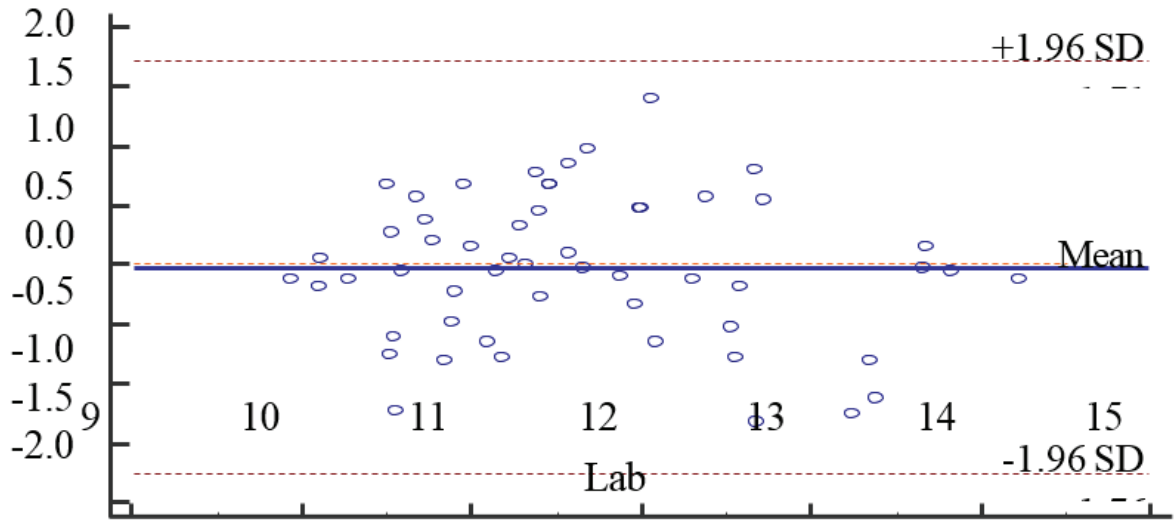

Figure (3): Bland–Altman plot of the relation between the hemoglobin levels measured by Sphb and by laboratory.

Discussion

This study was performed to evaluate efficacy of noninvasive hemoglobin monitoring in decision of initiation and cessation of blood transfusion in real time in patient undergoing surgeries. Continuous noninvasive Hb monitoring can obtain real-time change of Hb. The accuracy of noninvasive Hb monitoring has been reported in several surgeries presenting significant intraoperative bleeding [24-25], the accuracy of noninvasive Hb monitoring has been documented. Therefore, frequent laboratory

evaluation is required to detect the decrease of Hb level during an operation, which is not only time-consuming but also may lead to a delay discission about Hb management. In the results, there was no statistically significant differences in mean hemoglobin level, whether measured by Sphb or by conventional laboratory, at baseline the Sphb results were lower by only -0.10 g/dl, other readings showed slightly higher values of Sphb, and maximum mean difference recorded postoperatively by 0.12 g/dl.

Our result supported by Macknet et al. [26] (compared noninvasive CO- oximeter recording {Masimo Inc. Irvine CA} with invasive Hb testing) It is compatible with our result by good correlation between the Hb values obtained during times of rapidly changing Hb concentrations related to surgical blood loss and transfusion.

In his study (Pulse CO-Oximetry based SpHb measurement is accurate within

1.1 g/dL {1 SD} compared to laboratory CO-Oximeter tHb measurement in subjects undergoing hemodilution), Mark R Macknet et al. [27] concluded that this study, on the other hand, applied Hb >= 12 g/dL to healthy subjects.

Causey et al. in His study agree with our result [28] and concluded that noninvasive Hb monitoring is a new technology that correlated with laboratory values in intensive care unit (ICU) patients and in general surgery patients undergoing elective surgeries.

ALSO, our result supported by Berkow et al. study [29] concluded that Continuous non-invasive Hb measurement through pulse CO-oximetry showed clinically appropriate accuracy of Hb measurement within 1.5 g/dL when used during complex spine surgery compared to a standard laboratory reference instrument.

Butwick A Evaluating the use of the Masimo Rainbow SET Radical-7 Pulse CO-Oximeter in pregnant patients undergoing elective cesarean section (CS), Hb levels appeared to be 1.22 g/dL higher than pre-CS laboratory Hb levels and 0.89 g/dL higher after 24 h post-CS. From these findings they concluded that modifications are needed in the calibration of the device to improve accuracy and precision in obstetric patients [30].

Our findings did not agree with the Miller RD study (A review of three hemoglobin monitoring methods in patients undergoing spine surgery) in its study concluded that SpHb in certain patients is not as reliable as clinically required, and they showed that SpHb underestimates true Hb and should not be used to assess the need for blood transfusion[31].

Gayat et al. [32] incompatible with our result, he concluded that (the pulse CO-oximeter underestimated the Hb level and found that it was ‘‘too unreliable’’ to guide transfusion decisions), because he noticed in his result 13% error in terms of transfusion decision.

Conclusion

- SpHb could detect a decrease in Hb in dynamic situations and indicate the appropriate timing for further Hb measurements.
- This technology may provide more timely information on hemoglobin status than intermittent blood sample analysis and thus has the potential to improve blood management during surgery,

allowing earlier cessation of RBC transfusion as well as earlier consideration of initiation of RBC transfusion.

Conflict of Interest: None

Source of Findings: None

Ethical Clearance: None

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Association between ABO Blood Group and Epistaxis among Syrian Population

Ehab Moeen Mobarek[1], Mohammed Baraa Okdeh[2]

[1]Otolaryngologist Consultant, ENT department, Primary Health Care Corporation (PHCC), Qatar,
[2]Otolaryngologist Consultant, Department, Dr Mohammad Alfagih Hospital, Riyadh, KSA

Abstract

Background: Epistaxis is one of the most common otorhinolaryngologic emergencies in ear, nose, and throat clinics. Blood grouping is routinely done in patients with epistaxis.

Objectives: To determine the association between ABO blood type and epistaxis.

Methods: This retrospective study involved 260 patients with idiopathic epistaxis. Patients with risk factors for bleeding, including anticoagulant use, thrombocytopenia, hypertension, liver diseases, elevated bleeding time, low coagulation factor levels, or any benign/malignant tumor, were excluded from the study. Thus, only patients with idiopathic epistaxis were included in this study.

Results: The distributions of blood groups in patients with idiopathic epistaxis were

(*AB* < B<A<O), with highly trending with male gender. Also, more frequent in age category 6 – 12 y, 13 – 20 y, 1 – 5 y, 46 – 70 y, 21 – 45 y respectively, with no pervious history of nasal trauma (71.92%). Most of patients were no correlation with nasal disorders or deformity (73.84 %), also vast majority of them need no intervention for epistaxis i.e., conservative treatment (81.15 %).

Conclusions: Our study indicates that in the Syrian population, the O blood type is over-represented in patients with idiopathic epistaxis versus the general population. We conclude that blood type O is a risk factor for idiopathic epistaxis in the Syrian population.

Key words: *Epistaxis, blood group, von Willebrand factor, otorhinolaryngology emergencies, Syria*

Introduction

Epistaxis is a frequent presentation in ear, nose, and throat clinics. Approximately 60% of adults experience at least one episode of epistaxis in their lifetimes [1.2.3] In rare cases, this condition may cause massive bleeding and even death. Although epistaxis can originate in the anterior or posterior nasal cavity[4], it usually originates in the anterior nasal cavity. History taking, physical examination,

Corresponding author:
Dr Ehab M Mobarek-
ENT department, Primary Health Care Corporation (PHCC), Qatar
Email: emobarek@phcc.gov.qa

and laboratory tests are generally sufficient to determine the cause of bleeding. Although local and systemic processes can play a role in epistaxis, the condition can also be idiopathic.

ABO blood typing is an easily available laboratory test that is particularly important for blood transfusion and organ transplantation. ABO antigens are expressed not only on red blood-cell membranes, where they determine transfusion compatibility, but also on the surfaces of other human cells, including epithelial cells, platelets, and vascular endothelial cells, motivating

investigations of the involvement of ABO types in cardiovascular disease and postoperative outcomes [5]. Type-O blood is associated with diminished circulating levels of factor VIII (FVIII) and von Willebrand factor (vWF), which are constituents of the intrinsic clotting pathway [6.7.8] (Figure 1). Decreased levels of these factors are associated with a relatively high risk of bleeding.

Numerous studies have investigated the relationship between ABO blood types and hemorrhage and have established that some patients with certain blood groups are at risk for bleeding from various body sites [9.10]. Therefore, in the present study, we aimed to determine whether there was an association between blood type and the incidence of idiopathic epistaxis in the Syrian population.

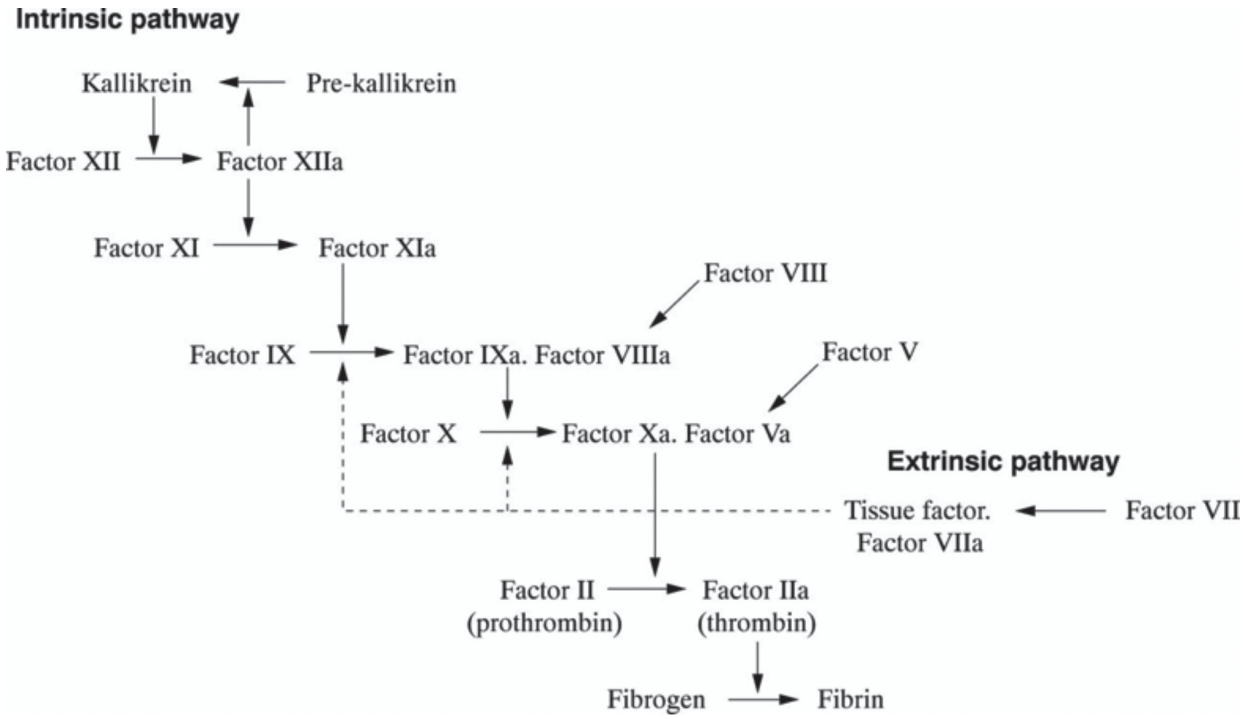

Figure 1: Components of the coagulation pathway

Materials and Methods

This retrospective study involved 260 patients who were admitted to the Ear, Nose, and Throat departments of Jiser al shogour National Hospital, Edlib Governorate, Syria, with complaints of epistaxis between January 2013 and January

2015. Patients with risk factors for bleeding, including anticoagulant use, thrombo- cytopenia, hypertension, elevated bleeding time, low coagulation factor levels, or any benign/ malignant tumor, were excluded from the study. In this way, we only included patients with idiopathic epistaxis in order to eliminate the effects of known risk factors for epistaxis. Informed consent was taken for the study and local ethical committee had no objection to do this study. Statistical analysis was done by simple manual analysis and chi square test. In this study we divided patients according of sex and categorized under 5 categories. Also, we study the relation between the epistaxis and common nasal disorder and past history of nasal trauma and main routs of treatment.

Results

The distribution of blood types:

Distribution of the sample by blood group shows a relatively normal pattern dominated by type O and type A blood group. These two types comprised the vast majority of the sample. In this respect this could be interpreted to indicate the research sample of the Syrian population under consideration. Research indicates that while type O blood group is associated with lower risks at heart diseases it does have characteristics associated with higher risk of bleeding

(Table 1).: O <A<B and AB

Blood Group	A	B	AB	O
No of Pt	89	41	27	103
Percentage	34.23 %	15.7 %	10.38 %	39.61 %

Gender Distribution:

Males represented by 77.69% of the idiopathic epistaxis sample whereas females represented by 22.30%. when the Syrian population is analyzed by age, males outnumber females in the 1-20years old age group. The average age research sample (as discussed below) is leaning towards younger participants in the same age group.

(Tab-2)

Gender	Male	Female
Number (260)	202	58
Percentage	77.69 %	22.30 %

Age Distribution was as below:

The greatest representation in the sample is in the 6-12 years old age group. However, a full 76.91 of the sample is in the 0-20 years old group. As mentioned previously the age group of Syrian patients that the study is based on contains more males than females. The high representation of young patients in the sample may indicate reduced likelihood of Idiopathic epistaxis episodes with age. It does not indicate causation for this trend.

(Tab-3)

Age	1 – 5 y	6 – 12 y	13 – 20 y	21 – 45 y	46 – 70 y
No of Pts	52	80	68	17	43
Percentage	20 %	30.76 %	26.15 %	6.53 %	16.53 %

Distribution of most associated nasal disorders:

Almost 74% of the sample reported on history of nasal disorders while the remain 26.14% reported one of three different nasal disorders. That is Deviated Nasal Septum, Sinusitis and Allergic Rhinitis.

(Tab-4)

Associated nasal disorder	Deviated Nasal Septum	Sinusitis	Allergic Rhinitis	Non
No of Pt	36	24	8	192
Percentage %	13.84 %	9.23 %	3.07 %	73.84 %

Distribution according of past history of nasal trauma:

Almost 72% of the sample reported no previous nasal trauma indicating previous injury is not a contributing factor of the epistaxis episodes.

The high percentage of the sample with no evidence of nasal disorder and without pervious trauma of external causation may indicate a possible internal predisposition of these bleeding episodes.

(Tab-5)

History of nasal Trauma	-ve	+ve
No of Pts	187	73
Percentage %	71.92%	28.07%

Distribution according to main rout of therapy:

Over 81% of the sample reported that their bleeding episodes required minimal medical intervention or treatment. The remaining patients reported more drastic treatment was required such as nasal packing and cautery

(Tab-6)

Type of Therapy	Conservative	Ant Nasal Packing	Nasal Cautery
No of Pt	211	13	36
Percentage %	81.15 %	5 %	13.84 %

Discussion

The ABO gene encodes several glycosyltransferases that attach sugar residues to the H (O) antigen to form the A and B antigens. These antigens exist on Blood type of epistaxis the surface of vWF, a transporter protein for FVIII [11.12]. High levels of vWF and FVIII are known to increase the risk of thrombosis [12]. Wiggins *et al* [13]. hypothesized that compared with the O allele, the A1 and B alleles are associated with an increased risk of arterial and venous thrombosis. The authors also reported a relationship between ABO alleles and hemorrhagic stroke [13].

Moeller *et al* [14]. compared vWF and FVIII levels in individuals with different ABO phenotypes and found that vWF levels increased in the order O < A < B < AB and FVIII levels increased in the order O < A < AB < B. The O blood type is associated with both increased bleeding and activated partial thromboplastin time, which indicate the involvement of the entire coagulation pathway and the extrinsic coagulation pathway, respectively [15]. These associations are the result of a decrease in the circulating levels of FVIII and vWF, which are constituents of the intrinsic coagulation pathway. Variability in the circulating levels of these factors is directly linked to the ABO genotype. Compared with A/A homozygotes, O/O homozygotes exhibit 34% lower vWF levels and 20% lower FVIII levels. In addition, compared with A/O and B/O heterozygotes, O/O homozygotes harbor 4% and 13% lower vWF levels, respectively, and 1% and 5% lower FVIII levels, respectively [6].

Numerous studies have investigated the relationship between ABO blood type and bleeding at various body sites. Leonard et al. [9] investigated the relationship between ABO blood type and secondary post-tonsillectomy hemorrhage; they found that type-O blood may be over-represented in patients presenting with secondary bleeds. Therefore, they suggested that patients with type-O blood were more likely to suffer from secondary bleeds after tonsillectomy. [9] Bayan et al.[10] researched the relationship between ABO

blood type and upper gastrointestinal bleeding and reported that the O blood type plays a significant role in upper gastrointestinal bleeding. However, Halonen et al.[16] investigated the relationship of blood type and certain coagulation parameters with bleeding tendencies in 354 patients undergoing abdominal and urological surgery and found that the O blood type did not significantly impact intraoperative bleeding tendency.

Although Reddy *et al.* [17] reported that the O blood type is a risk factor for epistaxis in Caucasian patients, no exclusion criteria were reported in their study. To conclusively determine that a parameter is a risk factor, other risk factors must be excluded. In the present study, we excluded other risk factors for epistaxis and included only patients with idiopathic epistaxis. Furthermore, the distribution of blood types differs between races. The most common blood type in Caucasians is O, whereas in the Syrian population, the most common blood type is A[18]. To the best of our knowledge, the current study is the first to evaluate the relationship between blood type and epistaxis in the Syrian population. Our finding that the O blood type is a risk factor for epistaxis is consistent with the findings of Reddy *et al.*, [17] which was conducted in Caucasian patients.

Also, According to MILLER et al study, Blood group O is associated with a lower expression of von Willebrand compared with non O blood groups. Individuals with blood group O are more likely to be diagnosed as having a mild form of von Willebrand disease [8]. This recent study also showed that blood group O is predominantly significant in patients with epistaxis compared with non O blood group.

Conclusion

In summary, the O blood type has been associated with decreased circulating levels of FVIII and vWF, which have been reported to disrupt the functioning of the intrinsic coagulation pathway and increase the risk of bleeding. Our study is the first to evaluate the relationship between blood type and idiopathic epistaxis in the Syrian population. Our findings demonstrate that compared to the general population, the O blood type is over-represented in Syrian patients with idiopathic epistaxis. Further studies including different races are required to confirm this relationship and to determine the association(s) between severe and persistent epistaxis and ABO blood type. Also, we found its more common in male gender and in age category 6 – 12 years with no correlation with most nasal diseases or past history of nasal trauma and most way of treatment was conservative therapy

Ethical Clearance -Taken from Research Department in (territory of health in Edlib Governate)- branch of M.P.H

Source of Funding: Self.

Conflicts of Interest: Nil.

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Post Covid-19 Syndrome: A Cross Sectional Study in Baghdad

Hajar Namir Hassan[1], Kawther Samer N Altabatbaee[1]

[1]Resident Physician, Alkarkh General Hospital, Baghdad, Iraq

Abstract

Many patients are being released from hospitals without follow up and thorough assessment of their recovery.Iraq is one of the countries that were hit hard by this novel disease, but till now there is little literature on the sequelae of this illness after recovery. The aim of our study is to assess the prevalence of post covid 19 syndrome and the characteristics of post covid 19 symptoms. A cross sectional study using interview based questionnaires of 165 recovered covid 19 subjects (mean age 37±14)and 67% of them were female. The prevalence of post covid 19 in the study sample was (66.7%), out of them (52.7%) reported acute post covid 19 symptoms, (18.2%) reported long post covid symptoms, and (29.1%) reported persistent post covid 19 symptoms. The most frequently reported symptom was fatigue (29%) followed by hair loss (23%) and anosmia/ parosmia (21.2%). All of the patients who were in critical condition during the illness developed post covid 19 syndrome. So a prolonged follow up of the recovered patients seems necessary, regardless of their initial clinical presentation.

Keywords: *Iraq, post covid-19, Long covid, duration, fatigue, critical, risk factor.*

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the organism responsible for coronavirus disease 2019 (COVID-19) rapidly evolved into a global pandemic[1]. It is regarded as a contagious disease of the respiratory system[2]. With a population approximately 200 million and 177 million recoveries, Iraq ranks twenty third among the most affected countries globally and third in the Middle East with a total cases of 1,564,828 individuals and the death count was 18,347 people[3]. The symptoms of COVID-19 range from cough, dyspnea, fever, fatigue and myalgia in mild cases to severe acute respiratory syndrome and respiratory failure in patients that are critically ill and require hospitalization and even intensive care unit admission[4]. Although the symptoms are mainly respiratory, they are also accompanied by olfactory, gustatory, cutaneous, cardiovascular, renal, gastrointestinal, and hematological manifestations[5]. Although the focus is mainly on the acute management of Covid-19 there is more efforts directed towards the post-Covid-19 symptoms. The increase in the number of people recovering from COVID-19 and the emergence of its sub-acute and long term effects makes it necessary to delve deeper into the subject. Previous coronavirus infection survivors, including the SARS epidemic of 2003 and the Middle East respiratory syndrome (MERS) outbreak of 2012, have displayed persistent post discharge symptoms similar to long term effects of COVID-19[6-9]. Based on recent

literature, the following integrative classification is proposed:"potentially infection related symptoms (up to 4-5 weeks),acute post covid symptoms (5-12 week), long post covid symptoms(12-24 week), and persistent post covid symptoms (more than 24 weeks)"[10].The aim of this study is to assess the frequency and the characteristics of post-COVID-19 manifestations.

Materials and Method

Study Design:

A cross sectional observational study was performed in Baghdad, Iraq. The study involved 165 recovered covid 19 subjects for evaluation of the prevalence of post covid 19 by interview based questionnaire. The questionnaire consisted of socio-demographic data including age, gender, smoking status, the presence of comorbidity and the severity of covid 19 disease and whether they needed hospital or ICU admission. The questionnaire also inquired about post covid 19 manifestation including persistent cough, chest pain, dyspnea, palpitation, myalgia, fatigue, arthralgia, hair loss, anorexia, anosmia, mood swing, insomnia.

Data Collection:

The resident physician collected the relevant data in outpatient clinics in Baghdad from 22 of May to the first of September 2021 by face to face interview of 205 individuals recovered from covid 19 for at least one month and after excluding the subjects who didn't meet the inclusion criteria the total population was 165 individuals.

Inclusion and exclusion criteria:

The study included recovered covid 19 patients with initial real time positive PCR assay followed by two consecutive negative RT-PCR assays, they were above 18 years old from both sexes excluding any patient who did not meet the criteria above.

Statistical Analysis

Descriptive statistical analysis was performed using a statistical package for social science (SPSS-24). Descriptive statistics, such as frequencies, percentage for the presentation of categorical data, and mean, standard deviation (SD), were employed for continuous variables.

Results

The study involved 165 participants, the mean age was 37.67 (SD 14.75) and the range was 18-80 years, and there were 54 male (32.7%)and 111 females (67.3%). Smoker participants were 25 (15.2%) and nonsmoker were 140 (84.8%) the participants that had comorbidities were (22.4 %).

Table 1 the socio demographic data among the study sample N=165

Socio-demographic data	N %
Age/years	
Mean ± SD	37.67±14.75

Cont... **Table 1 the socio demographic data among the study sample N=165**

≤ 30 y	75(45.5%)
31-40 y	26(15.8%)
41-50 y	27(16.4%)
50 y	*37(22.4%)*
Gender	
Male	54(32.7%)
Female	111(67.3%)
Presence of comorbidities	
Yes	37(22.4%)
No	128(77.6%)
Smoking status	
Smoker	25(15.2%)
Non smoker	140(84.8%)
Severity of the disease	
Mild/Moderate	146(88.5%)
Sever	14(8.4%)
Critical	5(3.03%)

At the time of the collection of the data, the mean time since recovery from the illness was 31 ± 18 weeks.

The clinical spectrum of SARS-CoV-2 infection was classified into mild/moderate, severe, and critical[11]. Participants with mild/moderate illness were 146 and those with severe illness were 19 out of them only 5 were in critical condition.

Of the 165 participants only 17 required hospital admission and from those 17 only 5 needed ICU admission. Among the 165 participants, 110(66.7%) reported post covid 19 symptoms.

In regard to the age group, less than 30 years showed the highest rate of infection with covid 19 (45%) , while the development of post covid19 syndrome was more in the age group 31-40 years (73%).

Out of the total study sample (52.7%) reported acute post covid 19 symptoms, (18.2%) reported long post covid symptoms, and (29.1%) reported persistent post covid 19 symptoms[10]. Figure 1

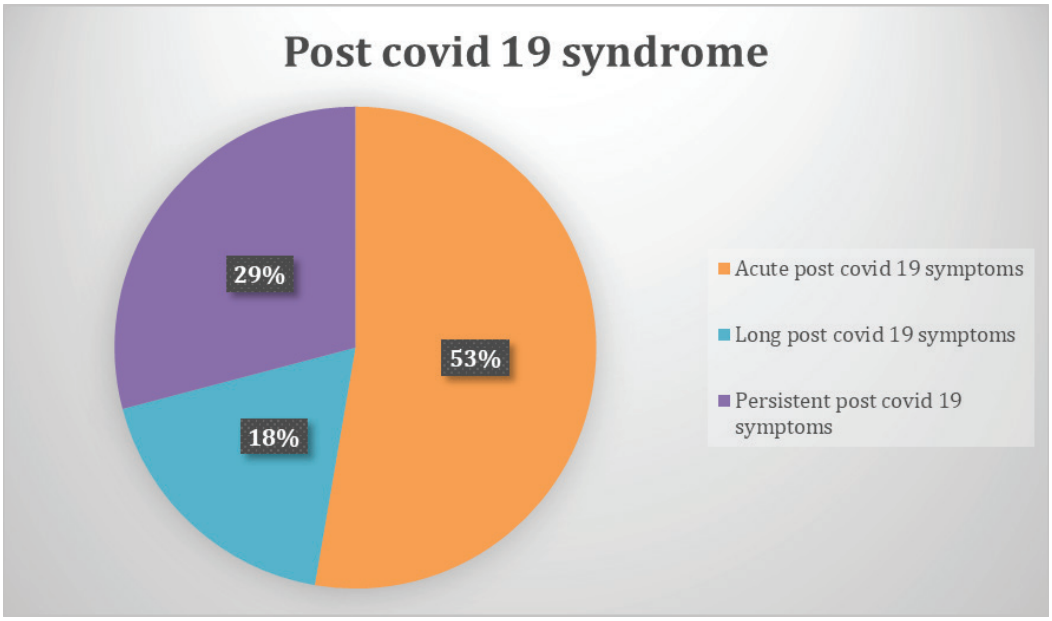

Figure 1: classification of post covid 19 symptoms: acute post covid symptoms (5-12 week), long post covid symptoms (12-24 week), and persistent post covid symptoms (more than 24 weeks)

The prevalence of post covid 19 symptoms in the patients who were in critical condition was (100%) while those who had severe illness the prevalence of post covid 19 symptoms was (64.2%) and the prevalenceof post covid 19 symptoms in those who were in mild/moderate condition is (65.7%).

The most frequently reported symptom is fatigue (29.1%), hair loss (23.0%), anosmia/ parosmia (21.2%), arthralgia (20.0%), insomnia (16.4%), dyspnea (15.8%), mood swing (15.8%), chest pain (15.2%), palpitation (13.9%), cough (12.7%), anorexia (8.5%), diarrhea(1.8%), and oblivion (1.8%).Figure 2

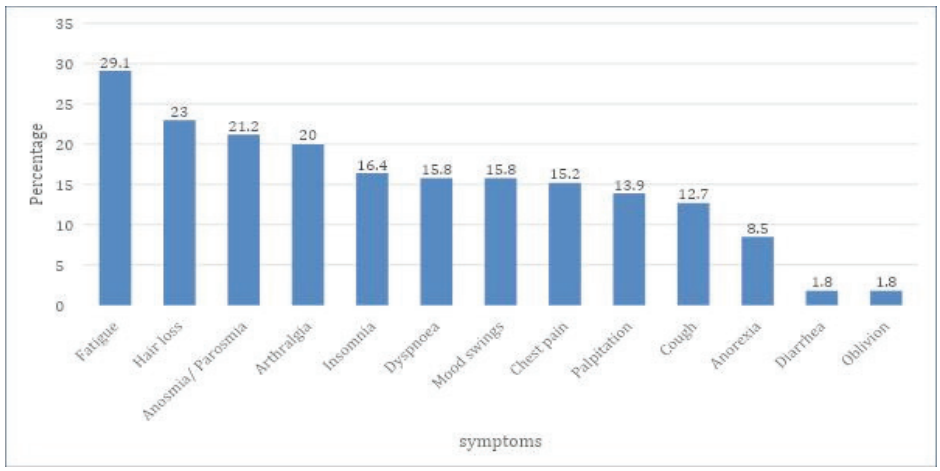

Figure 2: The percentage of post covid 19 symptoms in the study sample

Discussion

In the light of the covid 19 pandemic and its great impact on Iraq and since there is limited data on this novel disease especially in our country the aim of our current study is to describe the prevalence of post covid-19 symptoms and its characteristics.

In the review of previous studies, a meta-analysis shows that post covid 19 symptoms are present in more than 60% of patients[10],another study in Bangladesh found that 70% of people infected with covid 19 developed post covid symptom[12], this is consistent with our study that also found that 66.7% developed post covid 19 symptoms.

To assume that COVID-19 ends with the resolution of its symptoms and the avoidance of mortality currently cannot be accepted as the evidence shows that covid 19 affects multiple systems in the body mainly the respiratory system By analogy with post-sepsis syndrome and post-ICU syndrome COVID-19 infection may result in long-term effects named as post COVID syndrome.

The current study found that the most reported post covid symptom was fatigue in accordance with follow up studies in the United Kingdom, Italy andBangladesh which also revealed that fatigue is the most frequent symptom among individuals with post covid[9, 12, and 13]. Correspondingly after SARS some patients developed chronic fatigue syndrome/ myalgic encephalomyelitis (CFS/ME) [8].

As shown in Figure 3, our study indicated that the prevalence of post covid 19 is more in women, in line with our study another study in Switzerland found that women more often reported at least one persistent symptom [14]. And the prevalence of post covid symptoms is more in non-smoker in comparison to smokers, we didn't find a significant difference in the prevalence of post covid 19 in those who had comorbidities and those who didn't, this is consistent with a cohort study in France[15].

Although it's not clear why some people develop persistent post covid 19 symptoms and others don't, severe covid 19 illness that require intensive care admission was found to lead to persistent post recovery symptoms[16, 17]. This is termed as post intensive care syndrome[18], in our study those who were in critical condition and required management in intensive care unit, all of them developed post covid 19 syndrome.

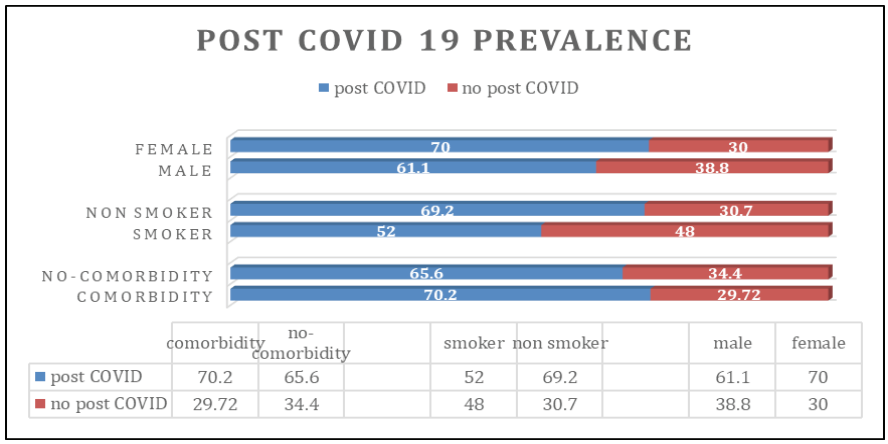

Figure 3: Post covid 19 prevalence according to gender, smoking status and the presence of comorbidities

Following a severe systemic inflammatory response syndrome and excessive release of inflammatory cytokines post covid 19 patients are at great risk of developing subsequent pulmonary fibrosis and may be the persistent symptoms of fatigue, dyspnea, cough and weakness are the early manifestation of the lung fibrosis[19, 20], in the current study (15.8%) reported difficulty breathing, and (12.7%) reported cough this might be explained by persistent fibrotic changes in the lung.

Limitations:

Our study had certain limitations, first of all,our study sample was from the outpatient clinic so the sample is not entirely representative of the targeted population. Secondly, the study is cross-sectional so we didn't have to follow up, further follow up would carry a better understanding of the progression of post covid 19 symptoms. Finally, the sample size was small. Studies in the future should have more diverse and bigger sample sizes.

Conclusion

Majority of COVID-19 recovered individuals have a wide variety of persistent symptoms that impact their everyday functioning,which is now referred to as post COVID syndrome. Several elements may influence the development of this condition. Age, gender, smoking and the presenceof pre-existing medical conditions are all factors to consider.

Even though all subjects recovered from COVID-19 should be monitored for long-term evaluation and management of post COVID symptoms, our study found that patients with critical conditions had the highest riskof developing post COVID syndrome, emphasizing the importance of close monitoringof this group.

Conflict of Interest: The authors have no conflict of interest to declare with the materials presented in the paper.

Source of Funding: Self.

Ethical Clearance: Not required.

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Trip, Slip and Fall: ICD10 and Fall from Height

Ishita Manral[1], KV Radhakrishna[2], Abhijit Rudra[3]

[1]Asst Prof, [2]Prof and HoD, Dept of Forensic Medicine and Toxicology, Armed Forces Medical College, Pune, [3]Prof, Forensic Medicine and Toxicology, Military Hospital, Bareilly

Abstract

Background: ICD 10 has unified the diagnosis, in this study, we have studied fall from height as per ICD 10 classification of cases who reported to emergency department of tertiary care hospital in Maharashtra. Unintentional fall from height represents a significant cause of injury in urban populations.

Results: In this retrospective study, data pertaining to cases which were examined and treated at a tertiary care centre in Western India was analysed from 2014-2016. A total of 44 cases qualified our criteria of unintentional fall from height.83% of the population study were male. 21-40 years of age were most commonly affected. Alcohol was a common factor amongst the falls. As the year progressed number of cases have decreased. W10 ICD 10, fall from stairs were the most common cause of fall. Head injuries (42%) followed by extremities injuries were the most common.

Conclusion: A significant number of non – fatal cases occur due to unintentional fall from height. There is a need to study the demographic profile of injured persons, assess the severity of their injuries and identify certain risk factors associated with such non-fatal injuries due to fall from height.

***Keywords**: Fall from height, ICD 10, falls*

Background

A fall is defined as an event which results in a person coming to rest inadvertently on the ground or floor or other lower level [1]. They are coded as W00-W19 in ICD-10 [1,2]. Trauma is a leading cause of morbidity in young adults. Amongst the causes of trauma, falls are the most common mechanism of injury [3,4,5]. It accounts for 40 to 60% of all traumatic injuries [5]. It has been studied that approximately 60% of falls are accidental, 20% are intentional, and 20% are crime related [6,7].

Corresponding Author:
Dr Ishita Manral,
7263077907, X4/22, Phase 2, Tucker army enclave, Hadapsar, Pune-411028, Maharashtra

Methods

The study was conducted in Department of Forensic Medicine and Toxicology in Western Maharashtra over two years 2014-2016. A total of 44 cases were studied according to ICD-10 classification of fall from height. The data was collected from the Emergency and Trauma register

in the Emergency department of Tertiary health care center in Western Maharashtra, India. The data was collected in an excel sheet in terms of name, age, sex, time of fall and type of fall according to ICD 10. Data was thus studied and analysis of ICD 10 code for injuries was done.

Results

Table 1: Origin of the fall and distribution of the age of the patients according to the ICD 10 Classification

ORIGIN OF FALL	AGE GROUPS								TOTAL	%
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	>71		
W01	1	1	1	2	1	1	1		8	18%
W06	1					1		1	3	7%
W07							2		2	5%
W10	1	1	3	2	1	4	1		13	30%
W12			1	2		1			4	9%
W13			1						3	7%
W14			1	1		3			5	11%
W17			1	1	2		1	1	6	13%
TOTAL									44	100

Table 2 showing the admission of patients in different wards.

ADMISSION	MALE		FEMALE		TOTAL
	NO	%	NO	%	
WARDS	18	82%	4	18%	22
ICU	9	82%	2	18%	11
OPD	7	78%	2	22%	9
TOTAL	34	100	8	100	42

Table 3 showing the fracture and closed head injury sustained by the 44 patients of non fatal fall from height.

Cause of fall	Injury (fracture, closed head injury) grievous hurt						Total	
	Head	Neck	Upper limb	Lower limb	Spine	Back	Number	%
W01	3		1				4	10
W06	3						3	7
W07				1			1	2
W10	8	4		2	2		16	40
W12								
W13								
W14			5		1	1	7	18
W17	1		2	6			9	23
Total	15	4	8	9	3	1	40	100

Table 4 showing the simple and grievous hurt sustained by the 42 patients of the non-fatal fall from height.

Region	Hurt	Number	%	Total	%
REGION	HURT			TOTAL	
		NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
Head	Simple	28	65%	43	42%
	Grievous	15	35%		
Neck	Simple	2	33%	6	5%
	Grievous	4	67%		

Cont... **Table 4 showing the simple and grievous hurt sustained by the 42 patients of the non-fatal fall from height.**

Upper limb	Simple	15	65%	23	23%
	Grievous	8	35%		
Lower limb	Simple	14	61%	23	23%
	Grievous	9	39%		
Spine	Simple	0	-	4	4%
	Grievous	4	100%		
Chest	Simple	1	100%	1	1%
	Grievous	0	-		
Back	Simple	2	100%	2	2%
	Grievous	0	-		
Total		102	100	102	100

Discussion

In our study out of 44 patient's, 83%(37) of the cases were male who suffered non-fatal fall from height and 17%(7) were females. In 2014 a total of 18 cases(42%) fitted our criteria, 2015- 19(46%) and in 2016-7(12%) of the cases were studied.

The most affected age group in our study was in 21-40years of age constituting 38% of the patients and then 51- 60(10) years constituting 24% of the cases. Falls due to slips, trips and falls constituted 19% (8) of the total cases. Falls from one level to another constituted 14% (6) of the total cases. 90% of the falls were non- occupational in nature and 10% were of occupational nature. Injuries were simple(61%) and of grievous(39%) nature. 42% sustained injuries of head and 46 % sustained injuries to extremities.

ICD 10 data used in our study are as follows [2]W01: Slip trips and stumbling, W06: Fall from bed, W07: Fall from chair, W10: Fall from stairs and steps, W12: Fall from scaffolding, W13:fall from building or structure, W14: Fall from tree, W17: other fall from one level to another.

Children constituted 7 % of the population and the injuries they sustained were due to slips and trips, fall from bed and stairs. Injuriesmostly sustained varied with the height of the fall. Injuries sustained were upper limb fracture and head injury. 66% of the children population of the study population had hospitaladmission(wards).In many large studies, falls are the leading mechanism of unintentional

injury for children and young adults[8, 9]. Landin et al [10]found in young children (< 5 years of age) falls were the most common trauma. After the age of 4th year activity of the child and environmental factors became more important. Skull fractures were more common in young children and humerus fracture were seen in children < 4 years of age[4].

The long bone fracture rate was significantly higher in the children compared with both the infant/ toddler and the adolescent/young adult groups [4].The immature skeleton has a higher proportion of cartilage, making it less susceptible to fracture[11,12,13] . Curry et al. conducted a series of experiments comparing age-related mechanical properties of bone and found that compared with adult bone, the bone of children has a lower bending strength, modulus of elasticity, and mineral content[14,15].

Patients with head-first impacts sustain head and upper extremity injuries 6. In children, the head-first landing position is the most common[16] . The increased head-to-body weight ratio found in children moves the centre of gravity in a cephalad direction and adultsattempt to right themselves into a foot-first landing position.21- 40 years constituted 38%(16) of our study population.83%(15) of the population was male.43% sustained grievous injuries. 18%(3) were admitted to ICU.18%(3) were of occupational nature. One case was diagnosed as case of alcoholic dependence syndrome.31%(5) sustained limb injuries. 43%(7) suffered head injury.69%(11) had hospital admission. We had four patients who were under psychiatric follow up. Three cases(75%) were known cases of alcoholic dependence and one case (25%) was a known case of depression.

Most of the non-fatal injuries involved the upper and lower extremities for employer reportedand ED-treated non-fatal injuries[17] . Lapostolle et al[16] concluded in their study that adults are more prone to limb injuries. In our study however 43% of our study population had head injury and 31% had limb injury. Male preponderance was similar to other studies[18, 19]. 16% of our study population were over the age of 60 years and sedentary by nature. 100% of the injury recorded in >60 years of age were of grievous nature with hospital admission.

Behavioural risk factors include those concerning human actions, emotions or dailychoices. They are potentially modifiable. For example, risky behaviour such as the intake of multiple medications, excessalcohol use, and sedentary behaviour[20,22,23]. In our study 9% of the population was under medication by a psychiatrist. Alcohol dependency was recorded in 75% of the cases with psychiatry evaluation done.

Conclusion

The basis of the study is the preventive measures that can be taken to decrease the morbidity caused due to falls in a developing country. Falls are a leading cause of injury. Commonly the young and the working age group are commonly affected due to falls sustaining injuries to head and extremities. Most of the studies are done studying the mortality due to unintentional fall from height. Morbidity due to fall from height is rarely studied. ICD 10 has unified the diagnosis and helps in statistical analysis which may help in formulating guidelines to prevent slip, trips and falls.

Ethical Clearance: a prior approval was obtained from the Institutional Ethical Committee: IEC/2016/Feb/AFMC/FMT

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Factors Influencing Drinking among Middle-Aged People

Jeong-Sook Lee

Assistant Professor, Department of Nursing, Sangmyung University, Republic of Korea

Abstract

Background: Middle age is a period of change, and many people consume alcohol to relieve the stress associated with this transition. The present study aims to investigate factors that influence drinking among middle-aged people.

Methods: This is a secondary analysis of data on social problems and cohesion that the Korea Institute for Health and Social Affairs. Collecting data from 1,260 middle-aged people between 40 and 64 years of age, the study measured resilience, stress, and drinking. Descriptive statistics, t-tests, analysis of variance, Pearson's correlation, and multiple regression analysis were performed.

Conclusion: Multiple regression analysis that investigated factors that influenced drinking had an explanatory power of 27.4%. The analysis also revealed that the following factors had effects on drinking among middle-aged people: gender, followed by smoking, marital status, difficulties in daily life due to health problems, employment status, and past experiences of violence. It is necessary to develop and implement strategies that mitigate high-risk drinking based on the factors that our study reveals. This would serve to promote a healthy lifestyle among the middle-aged while also preventing the progression to high-risk drinking.

Keywords*: drinking, high-risk drinking, middle age, resilience, stress*

Introduction

Although moderate consumption of alcohol reduces the level of tension and may make life more enjoyable, excessive drinking has negative effects on physical and mental health. These can translate to issues in family, occupational, and social relationships[1,2]. From 2018 to 2019, according to the Korea Disease Control and Prevention Agency[3], the monthly drinking rate (the rate at which the respondent drank at least once per month in the past year) increased by 2.2% among individuals in their twenties and thirties. However, this rate decreased by 1.7% among individuals in their forties, fifties, and sixties. In contrast, the high-risk drinking rate (the rate at which the respondent consumed 7 or more drinks per sitting for a male and 5 or more drinks per sitting for a female, for 2 or more sittings per week) decreased by 1.4% in individuals in their forties, fifties, and sixties. However, this decrease

Corresponding author:
Jeong-Sook Lee,
Assistant Professor, Department of Nursing,
Sangmyung University, Republic of Korea
Phone: +8210-5491-3912
Fax: +82504-267-3912
Email: luckyjs34@hanmail.net

was smaller than that observed in individuals in their twenties and thirties (3.1%). In summary, the monthly drinking rate and high-risk drinking rate are decreasing among middle-aged people. Nevertheless, they engage in high-risk drinking behavior relatively more often than younger individuals. Therefore, it is necessary to investigate the factors related to this behavior.

People resort to consuming alcohol to relieve stress due to experiences in difficult situations[4]. In particular, middle-aged people experience various changes, such as the bereavement of parents, grown-up children leaving home, and new diagnoses of chronic conditions. These changes may act as stressors and may lead to drinking[5]. Various stressors experienced in daily life, increase alcohol consumption and may later cause problems[1]. Excessive drinking in middle age decreases cognitive function[6], increases the risk of dementia[7], and makes individuals physically weaker in older age[8].

Resilience is the ability of an individual to adapt to changes in environment and respond to stressors in a physically, psychologically, and socially healthy way[9]. Thus, it acts as a protective factor when middle-aged people face stress[10]. Since resilience influences drinking caused by stress[11], alcohol consumption decreases when resilience is strengthened[12]. This contributes to the prevention of alcohol-related issues, such as alcohol abuse[13].

Since middle age is an important period of transition, coping well with these associated changes is helpful for adapting well to old age[14]. A review of literature revealed that resilience acts as a buffer against risky drinking behavior during stressful situations. As resilience and stress can predict drinking, it will be meaningful to confirm the relationship between these variables. However, very few studies have confirmed the relationship between these variables in middle-aged people. In addition, it is also necessary to assess the negative life experiences of middle-aged people and to assess how these experiences and demographic variables influence their alcohol consumption. Therefore, the present study aims to find the factors that influence alcohol consumption in this population bracket and to explore ways to decrease its harmful consequences. The findings of this study will contribute to the maintenance of a healthy lifestyle in middle-aged individuals.

Materials and Methods

Design: This study is a secondary analysis.

Participants and data collection: The present study used the data on social problems and cohesion that the Korea Institute for Health and Social Affairs collected in 2017. For the analysis, we extracted data previously collected from 1,260 individuals aged between 40 and 64 that consumed alcohol. The present study obtained appropriate IRB approval (2017-14).

Measurement: Resilience was measured using the Ego-Resilience Scale (ER89) developed by Block and Kremen[15]. The scale consists of 14 items rated on a 4-point scale (1 corresponding to “strongly disagree” and 4 corresponding to “strongly agree”). Higher scores indicate higher levels of resilience. Cronbach’s α coefficient was 0.80 in the present study.

Stress was measured using 10 out of the 14 items on the Perceived Stress Scale (PSS) developed by Cohen et al.[16]. The tool assesses how the respondent perceives their level of stress in the prior month, and the items are rated on a 5-point scale (0 corresponding to "never" and 4 corresponding to "very often"). Higher scores indicate higher levels of stress. Cronbach' α coefficient was 0.85 in the present study.

Drinking was measured using the AUDIT-Consumption (AUDIT-C). Derived from the Alcohol Use Disorder Identification Test (AUDIT) developed by WHO[17], AUDIT-C summarizes only the items concerning alcohol consumption[18] and consists of 3 items rated on a 5-point scale (0 – 4). The items assessed the following aspects: "How often do you have a drink containing alcohol? How many drinks containing alcohol do you have on a typical day when you are drinking? How often do you have six or more drinks on one occasion?" Higher scores indicate higher levels of drinking, and Cronbach's α coefficient was 0.83 in this study.

Data analysis: We analyzed the collected data on the IBM® SPSS® Statistics v24.0 software package. We analyzed the participants' demographic characteristics, resilience, stress, and drinking using descriptive statistics in terms of frequency, percentage, mean, and standard deviation. We used t-tests and one-way analysis of variance to test for differences in drinking habits according to demographic characteristics and negative life experiences, with Scheffe's post-hoc tests. We calculated Pearson's correlation coefficients to establish the relationships among resilience, stress, and drinking. Finally, we performed multiple regression analyses for factors that influenced alcohol consumption.

Results and Discussion

Differences in drinking according to demographic characteristics: As shown in Table 1, more participants identified as male (59.4%), with a significant number of participants aged between 40 and 49 years (48.2%). 49.4% finished high school, and 84.0% were married. Non-smokers numbered 69.0%, and 86.5% had chronic disease. 91.2% lived with someone else in their household, 94.8% reported to have no suicidal thoughts. 90.8% did not have any health issues interfering with daily life, 82.1% were employed. With regard to the demographic predictors of drinking habit, participants with the following characteristics consumed more alcohol: males; educational background with high school or college degree; divorced, separated, widowed, or single marital status; smoking; one-person household; lack of difficulties in daily life due to health problems, and employment status.

These findings supported previous reports that the following groups consumed more alcohol and were more likely to progress to problematic drinking behavior: male[1,2], individuals with a higher educational background[2,19], individuals who were not married[19], smokers[1], individuals living alone than those living with other family members[20], healthy individuals[1,19], and employed individuals[1,19].

Table 1. Differences in alcohol consumption according to demographic characteristics (N=1,260)

Variable	Division	n (%) or M±SD	Drinking	t/F(p)
			M ± SD	
Gender	Male	749 (59.4)	7.00 ± 2.93	19.54 (< 0.001)
	Female	511 (40.6)	3.89 ± 2.66	
Age	40-49	607 (48.2)	5.84 ± 3.18	0.93 (0.394)
	50-59	501 (39.8)	5.69 ± 3.27	
	60-64	152 (12.1)	5.47 ± 3.15	
	Mean	50.50 ± 6.73		
Education	≤ Middle schoola	166 (13.2)	5.03 ± 3.20	4.65 (0.010) (a < b, c)
	High schoolb	623 (49.4)	5.85 ± 3.17	
	≥ Collegec	471 (37.4)	5.83 ± 3.24	
Marital status	Marrieda	1,059 (84.0)	5.57 ± 3.18	9.96 (<0.001) (a<b,c)
	Separation, Divorce, Widowedb	126 (10.0)	6.31 ± 3.38	
	Unmarriedc	75 (6.0)	7.07 ±2 .92	
Smoking	Yes	390 (31.0)	7.56 ± 2.85	14.59 (<0.001)
	No	870 (69.0)	4.92 ± 3.02	
Chronic disease	Yes	1,090 (86.5)	5.75 ± 3.18	0.29 (0.769)
	No	170 (13.5)	5.67 ± 3.42	
One-person households	Yes	111(8.8)	6.82 ± 3.24	3.75 (<0.001)
	No	1,149 (91.2)	5.63 ± 3.19	
Suicidal thought	Yes	66 (5.2)	6.06 ± 3.40	0.85 (0.399)
	No	1,194 (94.8)	5.72 ± 3.20	
Difficulties in daily life due to health problems	Yesa	27 (2.1)	5.44 ± 3.09	4.70 (0.009) (b<c)
	Moderateb	89 (7.1)	4.75 ± 3.05	
	Noc	1,144 (90.8)	5.82 ± 3.21	
Employment status	Yes	1,034 (82.1)	6.12 ± 3.16	9.92 (<0.001)
	No	226 (17.9)	4.00 ± 2.85	

Differences in drinking according to negative life experiences: As also seen in Table 2, the loss of loved ones, such as death, abortion, and disappearance, was the most common negative life experience (34.8%), and bullying was the least common experience (1.3%). Negative life experiences affected alcohol consumption to the degree that participants who experienced violence or financial difficulty tended to drink more.

These findings coincide with previous reports that alcohol consumption increased with increased stress from negative life experiences, such as death of loved ones, conflicts with friends or neighbors, financial crises, and violence[4,19].

Table 2. Differences in alcohol consumption according to negative life experiences (N=1,260)

Variable	Division	n (%)	Drinking	t (p)
			M ± SD	
Loss of loved ones (death, abortion, and disappearance)	Yes	438 (34.8)	5.83 ± 3.38	0.73 (0.464)
	No	822 (65.2)	5.69 ± 3.12	
Violence (physical, emotional, verbal, and sexual)	Yes	60 (4.8)	6.85 ± 3.61	2.46 (0.017)
	No	1,200 (95.2)	5.68 ± 3.18	
Bullying	Yes	16 (1.3)	6.63 ± 3.38	1.12 (0.265)
	No	1,244 (98.7)	5.72 ± 3.21	
Accidents (car accidents, fire)	Yes	175 (13.9)	6.17 ± 3.34	1.94 (0.053)
	No	1,085 (86.1)	5.67 ± 3.18	
Financial difficulty	Yes	275 (21.8)	6.26 ± 3.34	3.06 (0.002)
	No	985 (78.2)	5.59 ± 3.16	
Childhood abuse	Yes	24 (1.9)	6.46 ± 3.91	0.92 (0.369)
	No	1,236 (98.1)	5.72 ± 3.20	

Levels of resilience, stress, and drinking: As demonstrated in Table 3, the participants scored 36.81±4.67 points for resilience, which was higher than the median and slightly lower than that reported in a previous study[21] conducted on middle-aged people. They scored 15.15±5.32 points for stress, which was lower than the median and lower than that reported in a previous review[21]. In other words, the participants in the present study perceived low levels of stress. The score for drinking habit was 5.74±3.21 points, and this was higher than that reported in a previous study conducted on university students[22]. A previous study on the optimal cut-off point for AUDIT-C suggested that scores of 5 or higher indicated high-risk drinking[23]. Based on this, the respondents of the present study had a moderately high risk of alcohol abuse. In fact, more than half of all participants (59.0%) had scores of 5 or higher.

Table 3. Levels of resilience, stress, and drinking (N=1,260)

Variable	M ± SD	Range	Division	n(%)
Resilience	36.81 ± 4.67	17.00-56.00		
Stress	15.15 ± 5.32	0.00-31.00		
Drinking	5.74 ± 3.21	1.00-12.00	≥5	743 (59.0)
			<5	517 (41.0)

Correlation between resilience, stress, and drinking: As also seen in Table 4, although drinking had a positive correlation with resilience, the correlation was very weak. Moreover, it did not correlate with stress. This finding contradicted a previous report that alcohol consumption decreased as resilience increased[12] but agreed with another study that found no correlation between stress and drinking[22]. Resilience positively correlated with stress, but the correlation was weak. This finding opposed a previous study finding that resilience in middle-aged people had a negative correlation with stress[24]. Since the significant correlations between the variables found in the present study were very weak and contradicted previous studies, the elucidation of the factors that contribute to the correlation require further research.

Table 4. Correlation between resilience, stress, and drinking (N=1,260)

Variable	Resilience r(p)	Stress r(p)	Drinking r(p)
Resilience	1		
Stress	0.16 (<0.001)	1	
Drinking	0.06 (0.033)	0.04 (0.155)	1

Factors that influence drinking habits in the participants: We coded the demographic characteristics and negative life experiences that showed significant differences as dummy variables. Along with resilience and stress, we used them as independent variables in a multiple regression analysis. The Durbin-Watson value was 1.67, confirming that there was no correlation between the residuals. Moreover, we calculated tolerance as 0.48 - 0.93, and variance inflation factor as 1.08 - 2.08, indicating no multicollinearity. As seen in Table 5, the regression equation was significant ($F=44.17$, $p<0.001$) explaining 27.4% of variance. We found the following factors to influence drinking habits among middle-aged people: gender ($\beta=0.35$, $p<0.001$), smoking ($\beta=0.18$, $p<0.001$), marital status ($\beta=0.08$, $p=0.015$), difficulties in daily life due to health problems ($\beta=0.07$, $p=0.004$), employment status ($\beta=0.06$, $p=0.031$), and violence ($\beta=0.05$, $p=0.034$).

The present study found that being male correlated with alcohol consumption. This can be interpreted in the context of Korean culture, which is more tolerant of drinking among men[1], and this finding supports previous reports[1,2]. The present study also found that the score for drinking was almost 2 points higher than the cut-off in male participants. Since excessive drinking in middle-aged males can negatively influence their quality of life in old age[2], appropriate interventions for drinking behavior are necessary. The finding that smokers consumed more alcohol coincided with a previous finding[1]. This may be so because many individuals smoke when they drink[1]. Marital status (divorced, separated, widowed, or single) also tended to predict alcohol consumption. Here, a stable marriage and spousal relationship may act as a protective factor[19] to reduce drinking. The present study also found that lack of difficulties in daily life due to health problems influenced alcohol consumption. This corroborated with previous research that found that perceived good health was likely to result in problematic alcohol consumption[1,19]. This may be because individuals who perceive themselves to be healthy and those who do not experience any discomfort or difficulty in daily life may consume more alcohol[1]. In the present study, employment status displayed some influence over drinking habits. In this case, employed individuals may be exposed to alcohol more often in order to maintain social relationships[1,19]. Violent past experiences also predicted drinking, supporting a previous report, that verbal or physical abuse from a spouse reinforced drinking behavior[19]. In the present study, we used resilience and stress as independent variables. These did not predict drinking, corroborating previous reports that neither resilience[22,25] nor stress[22] influenced drinking among university students. Conversely, another study conducted on an adult sample found that resilience decreased drinking[11]. Since research is lacking on the relationship between resilience and drinking in middle-aged people, further research is necessary in this regard. Previous studies have reported that higher levels of stress correlated with higher levels of alcohol consumption[4,5]. However, in the present study, the relatively low level of stress in our participants (below the median) may not have influenced drinking.

Table 5. Factors that drinking in the participants (N=1,260)

Variable	B	SE	β	t	p
(Constant)	4.89	1.01		4.84	<0.001
Gender	2.31	0.19	0.35	11.91	<0.001
Education	0.37	0.24	0.04	1.58	0.115
Marital status	0.74	0.30	0.08	2.42	0.015
Smoking	1.22	0.20	0.18	6.28	<0.001
One-person households	0.14	0.39	0.01	0.37	0.713
Difficulties in daily life due to health problems	0.80	0.28	0.07	2.87	0.004
Employment status	0.48	0.22	0.06	2.17	0.031
Violence (physical, emotional, verbal, and sexual)	0.80	0.38	0.05	2.13	0.034
Financial difficulty	0.32	0.20	0.04	1.61	0.108
Resilience	0.02	0.02	0.03	1.23	0.218
Stress	0.01	0.02	0.01	0.33	0.742
$R^2 = 0.280$, Adjusted $R^2 = 0.274$, F = 4 4.17, p <0.001					

Conclusion

This study is significant in that it identified factors that influenced drinking among middle-aged people and provided evidence to prepare programs to prevent problematic drinking behavior. The findings on these variables should be able to facilitate the development and implementation of programs to promote a healthy drinking culture and prevent drinking-associated problems in middle-aged people. Moreover, they necessitate further research to explore and strengthen protective factors to prevent the progression of moderate drinking to problematic drinking. These measures will help to improve the quality of life among middle-aged people.

Since we conducted the present study on a subset of middle-aged individuals in South Korea, it is difficult to generalize the findings to all middle-aged people.

Ethical Clearance: Taken from the Institutional Review Board of Ministry of Health and Welfare (2017-14).

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Study on Age Determination by Epiphyseal Fusion of Distal End of Ulna and Radius in Telangana Region

K Srinivasulu[1], Nakkala Supraja Internee[2], Chittireddy Sainithya[3], Jupaka Om Shanti[3]

[1]Prof & Hod Department of Forensic Medicine & Toxicology. Malla Reddy Institute of Medical sciences, Medchal, Telangana, [2]Dept of Forensic Medicine, Mediciti Institute of Medical Sciences, Medchal, Hyderabad, Telangana, [3]3rd MBBS, MallaReddy Institute of Medical sciences, Medchal, Telangana

Abstract

The use of radiographic data for age determination is a widely accepted method and considered scientifically approved. The aim of the present study is to determine the age of epiphyseal union of lower end of ulna and radius among Telangana population. A cross-sectional study was conducted in the region of Telangana, with 100 participants include 50 males and 50 females, we observed that the ossification of lower end of radius completed at 17 to 18 years in females and 19 to 20 years in males, whereas ossification center of lower end of ulna ossified one year earlier than radius, it ossifies at 16 to 17 years in females and 18 to 19 years in males.

Skeletal age is not uniform among all the participants. Ulna ossifies one year earlier than radius in both males and females. We also observed that the ossification completed early in females than in males. We found similar results in several studies conducted in India and abroad.

Key Words: *Age determination, Epiphysis fusion, Ulna, Radius.*

Introduction

Age estimation is an important parameter in dealing with both civil and criminal cases. Skeletal age estimation is based on the appearance and fusion of the ossification center, estimation of age from skeletal study is widely accepted in all medico legal issues. Bone age is an indicator of the skeletal and biological maturity of an individual; this is different from chronological age calculated by date of birth of an individual.

Age determination and issuing of age certificate is always a challenging task to a doctor, multiple factors will influence on appearance and fusion of ossification center. Age estimation becomes a valuable tool in dealing with many civil and criminal procedures such as consent in medical practice, validity of will, attainment of majority, marriage, kidnapping and sexual offences etc.

Age assessment, when done in a living person is always given in the form of a range; the variation in age estimation substantially increases to more than

Corresponding author:
Dr K Srinivasulu,
Professor HOD. Department of Forensic medicine & Toxicology, MRIMS, Hyderabad, Telangana.
Email: drksrinivas1968@gmail.com

a decade in elderly (Rosing et al., 2007[1]). Hence, it must be acknowledged that as age of an individual increases, the chances of assessing a close match to chronological age decreases.

Age determination also plays a great role in identification of an individual especially in mass disasters. A gross difference between skeletal and chronological age indicates a lag in the biological age and points to some underlying genetic, nutritional and endocrinal disorders.[2,3]

Age determination usually done in three steps: physical examination, dental examination and radiological examination. Dental examination by tooth eruption in early ages and physiological changes of tooth by Gustafson's formulae in late ages whereas radiological examination by ossification centers, their appearance and fusion in long bones in early ages and skull suture closure in late ages[2,3].

The aim of this study is to assess the bone age comparing the chronological age of the individual and compare the data with other similar studies.

Materials and Method

A cross- sectional study on age determination from radiological examination of wrist joint, lower end of Radius and Ulna by ossification centers fusion was conducted in Telangana region. The study was conducted with 100 participants in the age group ranging from 16 to 21 years, 50 male and 50 females. Individuals close to normal height, weight and skeletal structure were included in the study.

The following individuals were not included in this study.

- Individuals with bone related problems or deformities.
- Known nutritional, developmental or endocrinal abnormalities.
- Any other systemic diseases.

Informed consent was obtained from all the participants before commencement of the study.

Participants were asked to remove the jewelry and any metal objects that might interfere with the X ray-image. Each participant was subjected to radiological examination of left wrist joint in Antero posterior view. We choose x ray wrist joint, because wrist can be easily isolated from the trunk by extending the hand, thereby minimizing the radiation to the rest of the body.

The distal epiphyses of Radius and Ulna observed for fusion of ossification center. Fusion (union of epiphysis with diaphysis) is graded according to Dr William Sangma, Mckern and Stewart in to 5 stages as follows:

- Stage 1(F1): Nonunion –Epiphyseal cartilage growth plate widen and did not begin to decrease in thickness
- Stage 2(F2): Commence of union – when the thickness of Epiphyseal cartilage was found to be reduced appreciably (1/4th united)
- Stage 3(F3): Incomplete union – when the epiphysis cartilage gap reduced further.
- Stage 4(F4): Complete union – when the epiphyseal cartilage was bony in architecture and its density indistinguishable from the epiphysis and diaphysis in its neighborhood, but an epiphyseal line

called epiphyseal scar could still be distinguished.

 Stage 5 (F5): Complete union – with absence of epiphyseal scar.

Accurate chronological age was obtained in each individual based on their age certificate; bone age was assessed based on the skeletal picture of x ray using established standard practice. We considered stage 4 and 5 is complete union, stage 4 explained as recent fusion.

The findings obtained were tabulated and statistically analysed with the aid of PSPP. The results were compared with similar studies in other parts of India and abroad.

Results

A cross sectional study on age determination by union of ossification centers of lower end of ulna and radius by radiological examination was conducted in a rural medical college of Telangana region, revealed the following results.

Table-1: Age and Sex wise distribution in the study.

Age Distribution	Males	Females
16 Years	4	1
17 YEARS	4	2
18 YEARS	13	12
19 YEARS	19	18
20 YEARS	5	15
21 YEARS	5	2
TOTAL	50	50
COMBINED TOTAL		100

Table-1 Age wise distribution of participants of the study. 5 members of 16 years age group, 6 members in 17 years age group, 25 members in 18 years age group, 37 members in 19 years, 20 members in 20 years and 7 members in 21 years age group. A total of 50 participants of male and 50 participants of female were participated.

Table-2: Ossification status at the distal end of radius in females.

FEMALES			
Age	**Ossification status at distal end of radius**		
	stage 3	**stage 4**	**stage 5**
16 Years	1	0	0
17 Years	2	0	0
18 Years	0	10	2
19 Years	0	14	4
20 Years	0	0	15
21 years	0	0	2
TOTAL	3	24	23

Table-2 reveals that none of the participants in stage 2 ossification, very less number in stage 3 was observed in below 17 years age group individuals, 12 members are in stage 4 and 5 are in 18 years age group, 18 members are in stage 4 and 5 in 19 years age, above twenty years age group are in stage 5. In 94% of study population ossification completed at 18 years and above, only 6% in stage 3 are below 17 years age.

Table-3: Ossification status at the distal end of radius in males.

MALES			
Age	**Ossification status at distal end of radius**		
	stage 3	**stage 4**	**stage 5**
16 Years	4		
17 Years	4	0	0
18 Years	11	2	0
19 Years	0	16	3
20 Years	0	1	4
21 YEARS	0	0	5
Sub Total	19	19	12
TOTAL	50		

Table 3 shows 19 participants are in the age group of 16to 18 are in stage 3, remaining 31 participants are above 19 years are in stage 4 and 12 are in stage 5. In 58% of our study population the ossification completed at 19 – 20 years.

TABLE-4: Ossification status at the distal end of ulna in Females.

FEMALES			
Age	**Ossification status at distal end of ulna**		
	stage 3	**stage 4**	**stage 5**
16 Years	0	1	0
17 Years	0	2	0
18 Years	0	4	8
19 Years	0	0	18
20 Years	0	0	15
21 Years	0	0	2
		7	43
TOTAL (50)	0	14	86

Table 4 reveals, all the participants of above 16 years are in stage 4 and 5, Ossification of distal end of ulna in females occur at 16 to17 years in our study population.

Table-5: Ossification status at the distal end of ulna in Males.

MALES			
Age	**Ossification status at distal end of ulna**		
	stage 3	**stage 4**	**stage 5**
16 Years	4	0	0
17 Years	1	3	0
18 Years	0	10	3
19 Years	0	2	17
20 Years	0	0	5
21 years	0	0	5
TOTAL	5	15	30

Table 5 shows 45 participants (90%) above 17 years are completed ossification; only 5 participants of below 17 year's age are in stage3. In 90% of our study population, ossification of lower end of ulna has been completed at 18 to 19 years of age in males.

Discussion

A cross sectional study on ossification of lower end of ulna and radius was conducted in Telangana region, the results of the study compared with other studies in India and abroad.

In our study we found that the complete fusion of lower end of ulna occur at 16-17 years in females and 17-18 years in males, whereas the fusion of radius occurs at 17-18 years in females and 19 -20 years in males. The ossification centers of both radius and ulna fuse one year earlier in females.

Davies and Pearson's[4] (1927) studies on 5000 X-ray plates of patients found that epiphyses of long bones appear and fuse in females earlier than males, similar results were also observed in our study and several other studies.

Melbourne, Flecker H[5] (1932)noticed that the lower end of radius fuses around 18 years in girls and 19 years in boys, while same occurs at ulna around 17 years in girls and 19 years in boys, almost similar results were observed in our study.

A study conducted by Dr Sanjeev Krishnamoorthy and Abhishek Singh[6] on Age Determination from Radiological Investigation of epiphyseal appearance and fusion around wrist Joint at Khammam of Telangana state also revealed similar results. We also observed similar results in a study conducted in Kashmiri population by Nida Hassan and Farida Noor.[7]

A study conducted by Sangita Rajdev[8] in Surat shows different results, the ossification of Lower end of radius observed at 21 years in males and 20 years in females and the lower end of ulna ossified at 21 years in males and 19 years in females, both ulna and radius ossified almost at same age.

In another study conducted in western Rajasthan population by Raichandani Leena,[9] shows different results that the average age for complete epiphyseal fusion of lower end of radius is 18-19 years in males and 17-18 years in females and average age for complete epiphyseal fusion of lower end of ulna is 19-20 years in males and 18-19 years in females.

In most of the studies including in our study ulna ossifies earlier than radius except in a study at western Rajasthan conducted by Raichandani leena, in their study radius ossified one year earlier than ulna.

Conclusion

A cross sectional study on ossification of lower end of ulna and radius was conducted in Telangana population, we observed ossification of lower end of radius completed at 17 to 18 years in females and 19 to 20 years in males, whereas ossification center of lower end of ulna fused one year earlier than radius, it ossify at 16 to 17 years in females and 18 to 19 years in males. Several studies conducted in India and abroad including our study revealed that the ulna ossifies one year earlier than radius. We also observed that the ossification centers of both ulna and radius ossify early in females than in males, a similar kind of results were observed in most of the studies.

Conflict of Interest: Nil

Ethical Clearance: Yes

Source of Fund: Self

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Effect of Nursing Students' Caring Character and Gratitude Disposition on Nursing Professionalism

Mi-yeong Mun

Assistant Professor, Department of Nursing, Semyung University, 65, Semyung-ro, Jecheon, 27136, Korea

Abstract

Background/Objectives: The objective of this descriptive research study was to determine effects of caring character and gratitude disposition on nursing professionalism of nursing students.

Methods/Statistical analysis: Data were collected from January 10, 2022 to January 23, 2022 using self-reported questionnaires from 110 students in the first to fourth years of nursing education at two universities. Collected data were analyzed using descriptive statistics, t-test, analysis of variance, Pearson's correlation coefficients, and multiple linear regression using the SPSS WINDOW 25.0 program.

Findings: Regression analysis revealed that caring character (β=.33, *p*=.001) and gratitude disposition (β=.26, *p*=.005) were factors significantly affecting nursing professionalism, with a total explanatory power of 24.9%.

Improvements/Applications: To establish and strengthen nursing students' proper nursing professionalism, it is necessary to open courses related to caring character and gratitude disposition with the development of extra-curricular programs for nursing students.

Keywords: *Nursing Student, Caring Character, Gratitude Disposition, Nursing Professionalism*

Introduction

Nursing is an applied science with a practical philosophy. The purpose of nursing education is to enable nursing students to acquire professional knowledge and skills with the capacity to care for patients after graduation [1]. In order to achieve this goal, character education and academic guidance are essential. Good character is an essential element in patient nursing. It is the foundation for establishing nursing professionalism. It plays a very important role in determining the quality of nursing care for patients by influencing the behavior of nurses in the future [2]. A caring-character based on respect for human beings is the core of care [3]. Caring is

Corresponding author:
Mi-yeong Mun
Assistant Professor, Department of Nursing, Semyung University, 65, Semyung-ro, Jecheon, 27136, Korea
Tel: +82-43-649-1356, Fax: +82-43-649-7051
E-mail: cirog74@gmail.com

a universal human behavior that is essential for human growth, development, and survival. It is also an important element of nursing and the core of nursing education and training [4]. It is an essential element for nursing students to efficiently perform their roles as professional nurses [5]. It has been reported that caring character can improve as the academic year increases [6]. Caring character can be cultivated through intentional learning, feedback, and repetition [7].

Gratitude is the emotion of feeling grateful for the value and meaning of kindness given by others [8]. It is regarded as a fundamental virtue that transcends time and culture to this day [9]. Gratitude disposition is a cognitive and emotional response in which an individual acknowledges the contribution of others and those around him and feels grateful for the achievement of a positive experience or result with a relatively persistent and stable emotion. It has been found that people with high gratitude disposition are positive with a high life satisfaction, flexible interpersonal relationships, and pro-social behaviors [10]. Rather than avoiding problems when facing difficult situations, these traits can act as a factor to find and reinterpret positive meanings in stressful situations and utilize internal resources to help them grow [11], contributing to the formation of a nursing professionalism with a positive impact.

In addition, nursing professionalism is the sum total of beliefs, ideas, and impressions about nursing as a profession. It is a systemized view of nursing and a professional-conscious view of the nursing activity process or position of the person in charge of nursing [12]. Through positive nursing professionalism, professional values of nurses and their own identity for nursing are formed [13]. Thus, environmental factors and personal factors that can affect the knowledge and experiences of students according to social changes and influence nursing professionalism should be taken into account. It is necessary to identify various variables that influence nursing professionalism. A previous study on nursing professionalism of nursing students has shown that positive thinking and self-esteem can affect nursing professionalism [14] and that high satisfaction with the clinical practice education environment is positive for the formation of nursing professionalism among students [15]. Nursing professionalism with positive also have higher satisfaction with their jobs, higher nursing job performance, and higher organizational commitment [16].

Therefore, this study was to determine effects of caring character and gratitude disposition on nursing professionalism of nursing students.

Methods

1. Research design

This was a descriptive research study to determine effects of nursing students' caring character and gratitude disposition on nursing professionalism.

2. Sample and data collection

This study was conducted from January 10, 2022 to January 23, 2022 for 1st to 4th graders enrolled in the Department of Nursing at two universities in Chungbuk and Jeonnam. Data collection was carried out after voluntary consent for research participation was obtained, including information on the research and disadvantages of participating

in this research. It was conducted online using a structured questionnaire.

3. Research tools

3.1 Caring character

Kim [3] has used a tool developed for nursing students. The caring character scale of this tool was developed with eight sub-factors having a total of 51 items. The higher the score indicating a higher caring character of nursing students. At the time of tool development, Cronbach's α was 0.96. In this study, Cronbach's α was 0.95.

3.2 Gratitude disposition

The Gratitude Questionnaire (GQ-6) developed by McCullough et al. [10] was used in the Korean version of the Gratitude Disposition Scale, which was revised by Kwon et al. [17]. It consisted of a total of 6 items. The higher the score indicating a higher gratitude disposition. In the study by Kwon et al. [17], reliability was demonstrated by a Cronbach's α of 0.85. In the present study, its Cronbach's α was 0.85.

3.3 Nursing professionalism

Measurements were made using a tool developed by Yeun et al. [12]. This tool consisted of a total of 29 items in five sub-areas. The higher the score indicating more positive nursing professionalism. The reliability at the time of tool development was Cronbach's α of 0.92, and in this study Cronbach's α was 0.92.

4. Data analysis

All data were analyzed using SPSS WINDOW 25.0 Program. Descriptive statistics, t-test, analysis of variance (ANOVA), Pearson's correlation coefficients, and multiple linear regression were performed or determined.

Results

1. General characteristics

The average age of subjects was 23.00 years. The majority 77 (70.0%) of subjects were under the age of 23. By gender, there were 94 (85.5%) females. Those in the 4th grade of college accounted for the most 39 (35.4%). Most of them 69 (62.7%) were not religious. The most common reason for entering nursing department was because they had the right aptitude 65 (59.1%). Seventy-seven 77 (70.0%) subjects were satisfied with their major and 85 (77.3%) were satisfied with their friendship. As for the academic score, 44 (40.0%) scored the most at 3.99-3.50 points [Table 1].

2. Degree of caring character, gratitude disposition, and nursing professionalism

The caring character of subjects in this study had an average score of 4.34±0.35 out of 5. By sub-area, patient respect was the highest at 4.55±0.37 points while commitment was the lowest at 3.91±0.60 points. Gratitude disposition had an average score of 5.95±0.80 on a scale of 7 points. Nursing professionalism had an average score of 3.95±0.47 out of 5. By sub-area, nursing role had the highest score at 4.25±0.48 points, whereas the uniqueness of nursing had the lowest score at 3.53±0.76 points [Table 2].

3. Differences in caring character, gratitude disposition, and nursing professionalism according to general characteristics

Caring character showed a significant difference according to satisfaction with major. As a result of post-hoc analysis, the 'satisfied' group had higher score for caring character than the 'average' group (F=4.30, p=.016). Gratitude disposition showed a significant difference according to the reason for entering nursing department and satisfaction with friendship. As a result of post-hoc analysis, 'others recommendation' and 'employment guarantee' group had lower gratitude disposition than 'aptitude' and 'others' groups, but had higher gratitude disposition than 'entrance exam score' group (F=8.60, p<.001). Satisfaction with friendship was 'satisfied' was higher than 'average' (F=2.79, p=.006). Nursing professionalism showed a significant difference according to satisfaction with friendship. The group of 'satisfied' had higher nursing professionalism than the 'average' group (F=0.91, p=.037) [Table 1].

4. Correlation between caring character, gratitude disposition, and nursing professionalism

Caring character showed statistically significant positive correlations with gratitude disposition (r=.402, p<.001) and nursing professionalism (r=.456, p<.001). Gratitude disposition showed a statistically significant positive correlation with nursing professionalism (r=.403, p<.001) [Table 3].

5. Effect of caring character and gratitude disposition on nursing professionalism

In the nursing professional regression model, the Durbin-Watson statistic was 2.13, close to 2, indicating that there was no autocorrelation. The tolerance limit was 0.80 to 0.93, which was more than 0.1. The Variance Inflation Factor (VIF) was 1.08 to 1.26, which was less than 10, indicating no problem of multicollinearity. There was no individual with a Cook's Distance of 1.0 or higher for influence analysis. As a result of analyzing residuals, the normality and equal variance of errors and the linearity of the model were confirmed. Factors significantly affecting nursing professionalism were caring character (β=.33, p=.001) and gratitude disposition (β=.26, p=.005). Their total explanatory power was 24.9% [Table 4].

Table 1. Differences in caring character, gratitude disposition, and nursing professionalism according to general characteristics (*N*=110)

Characteristics	Categories	n (%)	Caring character		Gratitude disposition		Nursing professionalism	
			M±SD	t or F (p) Scheffé	M±SD	t or F (p) Scheffé	M±SD	t or F (p) Scheffé
Age (year)	≤23	77 (70.0)	4.34±0.37	-.045 (.964)	5.82±0.78	-2.64 (.009)	3.97±0.45	0.25 (.803)
	≥24	33 (30.0)	4.35±0.31		6.25±0.77		3.94±0.53	
Gender	Male	16 (14.5)	4.39±0.35	-0.59 (.556)	6.28±0.82	-1.80 (.075)	4.08±0.48	-1.07 (.287)
	Female	94 (85.5)	4.34±0.35		5.90±0.79		3.93±0.47	

Cont... **Table 1. Differences in caring character, gratitude disposition, and nursing professionalism according to general characteristics (*N*=110)**

Grade	1st	22 (20.0)	4.37±0.44	1.62 (.190)	5.67±0.97	1.13 (.341)	3.88±0.62	0.72 (.545)
	2nd	19 (17.3)	4.24±0.36		6.00±0.68		3.88±0.42	
	3rd	30 (27.3)	4.28±0.26		6.02±0.80		3.96±0.36	
	4th	39 (35.4)	4.42±0.35		6.03±0.75		4.04±0.48	
Religion	Christianity	11 (10.0)	4.31±0.33	0.35 (.792)	6.03±0.60	0.11 (.955)	3.99±0.50	0.16 (.925)
	Catholicism	27 (24.6)	4.35±0.36		5.89±0.89		3.92±0.09	
	Buddhism	3 (2.7)	4.54±0.19		6.06±0.54		4.08±0.07	
	None	69 (62.7)	4.34±0.36		5.96±0.81		3.97±0.06	
Reason for entering nursing department	Change to Aptitude[a]	65 (59.1)	4.38±0.34	2.47 (.060)	6.17±060	8.60 (<.001) a, e > b, c > d	4.00±0.48	0.61 (.659)
	Others' recommendation[b]	18 (16.4)	4.46±0.43		5.95±0.65		3.98±0.41	
	Employment guarantee[c]	19 (17.3)	4.14±0.28		5.46±1.05		3.81±0.55	
	Entrance exam score[d]	6 (5.4)	4.28±0.22		4.83±0.70		3.91±0.35	
	Others[e]	2 (1.8)	4.47±0.20		6.92±0.12		4.02±0.61	
Satisfaction with major	Satisfied[a]	77 (70.0)	4.41±0.32	4.30 (.016) a > b	6.01±0.72	1.26 (.289)	4.01±0.44	2.40 (.096)
	Average[b]	31 (28.2)	4.20±0.35		5.85±0.86		3.87±0.41	
	Dissatisfied[c]	2 (1.8)	4.21±1.03		5.25±2.47		3.41±1.85	
Satisfaction with friendship	Satisfie[d]	85 (77.3)	4.37±0.34	1.42 (.160)	6.06±0.76	2.79 (.006)	3.98±0.46	0.91 (.037)
	Averag[e]	25 (22.7)	4.26±0.39		5.57±0.84		3.88±0.53	
Academic score	≥2.99	2 (1.8)	4.44±0.29	0.50 (.680)	6.92±0.12	1.05 (.374)	3.76±0.39	0.52 (.667)
	3.49-3.00	31 (28.2)	4.40±0.36		5.89±0.93		4.02±0.39	
	3.99-3.50	44 (40.0)	4.33±0.33		5.94±0.84		3.98±0.54	
	4.50-4.00	33 (30.0)	4.31±0.39		5.97±0.59		3.89±0.46	

Table 2. Degree of Caring Character, Gratitude Disposition, and Nursing Professionalism (*N*=110)

Variables	Number of items	Possible score range	Min	Max	M±SD
Caring character	51	1-5	3.49	5.00	4.34±0.35
Patient respect	15	1-5	3.73	5.00	4.55±0.37
Compassion	9	1-5	3.56	5.00	4.39±0.38
Sincerity	8	1-5	2.88	5.00	4.26±0.47
Courage	6	1-5	2.00	5.00	4.15±0.59
Commitment	3	1-5	2.67	5.00	3.91±0.60
Professional attitude	4	1-5	2.75	5.00	4.29±0.54
Professional ethics	3	1-5	3.33	5.00	4.52±0.47
Identity	3	1-5	2.33	5.00	4.10±0.62
Gratitude disposition	6	1-7	3.50	7.00	5.95±0.80
Nursing professionalism	29	1-5	2.10	4.97	3.95±0.47
Professional self-concept	9	1-5	2.22	5.00	4.13±0.53
Social awareness	8	1-5	1.75	5.00	3.64±0.63
Nursing expertise	5	1-5	2.20	5.00	4.19±0.52
Nursing role	4	1-5	2.75	5.00	4.25±0.48
Uniqueness of nursing	3	1-5	1.67	5.00	3.53±0.76

Table 3. Correlation between Caring Character, Gratitude Disposition, and Nursing Professionalism (*N*=110)

Variables	Caring character	Gratitude disposition	Nursing professionalism
	r (*p*)	r (*p*)	r (*p*)
Caring character	1		
Gratitude disposition	.402 (<.001)	1	
Nursing professionalism	.456 (<.001)	.403 (<.001)	1

Table 4. Effect of Caring Character, Gratitude Disposition on Nursing Professionalism (*N*=110)

Dependent Variables	Independent variables	B	SE	β	t	p
Nursing professionalism	(Constant)	1.18	.554		2.13	.036
	Caring character	.45	.125	.33	3.59	.001
	Gratitude disposition	.15	.054	.26	2.85	.005
	Satisfaction with friendship	-.06	.081	-.07	-0.79	.433
		Change to R^2=.269, Adj. R^2=.249,				

Discussion

In this study, the caring character scored 4.34 out of 5 points. In the study of Cho and Kim [18] score was 4.06, similar to the result of this study. By sub-area, patient respect was the highest while commitment was the lowest. The same results were also found in the study of Cho and Kim [18]. The reason for the highest score for patient respect might be due to the fact that nursing students respect the values and beliefs of patients and keep good manners and etiquette when providing nursing care [3]. Gratitude disposition scored 5.95 out of 7 points. In the study of Jun [19] had a score of 5.48, Lee and Lee [20] study of score was 5.46, showing a similar score. Gratitude disposition can play an important role in establishing the correct nursing

professional values and promoting happiness among nursing students [21, 22]. Therefore, it is necessary to implement various audit activities and improve the audit disposition through extra-curricular programs. The nursing professionalism of this study had an average score of 3.95 out of 5. The Han [23] study scored 3.74 points. The Lim [24] study scored 3.64 points. The Noh and Kim [25] study scored 3.55 points, showing similar results. Regarding the score for each sub-area, nursing profession scored the highest, while the uniqueness of nursing scored the lowest. In the study of Han [23], the score was similar to results of the present study. The reason for such low perception despite the fact that education is being conducted through major classes needs to be reconfirmed through follow-up research.

As a result of analyzing the difference in caring character according to general characteristics, it was found that the higher the degree of satisfaction with major, the higher the caring character. It is also consistent with the findings of Cho and Kim [26] study. Therefore, it will be necessary to seek institutional and educational strategies that focus on teaching and learning methods and student guidance methods to increase major satisfaction [27, 28]. Gratitude disposition showed a significant difference according to the reason for entering nursing department and satisfaction with friendship. The study of Chung and Ko [11] found that there were significant differences in gratitude disposition according to health status, clinical practice experience, satisfaction with major, and personality orientation. The study of Lee [29] found that there were significant differences in gratitude disposition according to religion, health, college life satisfaction, and satisfaction with major. As such, various research results have been shown. Since it has been reported that a high level of gratitude disposition is effective in increasing life satisfaction and reducing negative emotional experiences [30], it is a must for professional nurses dealing with patients. Nursing professionalism showed a significant difference according to the satisfaction with friendship. The 'satisfied' group had higher nursing professionalism than the 'average' group. In the study of Park, Jun, and Ban [31], the degree of nursing professionalism was higher in the case of 'good' than the case of 'bad' or 'average' in interpersonal relationships, consistent with results of this study. Therefore can have a positive effect on the formation of nursing professionalism by acting as a protective factor to help students adapt a healthy way in complex human relationships [32] because the better the friendships and interpersonal relationships, the less stress.

As a result of this study, the higher the caring-character and gratitude disposition, the higher the nursing professionalism. Studies on caring personality and nursing professionalism remain insufficient. More research studies are needed to clarify them. A significant positive correlation between gratitude disposition and nursing professionalism has also been reported by Lee and Lee [20], Chung and Ko [11]. A study by Kim, Jin, and Kim [33] has reported that nursing students' gratitude disposition, happiness, and school life adjustment can be significantly increased through a gratitude promotion program. Therefore, when developing various educational programs to improve nursing professionalism of nursing students, gratitude disposition must be considered [20].

As a result of multiple regression analysis in this study, caring character and gratitude disposition were identified as factors significantly affecting nursing professionalism. It is difficult to compare these results with previous reports due to the lack of previous studies. However, results of this study are partially consistent with research results of Jun [21] and Chung and Ko [11]. Therefore, it is necessary to continuously make efforts so that nursing students can form a firm nursing professionalism through the university curriculum and maintain and develop their nursing professional values in the clinical field after graduation [21].

Conclusion

As a result of this study, it was confirmed that nursing students' caring-character and gratitude disposition had significant effects on nursing professionalism. Therefore, in order to establish and strengthen nursing students' proper nursing professionalism, it is necessary to open courses related to caring character and gratitude disposition with extracurricular programs. In addition, more research studies are needed to verify the effectiveness through application of the program.

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Effect of Academic Burnout on Self-Esteem in Nursing Students: Mediating Role of Resilience

Miyeong Mun[1], Miyeon Kim[2]

[1]Professor, Department of Nursing, Semyung University, Jecheon-si, Chungbuk, 27136, Korea,
[2]Professor, Department of Nursing, Catholic Sangji College, Andong-si, Gyeongbuk, 36686, Korea

Abstract

Background/Objectives: The objective of this study was to determine the effect of academic burnout on self-esteem of nursing students and the mediating role of resilience in such effect.

Methods/Statistical analysis: Academic burnout, self-esteem, and resilience were evaluated for 209 nursing students. For data analysis, descriptive statistics, t-test, analysis of variance, Pearson's correlation, and mediator regression were performed using SPSS 25.0. The Sobel test was used to verify the significance of mediating role.

Findings: Academic burnout had a significant negative effect on resilience (β=-.53, p<.001) and self-esteem (β=-.52, p<.001). Both academic burnout (β=-.26, p<.001) and resilience (β=.48, p<.001) were found to have significant effects on self-esteem (F=77.03, p<.001). As a result of conducting the Sobel test to test the significance of the mediating role of resilience, it was confirmed that resilience was a partial parameter in the relationship between academic burnout and self-esteem (Z=-5.80, p<.001).

Conclusion: The reduce academic burnout of nursing students and increase their resilience, it is necessary to develop teaching methods and courses and to develop extracurricular programs.

Keywords: *Academic Burnout, Nursing Students, Resilience, Self-Esteem*

Introduction

Due to recent acceleration of changes in the medical environment and the increase in expectations for health care services, the clinical field requires excellent nursing personnel with competence [1]. Nursing students not only need to acquire specialized knowledge, but also need to receive clinical practice education to acquire clinical performance skills such as basic roles and skills of nurses. Heavy studies and clinical practice put a lot of pressure on school life. If this is not actively dealt with, academic burnout appears as a result of poor health, incompetence, and apathy

Corresponding author:
Miyeon, Kim
Professor, Department of Nursing, Catholic Sangji College, Andong-si, Gyeongbuk, 36686, Korea
Tel: +82-54-851-3184, Fax: +82-54-853-3260
E-mail: miyoun1130@gmail.com

toward schoolwork [2].

Academic burnout is a state in which the sense of achievement in school is reduced due to chronic academic stress and excessive workload [3]. This can act as a negative factor leading to atrophy and frustration for those with a nursing major [4]. A previous study has reported that excessive learning and clinical practice of nursing students are related to academic burnout [5]. In particular, it has been found that academic burnout is the greatest when a major upon entering a university is selected based on a recommendation from surroundings [6]. Therefore, it is necessary to make a prudent decision when selecting nursing as a major.

It is essential for nursing students to have high-esteem because people with high self-esteem can realize themselves by accepting and respecting themselves and having a positive identity [7]. Self-esteem refers to self-respect, desirable, and perceived worth [4]. It has an important influence in determining an individual's behavior. It becomes a source of competence that gives confidence in performing nursing tasks [8]. Previous studies have shown that the higher the self-esteem, the lower the academic burnout [9]. This has an important effect on resilience which is a positive identity and an ability to cope with crisis situations without being greatly affected by external negative evaluations [10].

Resilience refers to the ability to relieve stress and successfully adapt as mental resistance to solve difficulties and return to a normal state [11]. Nursing students with high resilience have an active and flexible life attitude. They can actively cope with stress with a high adaptability to external environments [12]. In particular, when faced with stress of clinical practice situations, resilience is very important because it overcomes them well and enables efficient clinical practice [13]. Previous studies have confirmed that resilience is an important factor for positive self-esteem formation [8, 10]. The objective of this study was to determine the effect of academic burnout on self-esteem and the mediating role of resilience in this effect.

Methods

1. Research design

This was a descriptive research study to determine the mediating role of resilience in the effect of academic burnout on self-esteem of nursing students.

2. Data collection

For ethical consideration of study subjects, data were collected after obtaining approval from the Institutional Review Board (IRB) of S university (IRB No: SMU-2020-08-008). This study performed convenience extractions for students (all grades) of nursing departments at two universities. A total of 210 questionnaires were distributed and a total of 209 questionnaires were finally analyzed after excluding those who answered insincerely. The collection period was from September 7th, 2020 to September 18th, 2020.

3. Research tools

3.1 Academic burnout

The Korean version of the Maslach burnout inventory-student survey (MBI-SS) developed by Schaufeli et al. [14] and reviewed by Shin et al. [15] for validity using confirmatory factor analysis was

used. It consisted of 15 questions. The higher the score, the higher the academic burnout. At the time of tool development, its Cronbach's α value was .87. In this study, its Cronbach's α value was .89.

3.2 Self-esteem

A tool developed by Rosenberg [16] and adapted by Jon [17] was used. It consisted of a total of 10 items. The higher the score, the higher the self-esteem. At the time of tool development, Cronbach's α was .85. In this study, Cronbach's α was .85.

3.3 Resilience

The Connor-Davidson Resilience Scale (CD-RISC) developed by Connor & Davidson [18] and translated to the Korean version of the Resilience Tool (K-CD-RISC; Korean Connor Davidson Resilience Scale) by Baek et al. [19] was used. It consisted of a total of 25 items. The higher the score, the higher the resilience. At the time of tool development, Cronbach's α was .89. In this study, Cronbach's α was .89.

4. Data analysis

All data were analyzed using SPSS WINDOW 25.0 Program. Descriptive statistics, t-test, analysis of variance (ANOVA), and Pearson's correlation coefficients were performed or determined. Mediator regression was performed according to guidelines of Baron & Kenny [20]. The Sobel test was used to verify significance.

Results

1. General characteristics

The average age was 22.74 years old. There were 163 (78.0%) students younger than 23 years old and 163 (78.0%) female students. A total of 69 (33.0%) students were third graders in college. There were 129 (61.7%) students who did not have any religion. The academic score was 3.0-3.9 for 141 (67.5%) students [Table 1].

2. Levels of academic burnout, self-esteem, and resilience

Academic burnout had an average score of 2.58 ± 0.56 points out of five points. By sub-area, exhaustion had the highest score and cynicism had the lowest score. The average score for self-esteem was 2.94 ± 0.45 out of four points. The average score for resilience was 3.66 ± 0.45 out of 5. By sub-area, support had the highest score and spirituality had the lowest score [Table 2].

3. Differences in academic burnout, self-esteem, and resilience according to general characteristics

Academic burnout showed a significant difference according to grade (F=4.17, p=.007) and academic score (F=5.98, p=.003). As a result of post-hoc analysis, academic burnout of 3rd graders was significantly higher than that of 1st graders (p=.011). For academic scores of 2.0-2.9 points were statistically significantly higher than those of 3.0-3.9 (p=.025) and 4.0 or higher (p=.004). Self-esteem showed a significant difference according to academic score (F=5.46, p=.005). As a result of post-hoc analysis, 3.0~3.9 points (p=.011) and 4.0 points or higher (p=.017) were 2.0-2.9 points. It was statistically significantly higher than 2.9 points. Resilience showed a significant difference according to academic score (F=5.25, p=.006). As a result of post-hoc analysis, 3.0-3.9 points were statistically significantly higher than 2.0-2.9 points

(*p*=.006) [Table 3].

4. Correlation between academic burnout, self-esteem, and resilience

Academic burnout showed statistically significant negative correlations with self-esteem (r=-.519, *p*<.001) and resilience (r=-.528, *p*<.001). In addition, self-esteem and resilience showed a statistically significant positive (+) correlation (r=-.623, *p*<.001) [Table 4].

5. Mediating effect of resilience on the relationship between academic burnout and self-esteem

A three-step regression analysis was performed according to the procedure of Baron and Kenny [25]. As a result of the regression model analysis, the Durbin-Watson statistic was 1.74 (which was close to 2, indicating no autocorrelation), the tolerance was 0.717 (which was more than 0.1), and the Variance Inflation Factor was 1.40, which was less than 10. There was no problem of multicollinearity. Thus, the assumption of the regression analysis model was satisfied. As a result of analyzing the mediating role of resilience in the relationship between academic burnout and self-esteem, in the first stage, burnout had a significant negative effect on resilience (β=-.53, *p*<.001). In the second stage, burnout also had a significant negative effect on self-esteem (β=-.52, *p*<.001). Lastly, in stage 3, both academic burnout (β=-.26, *p*<.001) and resilience (β=.48, *p*<.001) were found to have significant effects on self-esteem (F=77.03, *p*<.001). Additionally, as a result of testing the significance of the mediating role of resilience, the Sobel test confirmed that resilience was a partial parameter in the relationship between academic burnout and self-esteem (Z=-5.80, *p*<.001) [Table 5].

Table 1. General Characteristics of Participants (*N*=209)

Characteristics	Categories	N (%)	M ± SD
Age (year)	≤23	163 (78.0)	22.74 ± 3.08
	≥24	46 (22.0)	
Gender	Male	46 (22.0)	
	Female	163 (78.0)	
Grade	1st	43 (20.6)	
	2nd	41 (19.6)	
	3rd	69 (33.0)	
	4th	56 (26.8)	

Cont... **Table 1. General Characteristics of Participants (*N*=209)**

Religion	Christianity	40 (19.1)	
	Catholicism	29 (13.9)	
	Buddhism	11 (5.3)	
	None	129 (61.7)	
Academic score	2.0□2.9	35 (16.7)	
	3.0□3.9	141 (67.5)	
	≥4.0	33 (15.8)	

Table 2. Levels of Academic Burnout, Self-Esteem, and Resilience (*N*=209)

Variables	Number of items	Possible score range	Min	Max	M ± SD
Academic burnout	15	1~5	1.27	5.00	2.58 ± 0.56
Exhaustion	5	1~5	1.00	5.00	3.13 ± 0.84
Cynicism	4	1~5	1.00	5.00	2.13 ± 0.77
Incompetence	6	1~5	1.00	5.00	2.42 ± 0.59
Self-esteem	10	1~4	1.40	4.00	2.94 ± 0.45
Resilience	25	1~5	2.36	5.00	3.66 ± 0.45
Hardiness	9	1~5	1.78	5.00	3.48 ± 0.62
Persistence	8	1~5	2.13	5.00	3.79 ± 0.52
Optimism	4	1~5	1.75	5.00	3.68 ± 0.62
Support	2	1~5	1.50	5.00	4.17 ± 0.62
Spirituality	2	1~5	2.00	5.00	3.33 ± 0.65

Table 3. Differences in Academic Burnout, Self-Esteem, and Resilience by Characteristics of Participants (*N*=209)

Characteristics	Categories	Academic burnout		Self-esteem		Resilience	
		M ± SD	t or F (*p*) Scheffé	M ± SD	t or F (*p*) Scheffé	M ± SD	t or F (*p*) Scheffé
Age (year)	≤23	2.57 ± 0.52	-.642 (.521)	2.93 ± 0.44	-.201 (.841)	3.64 ± 0.44	-1.01 (.316)
	≥24	2.63 ± 0.68		2.95 ± 0.48		3.71 ± 0.48	
Gender	Male	2.61 ± 0.69	.308 (.759)	2.95 ± 0.46	.159 (870)	3.63 ± 0.44	-.355 (.723)
	Female	2.57 ± 0.52		2.93 ± 0.44		3.66 ± 0.45	
Grade	1st[a]	2.37 ± 0.69	4.17 (.007) a < c	2.98 ± 0.43	1.89 (.133)	3.66 ± 0.41	2.15 (.095)
	2nd[b]	2.51 ± 0.56		2.88 ± 0.45		3.54 ± 0.50	
	3rd[c]	2.74 ± 0.57		2.86 ± 0.49		3.63 ± 0.48	
	4th[d]	2.61 ± 0.56		3.04 ± 0.37		3.77 ± 0.38	
Religion	Christianity	2.47 ± 0.45	2.33 (.057)	3.00 ± 0.38	1.89 (.114)	3.74 ± 0.40	2.38 (.053)
	Catholicism	2.71 ± 0.56		2.80 ± 0.33		3.55 ± 0.45	
	Buddhism	2.67 ± 0.52		2.86 ± 0.54		3.65 ± 0.43	
	None	2.59 ± 0.58		2.95 ± 0.47		3.65 ± 0.46	
Academic score	2.0 ~ 2.9[a]	2.84 ± 0.53	5.98 (.003) a > b, c	2.72 ± 0.46	5.46 (.005) a < b, c	3.44 ± 0.37	5.25 (.006) a < b
	3.0 ~ 3.9[b]	2.56 ± 0.57		2.97 ± 0.44		3.71 ± 0.39	
	≥4.0[c]	2.40 ± 0.56		3.03 ± 0.45		3.67 ± 0.45	

Table 4. Correlations Among Academic Burnout, Self-Esteem, and Resilience (*N*=209)

Variables	Academic burnout	Self-esteem	Resilience
	r (*p*)	r (*p*)	r (*p*)
Academic burnout	1		
Self-esteem	-.519 (<.001)	1	
Resilience	-.528 (<.001)	.623 (<.001)	1

Table 5. Mediating Effect of Resilience on the Relationship Between Academic Burnout and Self-Esteem (*N*=209)

Step	Variables	B	S.E.	β	t	p	F(p)	R2	Adj.R2
1	AB → RS	-.43	.048	-.53	-8.86	<.001	78.54(<.001)	.279	.275
2	AB → SE	-.42	.048	-.52	-8.59	<.001	31.65(<.001)	.270	.266
3	AB → SE	-.21	.050	-.26	-4.18	<.001	77.03(<.001)	.436	.431
	RS → SE	.48	.063	.48	7.67	<.001			
Sobel test: Z=-5.80, p<.001									

AB = Academic Burnout; RS = Resilience; SE = Self-Esteem.

Discussion

Nursing students' academic burnout score was 2.58 out of 5. The lower part had the highest burnout and the lowest apathy. In the study [21] using the same tool, the score was 3.24 out of 5. By sub-area, exhaustion was the highest and apathy was the lowest, supporting results of this study. This shows that nursing students are experiencing academic burnout due to stress caused by a combination of heavy studies and clinical practice. They are also emotionally exhausted. Thus, it is necessary to come up with measures to reduce the degree of academic burnout and achieve academic success.

Self-esteem scored an average of 2.94 points out of 4, showing similar results to 3.01 and 2.85 points reported in previous studies [22, 23] using the same tool. Since self-esteem imparts positive values to the job as well as the development of human value system and personality [24], various educational efforts are needed to promote self-esteem during

the university period.

The average score of resilience was 3.66 out of 5. It was 2.46 in a previous study [25] that used the same tool. It was 3.70 or 3.07 in previous studies [7, 26] targeting nursing students. It seems to show difference depending on the individual's inclination and temperament.

As a result of analyzing the difference in burnout according to general characteristics, there was a significant difference in burnout according to grade level and academic performance. As a result of post-hoc analysis, third year students had significantly higher burn out than first year students. It is considered that academic burnout is high due to difficulty in performing clinical practice and theoretical classes at the same time for higher-grade nursing students with the burden of the national examination to obtain a nurse's license [27]. In addition, the lower the grade, the higher the burnout, consistent with study results of Moon & Lee [28]. It is taken for granted that students with lower grades have higher burnout due to difficulties in adjusting to college life. For them, continuous attention and extracurricular activities are required to improve college life adaptation. Self-esteem showed a significant difference according to academic performance. The higher the grade, the higher the self-esteem. Nursing students with high self-esteem are highly satisfied with their majors as high self-esteem has a positive effect on performing nursing tasks as future nursing professionals [29]. Thus, an educational plan to improve self-esteem is required. Resilience showed a significant difference according to academic performance. The higher the grade, the higher the resilience. This supported the findings of Nam & Kim [13]. Resilience can overcome adversity and difficulties, give positive meaning to life, and induce active actions [30]. Since resilience is an individual's ability that can be improved through education or training [31], various efforts are needed to improve the resilience of nursing students through university curriculum.

There was a statistically significant negative correlation between academic burnout and self-esteem. Although it was difficult to compare this with the literature due to the lack of previous studies targeting nursing students, it was found to be consistent with study results of Kim & Lee [9] on elementary school students. It was confirmed that the higher the academic burnout, the lower the level of self-esteem. The higher the self-esteem, the lower the internalization problems such as anxiety and depression [32]. The higher the self-esteem, the less it forms a shield against emotional problems and behavioral difficulties [33]. Thus, a multi-faceted strategic effort is required for reduction. Self-esteem and resilience showed a statistically significant positive correlation, consistent with results of previous studies [7]. Therefore, it is necessary to seek various interventions to increase the self-esteem of nursing students.

As a result of confirming the mediating effect of resilience on the relationship between academic burnout and self-esteem in this study, it was confirmed that resilience had a partial mediating effect with an explanatory power of 43.6%. In other words, it was confirmed that academic burnout of nursing students had an intensive effect on self-esteem. At the same time, it had an indirect effect on self-esteem through resilience as a medium. A

direct comparison is difficult as there are no previous studies confirming the mediating effect of resilience on the relationship between academic burnout and self-esteem of nursing students. In order to reduce academic burnout, it is necessary to increase resilience, which is an individual's ability. Kim [34] has said that resilience is the same as the strength of the mind as the strength to take the adversity and difficulties that have come to you as a stepping stone for leaping. Kim [34] has emphasized that resilience can be improved by training. Therefore, it can be said that there is a need for an intervention plan to increase the resilience of nursing students who are prone to experiencing academic burnout.

Conclusion

This study confirms that academic burnout is a factor influencing self-esteem and that resilience has a partial mediating effect on the relationship between academic burnout and self-esteem. Therefore, it is necessary to develop teaching methods, curriculum openings, and extra-curricular programs to reduce academic burnout of nursing students and increase their resilience. Based on results of this study, it is important to develop a program or curriculum that can increase resilience of nursing students in order to reduce their academic burnout and verify the effectiveness of such program or curriculum in the future.

Ethical Clearance: For ethical consideration of study subjects, data were collected after obtaining approval from the Institutional Review Board (IRB) of S university (IRB No: SMU-2020-08-008).

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The Strategy of Provision Time Length Improvement of Medical Record Documents in Bhayangkara Lumajang Hospital with PDCA Method – Indonesia

Novita Nuraini[1], Siti Sofiyah[2], Rossalina Adi Wijayanti[3]

[1]Lecturer, Health Departement, Jember State Polytechnic, Jember, Indonesia, [2]Student, Health Departement, Jember State Polytechnic, Jember, Indonesia, [3]Lecturer, Health Departement, Jember State Polytechnic, Jember, Indonesia

Abstract

Background: Each hospital must follow minimum service standards regarding waiting times and the time for providing outpatient medical record documents. According to the results of observations, the time for providing outpatient medical record documents on the morning shift has a total average of 22 minute while the afternoon shift has a total average of 21 minute.

Methods: The purpose of this study is to improve and develop strategies to speed up the time of providing medical record documents at Bhayangkara Lumajang Hospital with the PDCA *(Plan, Do, Check, Action*) method.

Results: The results and discussion can be concluded, namely the *plan* (planning) in an effort to improve the time of providing medical record documents which is quite long, namely by making *tracers*. *Do* (implementation) of the results of the plan in an effort to improve the length of time for providing medical record documents at Bhayangkara Lumajang Hospital, by implementing the MCH system, applying *tracers* to medical record documents. The *check* can be concluded that the time for providing medical record documents has not met the expected standard.

Conclusion: *Action* (improvement) as a result of the agreement in *Brainstorming*, *Action* concluded that Bhayangkara Lumajang Hospital will maintain the standard time for providing medical record documents and apply the use of *tracers* from researchers.

Keywords*: long preparation time, medical record documents, PDCA, hospital.*

Introduction

A medical record is a file that contains the information and document about patient identity, check-ups, medication, treatment, and other services given to the patient. The obligation of medical record provision for each health service facility included is medical record filling accurately, complete, and on time.

Corresponding Author:
Novita Nuraini
Health Departement, Jember State Polytechnic, Jember, Indonesia
Email: novita_nuraini@polije.ac.id

Therefore, medical record units are demanded to be able to give the services rapidly, proper, and guarantee secrecy, also accurately[5].

The medical record activities are delivering and distributing the medical record to the outpatient unit. Medical records are influenced by fast and proper delivery. If the delivery of medical records to the destination policlinic isn't on time, it will affect the patient's waiting time. In this case, the patient waiting time toward medical record service is an important thing that will influence the first impression of hospital services[5].

The waiting time of service delivery starting from gets the registration card till gets the required medical treatment and the regulation of medical record documents. According to the standard of medical record document provision, the outpatient service is 10 minutes maximal. The gap category between waiting and check-up time that is estimated to satisfy or less satisfy the patient is when the patient starts to register in the locket, queue, and wait for the calling to the poly to be history and checked up by the doctor, nurse, or midwife more than 90 minutes (long category), 30 – 60 minutes (mid-category), and ≤ 30 minutes (fast-category) [4].

The waiting time and the outpatient medical record document provision time in Indonesia are determined by the Minister of Health through the minimal service standard. Each hospital has to follow the minimum service standard about the waiting time and the provision-time of outpatient medical record documents. The minimal service standard of outpatient waiting-time based on Health Minister Rule Number 129/Menkes/SK/II/2008 is less or equal to 60 minutes, while the outpatient medical record document provision time is less or equal to 10 minutes.

Table 1. The Data of Outpatient Medical Record Document Provision Time Length in Bhayangkara Lumajang Hospital Month January-February Year 2020

Day and Date	Morning Shift		Afternoon Shift	
	Time Average	The Amount of DRM	Time Average	The Amount of DRM
	≤ 10 minutes		≤ 10 minutes	
Wednesday, 29 -01 – 2020	14 minutes	20	35 minutes	15
Thursday, 30 – 01 – 2020	34 minutes	25	5 minutes	20
Monday, 03 – 02 – 2020	13 minutes	35	37 minutes	30
Tuesday, 04 – 02 – 2020	9 minutes	30	30 minutes	25
Wednesday, 05 – 02 – 2020	34 minutes	15	25 minutes	20
Thursday, 06 – 02 – 2020	12 minutes	15	11 minutes	10
Friday, 07 – 02 – 2020	35 minutes	10	6 minutes	15
Total	22 minutes	150	21 minutes	135

Source: Primary Data, 2020

According to the interview result with the registry operator and filling, the information is obtained that the provision time length of outpatient medical record documents is caused by several factors, those are the mistake to put the medical record file/misfile and the other trouble causes. It is required to identify the provision time length of medical record documents using 5M (man, machine, method, material, money). It is corresponding with the research conducted by Dian Putri Damayanti (2019) that stated the cause factors of the time length of ≥ 10 minutes medical record file provision are because the mistake of the medical record file storage in the shelf, the unworked transaction proof print machine, and the unavailable tracer. While, according to the research by Indah Kristina (2015), it explained that on the implementation of medical record retrieval and arrangement, the operator runs accordingly to the SOP, but no one who managed the provision time length standardization of outpatient medical records from the patient registers until the medical record was provided.

One of the activities in creating the quality to adjust the standard is applying the proper quality management system, having a goal and clear steps, and giving the innovation in taking the prevention and problem resolving faced by the hospital. One of the methods used to solve the problem in health services is the PDCA method (Plan, Do, Check, Action). PDCA method (Plan, Do, Check, Action) is a process of problem resolving by quality improvement in achieving an improvement[1], where each process is implemented with careful planning, the measured and clear implementation, the accurate evaluation and data analysis implementation, and the improvement action following the monitoring implementation. It really can solve the happened problems (Dewi et al., 2013).

Based on the problems explained above, the time length of outpatient medical record provision often happens. Thus, the researcher is interested to research with the title *The Strategy of The Provision Time Length Improvement of Medical Record Document in Bhayangkara Lumajang Hospital with PDCA Method.* This method is expected to help the hospital in decision-making to improve the health service quality, especially the medical record unit.

Methods

Type of Research

The type of research used is qualitative research; it is a research method used to investigate the natural object condition where the researcher is a key instrument[6]. This research is descriptive; it is a description in the word form to explain the events in Bhayangkara Lumajang Hospital without using numbers. In the end, the research also produces the recommendation related to the improvement efforts in medical record document provision.

Data Analysis Method

The research objects are all the information related to the provision time length of outpatient medical record documents and the strategy to accelerate the outpatient medical record document provision time. The research subject is 12 respondents consisted of 8 registration operators and 5 medical record operators.

Data Collection Method

The data collection methods conducted by the researcher are interviewing, observing,

brainstorming, and documenting the medical record document provision.

Result and Discussion

***Plan* identifies 5M elements (Man, Machine, Methods, Material, and Money) and arranges the improvement strategy of the provision time length of outpatient medical record documents in Bhayangkara Lumajang Hospital.**

The step in this research is the improvement strategy plan of the provision time length of outpatient medical record documents in Bhayangkara Lumajang Hospital. Supriyanto and Damayanti (2007) stated that a plan is a process to anticipate future events and to determine the strategy (a method, adaptive action) to achieve the organization's goal in the future. The plan involves some steps namely situation analysis, problem-causes analysis, the arrangement of the proposed activity plan, and the implementation plan.

The Step of Situation Analysis

The step of the situation analysis is required in the planning process because if it is implemented correctly, it can define the problem following the expecting reality[26]. The situation analysis involves the determination of the planner, task and planner team draft, policy and purpose of organization strategy, plan goal, data, and the required information in the plan and problem determination.

The Step of Problem Cause Analysis

After the main problem determination, the next step is the determination of the most possible problem causes. This step is also known as problem analysis. The problem causes can exist in one factor but also happened on more than one factor. The researcher ran the research in medical record installation on registration and filling sections in Bhayangkara Lumajang Hospital to know the time length provision of outpatient medical record documents in November-December 2020 until January 2021. The activities plan of the outpatient medical record document provision in Bhayangkara Lumajang Hospital by identifying 5M elements consists of Man, Machine, Method, Material, and Money factors.

Proposed Activity Plan

The step of the proposed plan activity arrangement is applied after passing several steps, those are: problem causes identification, problem-solving approach formulation, proposed activities plan arrangement based on the situation analysis step, problem-causes determination, solving solution, and the technic and device of the plan.

Activity Implementation Plan

AIP (Activity Implementation Plan) consists of activities, tools, funds, the required staff, schedule, and the division of executor's tasks and obligations. AIP arrangement consists of 2 activity steps; AIP arrangement and potential resistance analysis.

***Do* runs the plan of improvement activity to solve the time length problem of outpatient medical record document provision in Bhayangkara Lumajang Hospital.**

Do have to be executed following the plan. In implementing an activity plan, sometimes the activity plan made doesn't solve the problem

yet. Basically, the implemented thing in this step is trying a new planned product[1]. The do is implemented following the activity implementation plan on the plan step. The activity implementation consists of tracer making and outpatient medical record document tracer SOP that would be applied in the medical record unit of Bhayangkara Lumajang Hospital for three months, from November-December 2020 until January 2021. The implemented plans are tracer making (out-guide) and outpatient medical record document tracer SOP. According to the observation result, the operator already used the tracer and tracer SOP from the researcher and it was approved as the suggestion for the hospital and applied the *KIB (Kartu Indonesia Berobat)* to be more discipline to improve the provision time length of outpatient medical record documents to be faster.

***Check* runs the improvement check-up to discover the problem that is influencing the provision time length of outpatient medical record documents in Bhayangkara Lumajang Hospital.**

Check step is the following step of *do* step that has been run for three months. According to Bustami (2011), the base used in check compares the achievement result to the made plan (target). It is to determine if the activity success or not. The table below is the provision time length data of outpatient medical record documents in morning and afternoon shifts from 29 January 2020 until 07 February 2020 in Bhayangkara Lumajang Hospital.

Table 2. The Time length Data of Outpatient Medical Record Document Provision in Bhayangkara Lumajang Hospital, Month of January-February 2020

Day and Date	Morning Shift		Afternoon Shift	
	Time Average	The Amount of DRM	Time Average	The Amount of DRM
	≤ 10 minutes		≤ 10 minutes	
Wednesday, 29 -01 - 2020	14 minutes	20	35 minutes	15
Thursday, 30 – 01 - 2020	34 minutes	25	5 minutes	20
Monday, 03 – 02 – 2020	13 minutes	35	37 minutes	30
Tuesday, 04 – 02 – 2020	9 minutes	30	30 minutes	25
Wednesday, 05 – 02 – 2020	34 minutes	15	25 minutes	20
Thursday, 06 – 02 – 2020	12 minutes	15	11 minutes	10
Friday, 07 – 02 - 2020	35 minutes	10	6 minutes	15
Total	**22 minutes**	**150**	**21 minutes**	**135**

Source: Primary Data, 2020

The table below is the average time calculation of outpatient medical record document provision in Bhayangkara Lumajang Hospital from November-December 2020 until January 2021:

Table 3. The Average Check Result of Medical Record Document Provision in Bhayangkara Lumajang Hospital

Month	The Amount of DRM	The Average Time of DRM provision
November	220	33 minutes
December	220	40 minutes
January	140	3538 minutes
Total	560	37 minutes

Source: The observation result in Medical Record Installation Bhayangkara Lumajang Hospital

***Action* runs the time length improvement of outpatient medical record document provision in Bhayangkara Lumajang Hospital.**

Bustami (2011) opined that the step in improvement action is supposed to prevent recurring same peoblem. It is implemented with standardization (maintain the standard or apply the standard improvement), supervision, and rule. The other problems that weren't solved yet were recorded to be used in the next plan. According to the check and interview results conducted by the researcher, the plan application that has been done generally was matching the expected target and will be determined in this improvement.

The standard time of outpatient medical record document provision is important. It needs to be evaluated every month and continues the socialization to all the medical record operators about the importance of using the outpatient medical record document tracer. Next, the hospital needs to conduct the training procurement about the importance of using outpatient medical record document tracer and give a reward and punishment to the related operator, the medical record operators.

Conclusion

According to the research about The Strategy of Time length Improvement of Outpatient Medical Record Document Provision in Bhayangkara Lumajang Hospital with PDCA Method, the result and discussion can be concluded as follows:

1. Plan, in the improvement effort of the provision time length of outpatient medical record documents that quite long by identifying 5M elements, are making the tracer and outpatient medical record document tracer SOP.

2. Do the *plan* in the improvement effort of the provision time length of outpatient medical record

documents in Bhayangkara Lumajang Hospital, by applying the KIB system to be more discipline, applying the following the tracer use SOP made by the researcher and approved by the hospital on the outpatient medical record document that has been run for 3 months, start from November- December

3. 2020 until January 2021 in medical record unit of Bhayangkara Lumajang Hospital.

4. Check can be concluded that the provision time of outpatient medical record document in the before-after implementation comparison, there is a change that it is faster after the improvement implementation. The comparison result before the improvement implementation is the provision time length of outpatient medical record documents in the morning shift has an average total of 22 minutes; while the afternoon shift has an average total of 21 minutes. After the provision time length improvement of outpatient medical record documents for three months on 560 medical record documents, the average provision time of medical record documents is 37 minutes.

5. Action is the agreement that results in *Brainstorming. Action* is concluded that Bhayangkara Lumajang Hospital maintains the time length standard of outpatient medical record document provision following MSS (Minimum Service Standard) and the time length improvement of outpatient medical record document provision from researcher by using the tracer following the tracer SOP of outpatient medical record document well but not maximal.

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Phenytoin Induced Gingival Enlargement and Its Management- A Case Report

Pragya Singh[1], Nitin Tomar[1], Mayur Kaushik[1], Sameer Ahmad[1]

[1]Department of Periodontology, Subharti Dental College and Hospital, Meerut, UP

Abstract

Background: Gingival enlargement is associated with multiple factors including congenital diseases, hormonal disturbances, poor oral hygiene condition, inflammation, neoplastic conditions, and adverse drug reactions including anticonvulsants, calcium channel blockers, and immunosuppressants. This can have a deleterious effect on the quality of life and also on high oral bacterial load caused by plaque-retentive areas. **Method:** Various treatment modalities include both surgical (gingivectomy, periodontal flap, electrosurgery, and laser excision) and nonsurgical approaches (oral hygiene measures, oral prophylaxis, discontinuation of the drug, or the replacement of the drug with other alternative). **Conclusion:** Surgical intervention is required when non-surgical treatment fails to resolve the problem. Proper maintenance phase should be followed for better esthetic outcome along with drug replacement.

Keywords: *Drugs, Gingival enlargement, Electrosurgery, Surgical approach,*

Introduction

Gingival enlargement (gingival hyperplasia or gingival hypertrophy) is characterized by enlarged gingival tissue with lobulated appearance that gradually extends along the labial, lingual, and coronal aspects to cover the entire anatomic crown of teeth. It may be associated with pain and bleeding gums, and in advanced cases they may cause interference with speech, mastication, and aesthetics.[1]

Drug-influenced gingival enlargement is defined as "an overgrowth or increase in size of the gingiva resulting in whole or in part from systemic drug use: as stated by American Academy of Perioxontology. Drugs that are associated withgingival enlargement are antiepileptics (phenytoin), immunosuppressants (cyclosporine), and calcium channel blockers (nifedipine and verapamil), among which phenytoin is the most common drug which isassociated with gingival enlargement. The aim of this case report is to treat gingival enlargement in both upper and lower jaw due to phenytoin with combined nonsurgical as well as by surgical approach.

Case Report

A 20-years old male patient came to the out-patient department (OPD) of department of periodontology, Subharti Dental College and Hospital, Meerut, U.P , with a chief complaint of swollen and bleeding gums since 3 years. Patient gave history of epilepsy, which was diagnosed

at the age of 14 years and he was on medication, phenytoin 100mg bd since then. Patient first noticed changes in the gingiva after 2 years of starting of medication but did not pay much attention to it. When the enlargement of gingivaincreasesand he developed pain, bleeding gums along with difficulty in mastication, than he reported to hospital for treatment. He had reportedly not received any dental treatment. On intra oral examination, generalized fibrotic gingivalenlargement was seen in both upper and lower jaw. Gingiva was inflamed, reddish-pink in colour with irregular margins. The interdental papillae were scalloped, giving lobulated appearance.

Oral hygiene condition revealed abundant plaque and calculus deposits, and generalized bleeding on probing was present. On the basis of medical history and intra oral examination, provisional diagnosis of phenytoin-induced gingival enlargement was made. Complete blood analysis were within the normal limit and Orthopantomogram revealed no bony changes. With the help of non-surgical approach all local factors were removed and afterwards gingivectomy was advised along with the physician consultation for alternate drug regimen for the treatment of disease.

With the consent of the patient and his physician, complete oral prophylaxis was performed and 0.2% chlorhexidine mouthwash (10mL bid for 7 days) was prescribed to the patient [Figure1- 2]. The patient was instructed to maintain good oral hygiene, and proper brushing techniques were explained to him. He was reviewed after 15 days, revealing some reduction of the gingival enlargement, particularly in the lower arch. After that, surgical intervention, that is, gingivectomy, was performed to eliminate excessive gingival tissue.

Surgical Procedure

Following administration of local anesthesia and intraoral disinfection with 0.12% chlorhexidine gluconate mouth rinses, a periodontal probe was used to outline the incision for gingival enlargement. The incision line was marked with the sharp tip needle electrocautery all the way down to the base of the enlarged gingival tissue, at a level of 45° angle. A light and gentle stroke was used to guide the electrode while performing the incision. Initially shallow cuts were made on the gingiva with pocket marker prior to refining the incision. The remnants of soft tissue tags of gingival tissue from interdental areas were removed by using sharp surgical and periodontal curettes (Gracey curettes) [Figure 3-4]. The patients were prescribed antibiotics and analgesics for 5 days. Postsurgical care was followed by a regular 0.12% chlorhexidine rinses twice daily for 2 weeks. Patient was recalled after 15 days,1 month and 3 months for follow up visits [Figure 5].

PRE-OPERATIVE

(Figure-1)

AFTER PHASE 1 THERAPY

(Figure-2)

WITH ELECTROSURGERY

(Figure-3)

IMMEDIATE POST-OPERATIVE

(Figure-4)

POST-OPERATIVE AFTER 3 MONTHS
(Figure-5)

Discussion

Gingival hyperplasia is a frequent feature of gingival diseases.[3]Gingival overgrowth is a fibrotic enlargement of the gingiva that can be caused by a variety of etiological factors. Theenlargement may be aggravated by dental plaque and, sometimes, associated with other systemic diseases or occur as a side effect of systemic medications.[4]Kimball in 1939 reported the first case of phenytoin-induced gingival enlargement.[5] Phenytoin-induced gingival enlargement is a problem which is faced widely by the individuals under phenytoin therapy for the treatment of epilepsy. The effective control of this problem includes drug substitution, removal of other local factors such as plaque and calculus.[6]Various pathogenic mechanisms responsible for phenytoin-associated gingival enlargement have been described. Vernillo and Schwartz[7] reported the effect of phenytoin on human gingival fibroblasts in tissue culture. Phenytoin may be metabolized by gingival fibroblasts, which may determine the susceptibility of the patient to phenytoin-induced gingival enlargement, thereby suggesting a positive relationship between the dose of phenytoin and severity of the overgrowth.[8]Appropriate local therapeutic intervention is essential to prevent attachment loss and destruction of periodontal tissue, dealing with gingivitis and gingival enlargement .[9] Electrosurgery can be used as an alternative to conventional surgery in gingivectomy and gingivoplasty procedures.[10]In the present case report drug induced gingival enlargement was present in relation to maxillary and mandibular front tooth region causing esthetics problem in the patient. After non-surgical therapy, persistence of the fibrotic component was there which was then managed by surgical therapy i.e. with the help of electrosurgery.

Conclusion

Drug induced gingival enlargement is caused by unwanted effects of systemic medication on the periodontal tissues. For an effective control of this problem, proper treatment protocol would be necessary, which includes drug substitution and control of local inflammatory factors through nonsurgical intervention. So, surgical procedure is necessary when this sequence of treatment fails to resolve the problem. Proper maintenance phase should be followed for better esthetic outcome.

Conflict of Interest – Nil

Source of Funding-Self

Ethical Clearance –Approved by senior authority and a consent form was signed by the patient.

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Complete Recovery Following Surgical Resection Inchildhood Pilocytic Astrocytoma

Prastiya Indra Gunawan[1], RahardianIndarto Susilo[2], Wihasto Suryaningtyas[2]

[1]Neuropediatric Division, Department of Child Health, [2]Neurosurgery Division, Department of Neurosurgery, Faculty of Medicine, UniversitasAirlangga - Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

Abstract

Pilocytic Astrocytoma (PA) is a common type of brain tumour disease in the paediatric population. The cerebellum is the most common site of tumour origin. Here we present a 5-year-old girl who referred with gait imbalance,truncal ataxia and tandem gait which was later radiology and pathologically identified as Pilocytic Astrocytoma. Complete surgical resection was performed and it resulted in complete recovery.Knowledge of these imaging manifestations of pilocytic astrocytoma may be helpful to early recognition and prompt treatment.

Keywords:*, children, disease,pilocytic astrocytoma, surgical resection*

Introduction

Pilocytic astrocytoma (PA) is a common type of brain tumour disease in the paediatric population. PA isarare, slow-growing glioma, classified as grade I by the World Health Organisation (WHO). It accounts for approximately 25% of all central nervous system tumours and 42% - 66% of all paediatric brain tumours in the age group 0-14 years, and has been reported to be the most common gliomas and cerebellar tumours in children[1].

Children with astrocytoma classically present with signs and symptoms of obstruction of CSF flow and cerebellar dysfunction. Common presenting symptoms include headache, nausea and vomiting, gait imbalance and visual disturbances. As the tumour increases in size, there is usually progressive truncal ataxia and papilledema due to increased intracranial pressure. Symptoms are usually present for less than three months before diagnosis, although early in the course of illness, the symptoms may be subtle and intermittent[2].

The diagnosis of astrocytoma is supported by either Computer Tomography (CT)scan or Magnetic Resonance Imaging (MRI). Histopathology examination is the gold standard to establish

Corresponding author:
PrastiyaIndra Gunawan
Pediatric Neurology Staff, Department of Child Health Airlangga University College of Medicine; DrSoetomo Hospital Jl. Prof DrMoestopo 6-8 Surabaya Indonesia, Email: prastiya-i-g@fk.unair.ac.id, Telephone +628113429476
Fax: +62315501748

diagnosis of astrocytoma.It is characterised by Rosenthal fibres and eosinophilic granular bodies[3].

Prognosis for astrocytoma is primarily based upon the tumour location and presence or absence of neurological deficits at the time of presentation[4].

The Case

A 5-year-old girl who presented with gait imbalance, truncal ataxia and tandem gait for onemonth. She reported no history of seizure, trauma, fever, nausea, headache, decrease of consciousness, blurred vision, nor nuchal rigidity. On examination, the patient had increase of deep tendon reflexes, Babinskiand Chaddock signs were positive in both plantar andmotoric examination showed decrease of muscle strength in lowerextremities. Head MRI confirmed cystic intraaxial lesion with heterogenous contrast enhancing large mural nodule of the left cerebellum, appropriate with pilocytic astrocytoma compressing the fourthventricle causing non-communicating hydrocephalus and periventricular and perioptic nerve edema (Figure1).

The patient was considered for External Ventricular Drainage (EVD), surgical resection and the pathological interpretation of the mass. The patient tolerated the procedure well without complications. Pathological findings confirmed astrocytic cells with a focus on the formation of Rosenthal fibre consistent with pilocytic astrocytoma.

Head CT scan evaluation after surgical resection revealedsolid cystic lesion and residual mass at left fossa posterior, ventricular dilatation with attached EVD, and subdural hygroma in fronto-temporo-parietal on either side (Figure2).

The patient was discharged without any complaint nor neurological sequelae and in stable vital sign. Patient was planned to routinely control to the Neuropediatric Outpatient Clinic.

Figure 1. Head MRI showing pilocytic astrocytoma compressing the fourthventricle andcausing non-communicating hydrocephalus.

Figure 2. Head CT scan evaluation revealedresidual mass at left fossa posterior, ventriculardilatation with attached EVD, and subdural hygroma in fronto-temporo-parietal on either side.

Discussion

Pilocytic astrocytoma (PA) are WHO grade I brain tumours that occur predominantly in childhood and display benign behaviour. PA could arise in various locations in the neuroaxis, such as the optic nerve, optic chiasm, hypothalamus, cerebellum, brain stem, thalamus, basal ganglia and cerebral hemisphere, but the cerebellum is the most common site of origin[1].Clinical signs and symptoms of pilocytic astrocytomas manifestations depend on the location of the tumour. Patients with tumour in the posterior fossa present with signs and symptoms of increased intracranial pressure (i.e headache, nausea, vomiting, mental status changes and hypertension) and cerebellar dysfunction (i.e weakness, ataxia, poor balance, dysmetria)[5]. Broad areas of weakness are more likely to be either damage to the central nervous system or a systemic disease that is attacking nerves. True weakness can be caused by problem affecting upper motor neurons, lower motor neurons, the neuromuscular junction or the muscle itself. Children with posterior fossa tumour are associated with hydrocephalus. Treatment of the hydrocephalus associated with fourth ventricular obstruction by the tumour mass is usually performed using multiple ventricular taps, insertion of external ventricular drains, and internal CSF shunt for initial therapy of hydrocephalus[6].

The diagnosis of astrocytoma is supported by Magnetic Resonance Imaging (MRI)[7]. Histopathology examination is the gold standard to establish diagnosis ofpilocytic astrocytoma.In our case, histologically thetumourwas characterised by Rosenthal fibres and eosinophilic granular bodies[2]. Cerebellar pilocytic astrocytoma are generally resectable and adjuvant therapy is not indicated. In our case, complete surgical resection is recommended as the best treatment option for PA.Overall, the surgery leads to over 90% long-term survival[8].The 10-year survival rate is greater than 90%; complete surgical resection is generally considered curative.The overall prognosis is primarily based upon the lesion location and presence or absence of neurological deficits at the time of presentation[9].

Summary

Early recognition and treatment of PA can decrease morbidity and mortality. The treatment focuses on surgical resection. Our patient was performed External Ventricular Drainage (EVD) and resection of the tumourto reduce high intracranial pressure. After the surgery the patient was in complete recovery.

Conflict of Interest: The authors declare no competing interest

Ethical Clearance: This is a case report and inform consent was approved and taken from the parents.

Source of Funding: Self funding

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Results of Surgical Treated of Nodular Thyroid in Women

Rafa'a Sami Mahmood Al- Hayali

Specialist Surgeon, Fellow of Arab Board of Health Specialization, AL-jumhori Teaching Hospital , Mosul, Iraq

Abstract

The long-term results of surgical treatment of nodular goiter and thyroid cancer were studied. Glands in 239 women under the age of 40 years. The patients were divided into two homogeneous groups: 1st — operated on for differentiated thyroid cancer; 2nd - operated on for benign neoplasms. Revealed causes and frequency the occurrence of recurrence of the disease, especially the course of postoperative hypothyroidism. The relationship of the occurrence of complications with the nosology and volume of the operation is analyzed. Evaluated the reproductive function of women after surgery. Tactics offered treatment of nodular goiter and thyroid cancer in pregnant women. Untreated thyroid diseases during pregnancy may lead to premature birth, preeclampsia (a severe increase in blood pressure), miscarriage, and low birth weight among other problems. Therefore, it is important to talk to your doctor if you have had a history of hypothyroidism or hyperthyroidism so you can be monitored before and during your pregnancy, and to be sure that your medication is properly adjusted, if necessary.

We studied the long-term results in 239 women under the age of 40 years. Patients were divided into two homogeneous groups: 1 - thyroid cancer, 2 - operated for benign tumors. The causes and frequency of recurrence of the disease and postoperative hypothyroidism were identified. The relation between the occurrence of com- plication's with nosology and operation volume was analyzed. We evaluated the reproductive function of treatment of the goiter and thyroid cancer in pregnant women.

Keywords: *Thyroidcancer, nodulargoiter, pregnant, treatment, postoperative*

Introduction

The thyroid diseases—hyperthyroidism and hypothyroidism—are relatively common in pregnancy and important to treat. The thyroid is an organ located in the front of your neck that releases hormones that regulate your metabolism (the way your body uses energy), heart and nervous system, weight, body temperature, and many other processes in the body[1][2].

Thyroid hormones are particularly necessary to assure healthy fetal development of the brain and nervous system during the first three months of your pregnancy since the baby depends on your hormones, which are delivered through the placenta. At around 12 weeks, the thyroid gland in the fetus will begin to produce its own thyroid hormones[3][4][5].

There are 2 pregnancy-related hormones: estrogen and human chorionic gonadotropin (hCG) that may cause your thyroid levels to rise[6][7]. This may make it a bit harder to diagnose thyroid diseases that develop during pregnancy. However, your doctor will be on the look-out for symptoms that suggest the need for additional testing[8].

However, if you have pre-existing hyperthyroidism or hypothyroidism, you should expect more medical attention to keep these conditions in control while you are pregnant, especially for the first trimester. Occasionally, pregnancy may cause symptoms similar to hyperthyroidism[9][10]; should you experience any uncomfortable or new symptoms, including palpitations, weight loss, or persistent vomiting, you should, of course, contact your physician[11].

Causes of Thyroid Disease in PregnancyHyperthyroid disease—The most common cause of maternal hyperthyroidism during pregnancy is the autoimmune disorder Grave's disease. In this disorder, the body makes an antibody (a protein produced by the body when it thinks a virus or bacteria is present) called thyroid-stimulating immunoglobulin (TSI) that causes the thyroid to overreact and make too much thyroid hormone[12].

Even if you've had radioactive iodine treatment or surgery to remove your thyroid, your body can still make the TSI antibody. If these levels rise too high, TSI will travel through your blood to the developing fetus, which may cause its thyroid to begin to produce more hormone than it needs[13][14]. So long as your doctor is checking your thyroid levels, both you and your baby will get the care needed to keep any problems in check[15].

Hypothyroid disease—The most common cause of hypothyroidism is the autoimmune disorder known as Hashimoto's thyroiditis. In this condition, the body mistakenly attacks the cells of the thyroid gland, leaving the thyroid without enough cells and enzymes to make enough thyroid hormone to meet the body's needs[16][17].

Diagnosis of Thyroid Disease in PregnancyHyperthyroidism and hypothyroidism in pregnancy are diagnosed based on symptoms, physical exam, and blood tests to measure levels of thyroid-stimulating hormone (TSH) and thyroid hormones T4, and for hyperthyroidism also T3[18].

Thyroid physiology in pregnancy

Approximately 94% of thyroid hormones are secreted by the thyroid gland as thyroxine or tetraiodothyronine (T4) and 6% as triiodothyronine (T3) (Fig. 1). T4 is catalytically converted to the more metabolically active T3 in peripheral tissues by deiodinases and a portion of peripherally-produced T3 returns to the circulation and it is because of this peripheral conversion that the plasma T4 to T3 ratio is approximately 4:1 [19][20]. Both T4 and T3 are mostly bound to carrier proteins in the serum, chiefly thyroxine-binding globulin (TBG). However, it is the free hormones (free T4 (fT4) and free T3 (fT3)) that are available to be actively transported into cells and exert their effects[21][22].

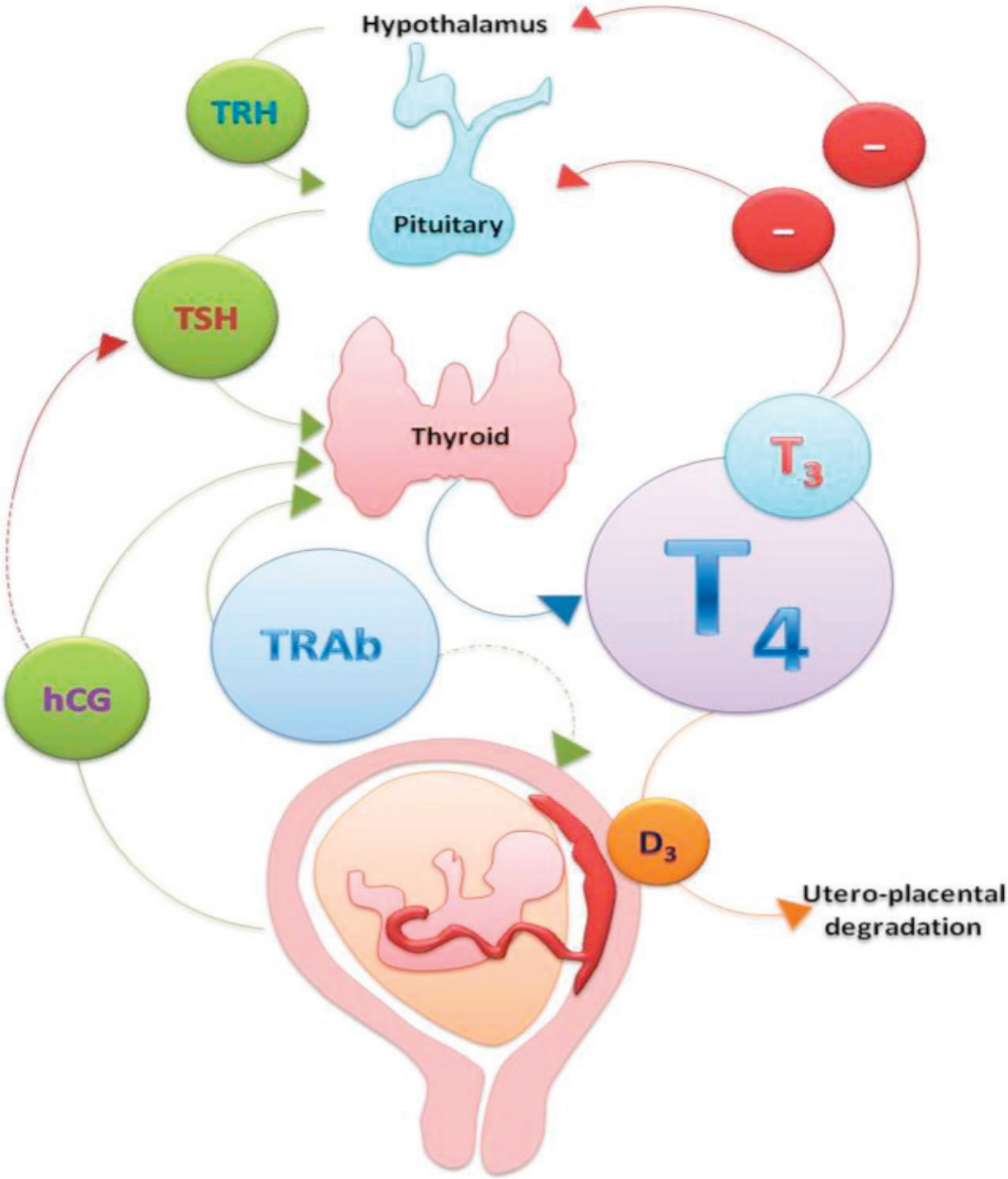

Fig. 1 Hypothalamic-pituitary-thyroid axis and pregnancy.

Changes in maternal thyroid function during pregnancy result from a combination of increased metabolic demands, increased serum TBG concentrations, stimulation of the TSH receptor by human chorionic gonadotropin (hCG) [23][24], an increased mother-to-foetus transfer of thyroxine and an increased intraplacental breakdown of T4 and T3 (resulting from the placental expression of deiodinase 3)[25].

Total T4 and T3 concentrations increase by 50% as a result of a 50% increase in circulating TBG levels by 6–8 weeks of gestation; their levels plateau at around 16 weeks of gestation [26]. Maternal TSH is usually within normal limits during pregnancy but it can be decreased in the first trimester due to the increased hCG levels and the cross-reactivity of this hormone on TSH receptors[27] ; both are glycoprotein hormones with a common α subunit and a considerable homology between their β subunits. Therefore hCG has a weak thyroid stimulating activity [28]. This hormonal interplay results in a biochemical picture of subclinical hyperthyroidism, which can be considered as a physiological finding[29]. The decrease in hCG secretion later in pregnancy leads to reduction of serum fT4 and fT3 concentrations and finally the normalisation of TSH level[29].

Thyroid hyperfunction and symptoms, if present, subside as hCG production falls, typically at 14–18 weeks of gestation. Ideally, the assay-specific TSH reference ranges for each trimester should be calculated based on the local population in iodine sufficient areas and pregnant women recruited for such calculations should be euthyroid and thyroid antibody negative. When this is not feasible, a reasonable alternative is to use the consensus ranges as per the various guidelines.

Table 1: TSH reference ranges in pregnancy.

	TSH reference ranges (mU/L)		
	First trimester	**Second trimester**	**Third trimester**
American Endocrine Society	0.1–2.5	0.2–3.0	0.3–3.0
American Thyroid Association			
European Thyroid Association	<2.5	<3.0	<3.5

Tasks:

1. Determination of risk factors recurrence of the disease after surgery.

2. Identification of the main causes of postoperative hypothyroidism and the possibility of its prevention.

3. Determine the degree of influence of these diseases and transferred operations on the state of reproductive female systems.

Materials and Methods

In AL-Gomhury General Hospital analyzed case histories of 239 women at the age of 40 years, which were operated on do nodal lesions of the thyroid gland for 4-year ago . They were divided into 2 groups. The first group consisted of 112 women operated on differentiated thyroid

cancer Shl. Isolation of various forms of thyroid cancer. PS based on the International Histological classification developed in 1974 by a group World Health Organization Experts. The ratio of various forms of tumors is given in

Table 1.Frequency of various forms of differentiated cancerthyroid gland

Form of thyroid cancer	Number of patients	
	Abs	%
Papillary thyroid cancer	67	59.8
Follicular thyroid cancer	35	31.3
Follicular papillary thyroid	10	8.9
Total	112	100

The average age of patients was 29.6 ± 0.74 years (from 10 up to 40 years).

In determining the stage of the process, the class TNM certification. By the time of surgery, the disease is was carried out in the following stages (Table 2).

The second group, consisting of 127 patients, were persons with benign thyroid pathology Shl. According to the results of postoperative histological remote material studies all observations were divided into groups (table 3).

TABLE 2. The distribution of patients with thyroid cancer in stages

Stage	Number of patients	
	Abs	Stage -%
T 1 N 0 M 0	16	Stage I - 14.3
T 2 N 0 M 0	58	Stage II - 77.7
T 3 N 0 M 0	26	
T 2 N 1a M 0	3	
T 4 N 0 M 0	5	Stage III - 8.0
T 3 N 1a M 0	3	
T 3 N 1b M 0	1	

TABLE 3. Frequency of various forms of benign nodal lesions in patients of the 2nd group

Nosological form	Number of patients	
	Abs	%
Colloid goiter	99	78
Thyroid adenomas	13	10.2
Autoimmune thyroiditis	15	11.8
Total	127	100

The average age of patients was 30.6 ± 0.6 years (from 16 up to 40 years).

The following types of surgical procedures were performed for the patients. interventions (table 4).

TABLE 4. Surgical interventions in patients of the 1st and 2nd groups

Name of operation *	Group 1		Group 2	
	Abs	%	Abs	%
Thyroid lobe resection	0	0	18	14.2
Hemithyroidectomy	59	52.6	54	42.5
Thyroid lobe resection	1	0.9	29	22.8
Subtotal resection of the thyroid lobes	0	0	17	13.4
Subtotal resection of the thyroid gland	49	43.8	9	7.1
Thyroidectomy	3	2.7	0	0
Total	112	100	127	100

Note: * - operation names are in accordance with nomenclature [10]

Thyroidectomy were performed at stages T 4 N 0 M 0 , T 3 N 0 M 0 and T 3 N 1b M 0 . In the latter case, thyroidectomy supplemented by bilateral fascial-dissecting tie fiber of the neck. Unilateral lymphadenectomy was performed in 6 cases (3 in addition to the subtotal resection of the thyroid gland and hemithyroidectomy) in the presence of unilateral damage to regional lymph nodes. 4 patients with thyroid surgery combined with other goy operation (1 cholecystectomy by the traditional method, 2 laparoscopic cholecystectomy, 1 hernia repair with Mayo plastic surgery for umbilical hernia).

The early postoperative period was relatively satisfactorily in most patients. One patient (0.42%) developed bleeding, consuming battered surgical hemostasis. The phenomena of paresis of the gort not recorded in 4 patients (1.67%). In 2 cases required the imposition of a temporary tracheostoma (0.84%).

To study long-term results survey was carried out with the consent of the patient and included an tirovaniye (100%), survey (100%), ultrasonography of a thyroid gland zy (100%), reflexometry (100%), fine-needle asp biopsy (9.6%), a study of hormonal blood profile (84.9%), ECG (15%), examination by a gynecologistwith an assessment of the fertility function (4.6%). Tireoscin- tigraphy despite its importance in identifying recurrence of thyroid cancer [11], according to technical reasons could be performed only in 5% of patients.

The survey questionnaire was asked questions about health status before and after surgery, family history of thyroid disease was studied glands, oncological diseases. Special attention paid to childbearing function, quantity and course pregnancies, their connection with the operation and the method of completion.

For reflexometry, ref- Lexograph "Achilles-001", developed by engineering technical cooperative "Novator" Omsk. For registration The result of the stratum was an electrocardiograph.

If a thyroid dysfunction is suspected glands produced determination of thyroid hormones new in the blood. For this outpatient on an empty stomach in patients determined the serum concentration of the following hormones: triiodothyronine (T 3), total thyroxin (T 4) and thyreotropin (TSH). Blood sampling was done before 11 o'clock in the morning from the cubital vein. Serum defended, frozen lived and kept at -20 ° C.

Ultrasound examination of the thyroid gland all 239 women of both groups were plagued. To conduct research was used apparatus Alloca, it's often- that is 3.5 MHz.

Table 5): Results and its discussion The frequency of recurrence of thyroid disease the gland was 2.7% for thyroid cancer and 9.4% for benign nodal thyropathies.

Nosology	1st group	2nd group
Colloid goiter	-	9
Thyroiditis	-	3
Crayfish	3	-
Total	3 (2.7%)	12 (9.4%)

In this case, the re-formation of nodes was fixed 54 cases (22.6%), but their histological the structure differed from that established on the first operation (psevdoretsidivy). Repeated operation was 21 patients were infected (8.8%). Higher percentage true recurrence in benign pathology was due to involvement in the pathological process a process of greater thyroid tissue and inadequate surgical intervention.

The relationship of the transaction volume with the frequency the recurrence of the disease. The following laws have been identified dimensionality: - in case of benign pathology, relapse after subtotal resection of the thyroid glands are significantly lower than after hemithyroidectomy ($p = 0.05$); - recurrence rate after hemithyroidectomy significantly higher in benign thyroid patty than in thyroid cancer ($p = 0.05$).

Another important indicator for assessing long-term results of surgical treatment, is the presence of postoperative hypothyroidism.

When using the standardization method is established that if the patients of the 1st and 2nd groups were performed alone naive in terms of surgery, the frequency of hypothyroidism in the 2nd the group would be significantly higher ($p = 0.05$).

Of the 34 women of the 1st group, hypothyroidism had 15 (44.1%), out of 30 of the 2nd group - 14 (46.7%). With a statistical treatment (Fig. 2) revealed that in the presence of hypothyroidism premature abortion rate significantly higher than that in the total populations, and in women without hypothyroidism ($p = 0.01$). It also draws attention to the fact that pregnancy is significantly less common absence of hypothyroidism than in the general population oscillations ($p = 0.001$). This fact is indirectly about the high role of thyroid hormones in providingthe normal course of pregnancy. Miscarriage of pregnancy with manifest hypothyroidism is more common than subclinical however, statistically this difference turned out to be true ($p = 0.3$).

Hypothyroidism, present in 29 women during the menstruation and confirmed at that time level data TSH and T4, was subsequently compensated by the reception L-thyroxine in 17 patients. 12 women when receiving more than 200 mcg of L-thyroxine per day to achieve normalization of nya thyroid hormone fails. They were all previously surgical interventions were made in the amount of hemi- thyroidectomy and more.

Findings

1. Hemithyroidectomy provides a low risk of re- diva only with differentiated thyroid cancer glands. With benign thyroid disease glands to reduce the likelihood of recurrence can perform subtotal resection of the thyroid gland PS or thyroidectomy.

2. The likelihood of postoperative hypothyroidism it depends not only on nosology and to a significant extent fines ($\rho = -0.77 \pm 0.18$) is associated with the volume of the remaining tissue thyroid gland.

3. Violation of the reproductive function of women operated on for nodular lesions of the thyroid gland, is associated with the presence of postoperative hypothyroidism and does not depend on the morphological structure node tours.

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

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Review Article

An Alternative Yogic Approach for Premature Ejaculation—A Narrative Review

Ramesh Kumar[1], Saloni Malik[2], Gaurav Saurabh Sharma[3], Ananya Gupta[4], Anshu[5]

[1]Department of Pharmacology, [2]Department of Pulmonary Medicine, [3]Department of Psychiatry, AIIMS Rishikesh, [4]Department of Yoga Science University of Patanjali, [5]Department of Pulmonary Medicine AIIMS Rishikesh

Abstract

Background: Premature Ejaculation is a common sexual disorder which negatively affects men's life. Premature Ejaculation estimate prevalence is 20-30 %. It affects to overall quality of life and associated with anxiety, stress, and other psychological factors.

Objective: The purpose of the study was to conduct a review of alternative therapy in the management of Premature ejaculation (PME).

Method: A review was conducted using search terms Premature Ejaculation, Yoga Therapy, Alternative therapyand all the probable term in national and international data repositories such as PubMed, Scopus, science direct, google scholar, web of science in English language.

Result: The review of alternative therapies in the management of Premature ejaculation suggests that most of the studies used Selective serotonin reuptake inhibitors (**SSRIs**), phosphodiesterase type 5 inhibitors (PDE5) and physical activity. There are very few studies conducted in relation to yoga and Premature ejaculation. Further, most of the studies explored effect of alternative therapies on psychological outcomes.

Conclusion: Evidence suggests that Pharmacological clinical trial is effective with side effect, Cognitive behaviour therapy and Pharmacological Drugs separately both are less effective. One evidencebased study with integrated yoga therapy should be considered in the management of Premature ejaculation. Higherquality trial with yogic approach needed to first line management of patients presenting with Premature ejaculation.

Keywords: *Premature Ejaculation, Yoga Therapy, Alternative therapy.*

Corresponding author:
Saloni Malik
PhD Scholar (Pulmonary Medicine)
AIIMS Rishikesh
Veerbhadra Road, Rishikesh
Uttarakhand - Pin No: 249203
India, E-Mail: salonimalik5@gmail.com

Introduction

Premature ejaculation (PME) is one of the most common male sexual disorders.[1] Diagnostic and Statistical Manual of Mental Disorders (DSM–5) defines PME "A persistent or recurrent pattern of ejaculation occurring during

partnered sexual activity within or approximately 1 minute following vaginal penetration and before the individual wishes it." The specific DSM-5 criteria for premature (early) ejaculation are as: In almost all or all (75-100%) sexual activity. Different classifications of PME are as: (i) Lifelong (ii) Acquired (iii) Generalized (iv) Situational (v)Mild: 30 sec. to 1 min. (vi) Moderate: 15-30 sec. and (vii) Severe: approx. 15 Sec. of vaginal penetration. [2]

Internationally more than 20%-30% of men ages 18-70 years rapidly ejaculate.[2] Clinical studies of India reported different prevalence data of PME patients, 77.6% of patients complained about PME in 1000 men in AIIMS Delhi [3], 4.6% in 1120 subjects in a rural area of Haryana, [4] 30.0% in 235 males in Kolkata, [5] and 35.78% in male 95 subjects in Maharashtra.[1] Epidemiological study reportedthe prevalence of PME 8.76% in 742 male subjects in Mysore India. [6] Sexual disorder patients have 3 levels of burden: (i) Emotional (ii) Health (iii) burden on the relationship.[7]PME negatively impact on relationships.[8] It can also impact many aspects of man's life, including reducing self-esteem, deteriorating relationships, and causing anxiety, embarrassment, and depressed feelings.[9] A study reported that 68% of PME patients had decreased self-confidence during sexual activity, half of the single men reported avoidance of relationships or ignore to establish new relationships, men in relationships reported distress at not satisfying their partner with some worrying that their partner was unfaithful to them because of PME.[10]

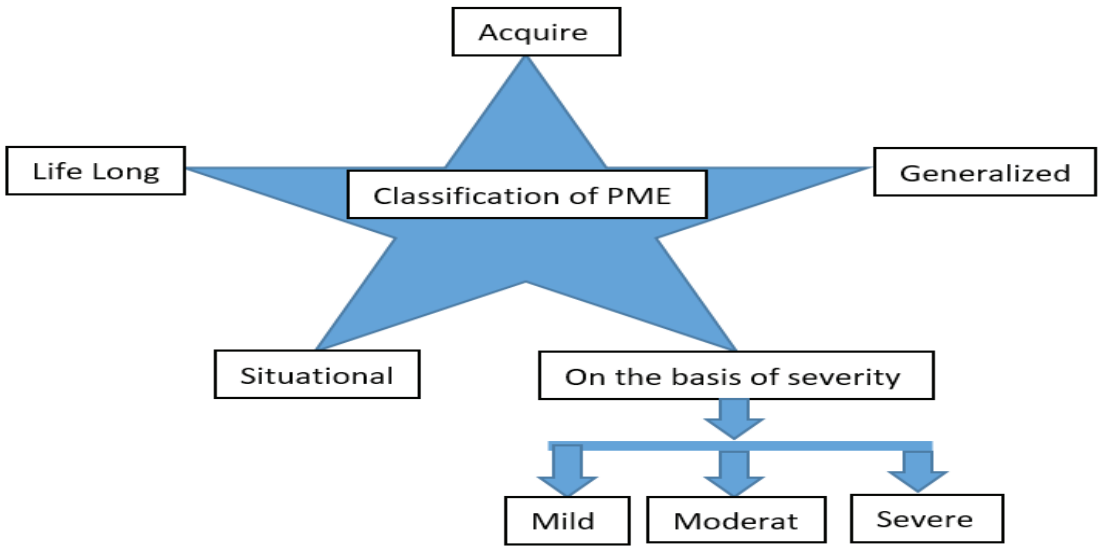

Figure: 1 Classification of Premature Ejaculation on basis of DSM5

Etiology

The exact Etiology of PME is unknown although it includes biological and psychological theories. Psychological Etiology includes sexual performance anxiety, marital relationship problem, hypo-sexual desire, and biological etiology are erectile dysfunction, prostate infection or inflammation, hyperthyroidism. [11,12,13] It was

found that persons with negative psychological status were prone to develop PME, and the positive correlations were seen between sexual disorders and psychological illness. [14]

Clinical Features

The cross-sectional studies of G. Rasterelli et.al (2018) and Jianzhong Zhang et.al (2019) had reported clinical features of Premature ejaculation patients commonly complain of Decreased sexual desire, decreased ejaculate volume, reduced frequency of sexual intercourse, shortness of Intra-Vaginal Ejaculatory Latency Time and inability to control ejaculation. [15,16]

Association: There are five correlated characteristics described in DSM-5 for the diagnosis of PME. In the Partner's factors considered health status and sexual problem of partner, The relationship factor explaining about communication skill and inconsistency wish in sexual activity, Individual vulnerability factors explore about poor body image and history of emotional and sexual abuses and other psychiatric comorbidities e.g depression, anxiety, loss of job etc, in the cultural and religious factor shyness of individual and disallows against sexual activity and frame of mind towards sexuality and in the Medical factors seen to be prognosis, course / treatment of PME. [2]

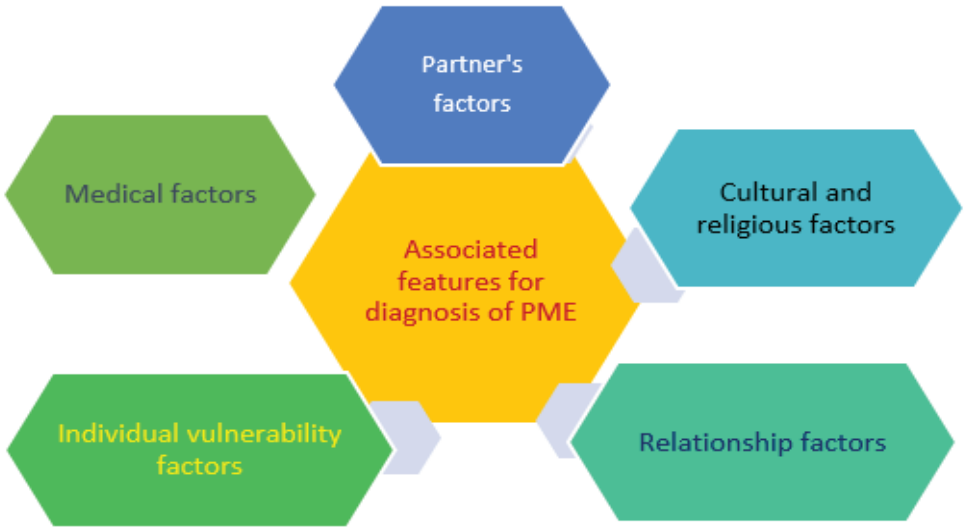

Figure: 2 Associative Diagnostic Factors for Premature Ejaculation

Yogic approach for Premature Ejaculation

There are few studies including Yoga therapy has been conducted for treatment of Premature ejaculation. In their, some were non-comparative [17], some were comparative [18], some were randomized control studies [19-21] and one study was pilot [21]. In these studies Asanas [17-22] , Pranayama (breathing practice) [17-22], Bandha (Hathyogic locks) [17], mudra [17-22] , cleansing practices [17] and relaxation [17-18] were used as Yoga therapy for 45-60 minutes/days. These studies had compared with stop-start method [19] , pelvic floor exercise [20] , Naturopathy techniques [21] and Ayurvedic

drug Narshimbhachuran[22]. Male sexual quotient (MSQ) [17] , Intra-vaginal ejaculatory Latency time (IELT) [18,19,22] , Premature ejaculation Severity Index (PESI) [21] and subjective interviews [22] are used as outcome measures. Yoga therapy was found effective for treatment of Premature Ejaculation [17-22].

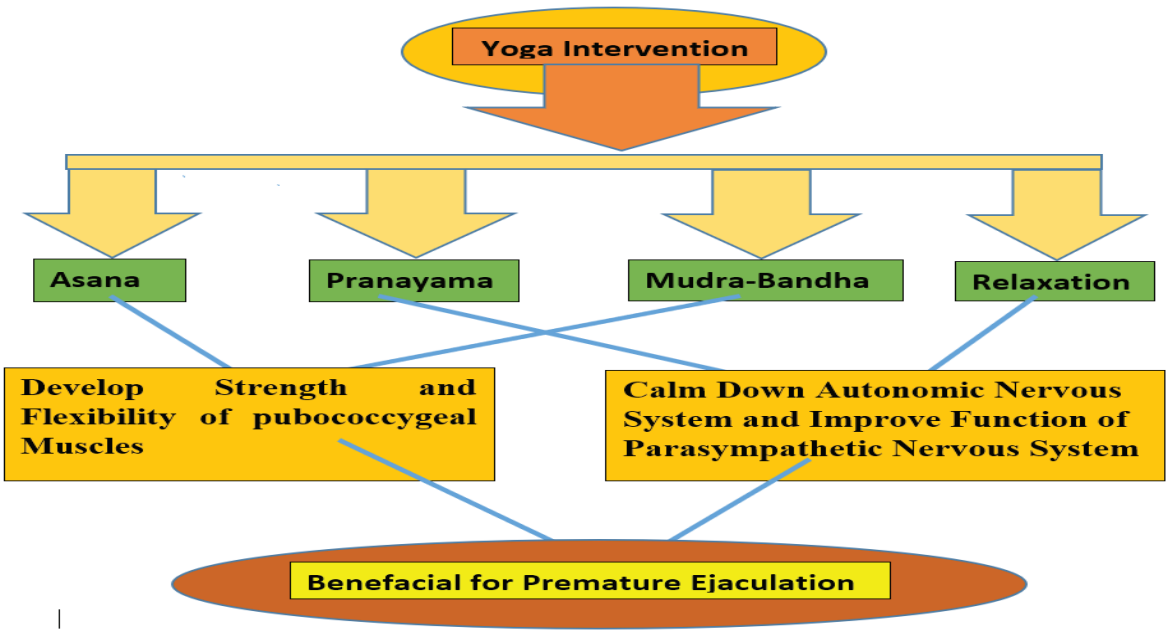

Figure: 3 Some important Yogic Practices for Premature Ejaculation

Holistic Approach of Yoga therapy for Premature Ejaculation

As per Dr Georg Feuerstein Yoga is not complete physical or psychological therapy but it has therapeutic element and traditionally Yoga is means of psycho-spiritual growth and leading to inner peace and freedom. [pg -1] In theThe Nirvana Prakarana of the Laghu Yoga Vashishta Sage Vashishta teaches Lord Rama that there are two major classifications of disease described the root of Mental disorders and bodily diseases, those that are first is Adhija (the psychosomatic, stress disorders) i.e. caused by the mind and second is Anadhija (infectious disease, accidents etc) i.e. caused by infections and accidents of the gross body. [23] Yoga therapy is not organ specific and symptomatic but it is a science that works holistically to strengthen the inner being. Dr. Swami GitanandaGiri considered Yoga Chikitsa could be termed as "man's first attempt at unitive understanding of mind-emotions-physical distress and is the oldest and holistic concept of therapy in the world. The Brahmacharya Mudra in Yoga is a unique approach to sexual control. Sexual hormones can be regulating through the use of the Shat Mudras, which are sometimes called Oli Mudras. A special technique of Yoga i.e. "Abhya Sadhana Chikitsa" particularly applied for the reduction of anxiety and stress. This system consists different techniques, from Yoga like: Asanas, Kriyas, Mudras, Pranayama, Relaxation Techniques, evolved within Jnana Yoga Therapy and Raja Yoga Therapy. There are Two

distinct system have evolved. The first one (Raja Yoga) deals with tension-relaxation or Spandha-Nishpandha Kriyas that related to the physical therapy of Yoga Chikitsa, while a second (Jnana Yoga) aspect termed ChintaaChikitsa deals with psychological anxiety and stress. [23]

Premature Ejaculation as A Psychosomatic Disease (MindBody Disease) A Rational View

Symonds T et.al (2003) explained The cause of Premature Ejaculation has been considered to be psychological factors are dominant than physiological. Because of this assumption, sex therapy was considered the treatment of choice with behavioral and/or cognitive approaches proving to be the most successful [24], Tondo et.al (1991) also agreed with this concept that narcissism, or unconscious feelings toward women the causal factor of premature ejaculation in male. [25] (tondo 1991). In the concept of Yoga The human body exists in 5 layers, they are They are: (1) ANNAMAYA KOSHA the physical level) (2) PRANAMAYA KAOSHA the subtle energy level (3) MANOMAYA KOSHA the sheath of mind/ emotion (4) VIGYANMAYA KOSHA Intellectual mental level (5) ANANDAMAYA KOSHA a state of optimal homeostasis and balance. Human mind is the part of Manomaya Kosha, imbalances in this layer become root cause of the Psychosomatic disorders.[26] The great sage Mahrshi Patanjali considerd five cause of mental imbalances are knowen as Punchklesha, the punchklesha are (1) Avidya- Ignorance impermanent impure painful and nonself as permanent pure pleasure and self. (2) Asmita (Egotism) identification of purusha principle with prakri t i principle. (3) Raag (Attachment) attachment toward the thing which gives you pleasure. (4) Dvesha (Hatred) aversion towards those things which are unpleasant or give you pain. (5) Abhinivesh fear of death, clinging to life or willing to live.[27] and Sage vashishta in his litrature“Yoga Vashishtha” says progression of mind body illness from mind to the body as vyadhi or disease through the channel of prana. [23]

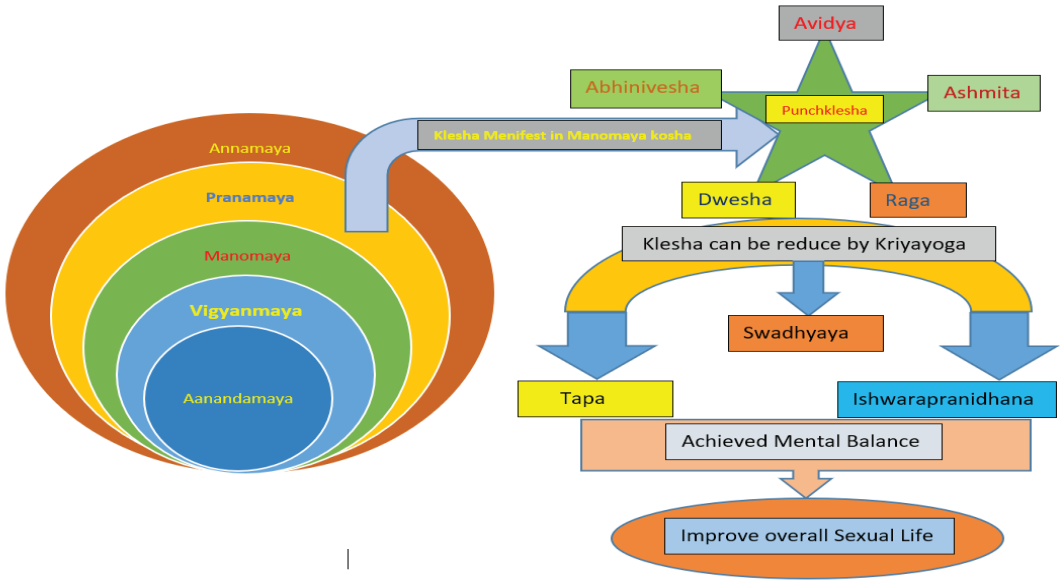

Figure: 4 Origin source, Yogic causes and Management approach for Premature Ejaculation

Discussion

Sheu G (2014) et.al described in his article seminal ejaculation completed in two processes, (i) emission and (ii) Expulsion. Emission is a physiologic process involving the different part of penis distal epididymis, the vas deferens, the seminal vesicles, the prostate gland, the prostatic urethra, andin Expulsion discharge of the products of emission happening from the urethra, by the coordinated actions of some special parts of penis like bladder neck, urethra, and pelvic striated muscles. Neuroanatomy of Ejaculation consists sympathetic nervous system regulation of Emission while expulsion is moderated by the somatic nervous system. Dopamine, serotonin andnitric Oxide are inhibitory neurotransmitters have been identified in the ejaculatory neuraxis .[28]Regular practice of Yoga improve the quality of sperm if one has issues with sperm count or motility. Practicing yoga is well proved for male disorders like prostate health, warding off prostate disorders, and reducing the size of prostate if it has got enlarged. Adopting Yoga practice regularly, reduce stress and anxiety levels also, which can improve the overall health of reproductive organs, as it has proven that having less stress in life help improve sexual life.[19] Similarly Pallav Senguptael.al were reported, yoga practice brings positive changes in sexual life within few months And a sense of well-being develop for the whole body.[29]Stimulation of the sympathetic nerves causes contraction of epididymis, ejaculatory ducts, and seminal vesicles, leads to ejaculation of semen. Increasing parasympathetic stimulation is assumably beneficial in enhancing ejaculatory control. Dhikav. V et.al (2007) reported a significant therapeutic effect of yoga in Premature Ejaculation. [18]

Conclusion

In this narrative review article reviewed about etiology, clinical features, holistic Yogic approach to PME and PME as a psychodynamic Disease. From above studies it is clear that PME have less Physical causes and psychological more. Yoga is a mind body therapy system so PME patients can get beneficial effect to improve sexual health.

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Ethical Clearance: It's a Review article

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Knowledge and Confidence of Iraqi Pediatric Residents in Management of Diabetic Ketoacidosis in Children

Wasnaa Hadi Abdullah[1], Ali Hasan Aljumaili[2], Hussain Alsaffar[3]

[1]Senior Lecturer, Pediatric Department, College of Medicine, Al-Mustansiriyah University, Baghdad, Iraq, [2]Consultant Pediatrician, Central Child Teaching Hospital, Baghdad, Iraq, [3]Consultant in Paediatric Endocrinology and Diabetes,Child Health Department, Sultan Qaboos University Hospital, Muscat, Oman. Honorary Associate Professor, University of Wasit, Iraq

Abstract

Background: Diabetic ketoacidosis (DKA) is a leading cause of mortality in children with type 1 diabetes mellitus. Pediatric residents in Iraqi hospitals are usually the front liners in managing pediatric emergencies. Therefore, it is important to make sure they are practicing at the highest possible standards to ensure patients' safety. **Objectives:** this study evaluates the knowledge of Iraqi pediatric residents regarding DKA recognition and management and sheds the light on the areas that need further improvement. **Methods:** An online survey was conducted. A survey link to an online questionnaire using Survey Monkey was sent to residents at different levels between first and fourth year of training (R1-R4) in general pediatrics. **Results:** About 60.9% of respondents spent more than 6 months in pediatric emergency training. The majority of residents had treated more than 10 children presented with DKA, with the highest percentage (81.8 %) found among R4s residents. Only 27.8% of residents recognized the diagnostic criteria of DKA. Three quarters of the participants could correctly calculate IV fluid infusion rate for maintenance by accounting for the deficits and subtracting the boluses before calculating the corrections over 48 hours. 68.3% of respondents would not routinely attach DKA patients to a cardiac monitor unless the patient's condition is unstable. 69.6% of survey respondents feel confident in treating children with DKA. Most participants (91.3%) think that there is a need for more DKA training/education sessions. **Conclusions:** Most of the respondents have a reasonable level of knowledge on how to manage DKA in children in Iraqi children's hospitals. Some gaps in knowledge were identified and need to be highlighted in near future. Educational sessions for the residents about DKA management in children are deemed necessary.

Keywords: *DKA, Iraq, Residents, Education, Pediatric.*

Introduction

Diabetes mellitus (DM) is a serious clinical condition that requires careful approach. Unfortunately, there is an increasing prevalence of DM globally. The trajectory of the disease estimates the number of patients to be doubled by 2025 and total number might reach to almost 642 million world-wide by 2040 [1-3]. DM in Arab countries

Corresponding author:
Wasnaa Hadi Abdullah
Wasnahadi@uomustansiriyah.edu.iq

is a major public health issue with an estimate of 20.5 million patients reported by 20 Arab countries in 2011 [4]. Iraq is considered to have a medium prevalence of DM (9.3%) compared to other Middle Eastern countries [4, 5], with a highest prevalence from the region (25.7%) in Bahrain [6].

Diabetic ketoacidosis (DKA) is a common acute complication of DM and it can cause increased morbidity and mortality if not effectively and timely managed [7]. DKA was first described by Julius Dreschfeld in his lecture to the Royal College of Physicians about Diabetic Comma in 1886 [8], which remained of a great concern until the discovery of insulin in 1922 and its utilisation in the treatment of DKA. In the Middle East, there is an estimated 64,000 cases on type 1 DM (T1DM) affecting children younger than 15 years old [9] while the overall incidence of DKA in the Arab region is almost 46.7% [10]. The DKA mortality is mostly due to cerebral edema but the sequence of events that leads to DKA cannot be precisely predicted for every given case [11]. However, DKA is a common clinical problem and a major cause of death in younger patients with DM [12]. so DKA management requires knowledge and skills by the medical staff to reduce the associated morbidity and mortality. Therefore, we aim in this study to evaluate the knowledge of Iraqi pediatric residents about their recognition and management of DKA in children and young people, and to identify any gaps in their knowledge and therefore working on raising the standards of provided health care.

Materials and Methods

A survey questionnaire was conducted online between February 29th and March 29th, 2020 and 70 pediatric residents in various Iraqi hospitals were provided with the survey link. The online questionnaire contained 34 items including (assessing knowledge about DKA diagnosis and severity, management of DKA including fluid and insulin and monitoring of progress, dealing with possible complications, and finally involvement of senior on call in the follow up of DKA cases). The data collection and statistical analysis in this cross-sectional study were conducted using the commercial website Survey Monkey (https://www.surveymonkey.com/). A 95% confidence interval was used and a value of $p<0.05$ was considered statistically significant.

Results

The survey was completed by 41 of 70 (response rate 58.5%) pediatric residents in Iraqi hospitals based in Baghdad, the Capital City of Iraq. 20 Male residents accounted for 48.7% of those who took part, while 21 female residents accounted for 51.2 %. About 60.9% of respondents spent more than 6 months in pediatric emergency training. Residents rated their awareness and knowledge of dealing with children presenting with DKA in the questionnaire, the bulk of residents in R2-R4 training years evaluated themselves as “good” while R1 evaluated themselves as “very good” as shown in table 1.

Table 1: Comparison between pediatric residents in terms of level of knowledge of DKA management.

	R1	R2	R3	R4
Number of participants	**6**	**18**	**6**	**11**
Self-assessment of knowledge and management of DKA in paediatrics Poor Fair Good Very good	 1, 16.7% 1, 16.7% 1, 16.7% 3, 50%	 0 3, 16.7% 11, 61.1% 4, 22.2%	 0 0 5, 83.3% 1, 16.7%	 0 2, 18.2% 6, 54.5% 3, 27.3%
Residents who could calculate rate of IV fluid [Maintenance rate + deficit] – boluses (given at resuscitation, correction over 48 hrs) [Maintenance rate + deficit] (correction over 48 hrs) Correction of fluids over 24 hrs	 5, 83.3% 0 1, 16.7%	 14, 77.8% 1, 5.6% 3, 16.7%	 3, 50% 1, 16.7% 2, 33.3%	 8, 72.7% 0 3, 27.3%
Frequency of glucose monitoring during the early hours of management (first 12 hrs) Every 30 min Every hour Every two hours Every 3-4 hrs	 0 5, 83.3% 1, 16.7% 0	 0 15, 83.3% 3, 16.7% 0	 0 5, 83.3% 1, 16.7% 0	 0 9, 81.8% 2, 18.2% 0
Cardiac monitoring of all DKA patients	1, 16.7%	4, 22.2%	3, 50%	5, 45.5%
Choice of level of blood glucose at which dextrose is added to IV fluids <9 mmol/L <14 mmol/L <5 mmol/L	 1, 20% 4, 80% 0	 3, 18.8% 10, 62.5% 3, 18.8%	 1, 16.7% 5, 83.3% 0	 3, 27.3% 8, 72.7% 0
Global confidence in handling children with DKA Very confident = 3 Confident= 2 Fair = 1 Not confident at all =0 Average score of confidence	 1, 16.7% 2, 33.3% 3, 50% 0 1.6	 1, 5.6% 13, 72.2% 4, 22.2% 0 1.8	 1, 16.7% 5, 83.3% 0 0 2.16	 0 7, 63.6% 3, 27.3% 0 1.7

The majority of residents who took part in this study had treated more than 10 children and young people presented with DKA, with the highest percentage (81.8 %) found among R4s residents, as shown in table 2.

Table 2: Comparison between junior residents (R1-R3) and final year residents (R4)

	R1-R3	R4
Number of residents	**30**	**11**
Number of DKA cases that each resident had managed during their training None Less than 5 5-10 More than 10	0 1, 3.3% 6, 20% 23, 76.7%	0 0 2, 18.2% 9, 81.8%
% of correct answers about DKA diagnostic criteria	6, 20.7%	5, 45.5%
Giving a bolus dose of IV fluids to patients with severe DKA but not in a shock 10 ml/kg of 0.9% NaCl 20 ml/kg of 0.9% NaCl	43.3% 56.7%	80% 20%
Percentage of correct responses regarding timing to switch IV insulin to SC insulin	18, 62.1%	8, 72.7%
Percentage of residents who correctly answered survey question regarding the use of sodium bicarbonate infusion to correct acidosis	27, 90%	11, 100%
Management of hypoglycaemia (<4mmol/L) in the presence of ketosis Giving a dextrose bolus Increasing IV glucose concentration Temporarily stopping insulin infusion All of the above None of the above	11, 36.7% 9, 30% 3, 10% 6, 20% 1, 3.3%	2, 18.2% 6, 54.5% 1, 9.1% 2, 18.2% 0
Number and percentage of residents who correctly recognised cerebral oedema as a life threatening complication of DKA	20, 66.7%	9, 81.8%
Recognising features of cerebral oedema during DKA Average level of knowledge	65.3%	69.1%

Assessing knowledge about DKA diagnosis and severity

The survey revealed that only 27.8% of residents recognized the diagnostic criteria of DKA (Blood glucose >11mmol/L, blood pH <7.3 or HCO_3 < 15mmol/L and ketonemia), with R4 trainees accounting for the highest percentage (45.5%) as shown in table 2. Regarding the presence of leukocytosis in DKA patients, 70.7% participants agreed that an elevated white blood cell count is usually seen in DKA and does not always signify infection.

Management of DKA

Involving the senior on-call physician

The survey results showed that almost half of residents (51.2%) would inform their seniors about the attendance of a patient with DKA only when it becomes difficult to manage. However, only 26.8% of residents, the majority of whom are R4 residents, do notify their seniors immediately, as soon as the diagnosed was confirmed.

In terms of discussing the case with the on-call endocrinologist consultants, the number of residents who consulted the on-call pediatric endocrinologist varied with 33.3% of R1-R3 and 54.5% of R4 who consulted the endocrinologist while the patient is in the emergency room.

Fluid Management

The survey showed that 40 out of 41 (97.5%) respondents give a fluid bolus intravenously (IV) to DKA patients regardless of whether they are in shock or not. Saying that, 73.9% of residents prescribe 0.9% normal saline as their IV fluid of choice for fluid replacement and maintenance in management of DKA. Almost half of respondents (53.3%) would start with 10 mL/kg of 0.9% normal saline. The majority of R4 participants (80%) have answered the question related to fluid management correctly compared with 43.3% of R1-R3 trainees, as shown in table 2.

For patients with severe DKA and in a shock, 63.4% of residents think that the fluid bolus should be given over 15 to 30 minutes, while the rest (36.5%) think it should be given slower than that i.e. over 30 to 60 minutes.

Three quarters of the participants (73.1%) could correctly calculate IV fluid infusion rate for maintenance by accounting for the deficits and subtracting the boluses before calculating the corrections over 48 hours. The greatest percentage of respondents who correctly answered the question were R1 trainees (83.3%) as shown in table 1. Majority of respondents, 27 out of 41 (65.8%) had correctly suggested adding glucose to the IV fluids if blood glucose decreases below 14 mmol/L during the course of managing the acute DKA.

Insulin therapy

Most respondents (85.3%) indicated that they would start insulin infusion 60 minutes after starting IV fluids. Meanwhile, 63.4% were able to appropriately suggest when intravenous insulin should be switched to subcutaneous insulin, with higher response of correct answer among of R4 doctors (72.7 %) in comparison with (62.1%) of R1-R3 trainees (table 2).

Monitoring the progress

The survey participants were aware of the need to monitor blood glucose very frequently during the first few hours of DKA management. The majority of respondents from each stage from R1 to R 4 indicated that they should monitor random blood sugar hourly especially during the first twelve hours of DKA (table 1). This study also showed that 89.1% of participants could correctly identify the parameters required for monitoring the patient's progress in response to the treatment plan including monitoring of blood sugar, blood or urine ketones, serum electrolytes, renal function tests, neurological evaluation and blood gas analysis.

Majority of residents (92.6%) of whom 100% of R4 did not utilize sodium bicarbonate infusion regularly to correct metabolic acidosis (table 2). The bulk of participants (87%) are mindful that cardiac arrythmia could arise from hypokalemia during the course of DKA. Despite that, 68.3% of respondents would not routinely attach DKA patients to a cardiac monitor unless the patient's condition is unstable or deteriorating. Interestingly, the residents' awareness about this critical point increases as the residents get more senior; 16.7%, 22.2%, and 50% from R1, R2 and R3s respectively (table 1). Surprisingly, only one responder was aware of the other possible causes of arrhythmias during the course of DKA management including hypophosphatemia, hypernatremia and hypercalcemia.

Dealing with possible complications

When it comes to treating hypoglycemia (<4 mmol/L) throughout DKA management, only 8 out of 41 participants (including 20% of R1-R3 and 18.2% of R4) indicated that a dextrose fluid bolus is needed, in addition to suspending the insulin infusion momentarily, and that the infused glucose concentration should be increased to avoid more hypoglycemia subsequently (table 2).

Among life-threatening complications for DKA, majority of residents (73.1%) chose cerebral edema, in comparison with only 29.2% who select hypokalemia and 14.6% who chose aspiration pneumonia. The survey revealed that 66.7% of R1-R3 respondents are aware of the signs to detect cerebral edema in comparison with 81.8% of R4 (table 2), and average level of knowledge regarding recognizing features of cerebral edema during DKA was 65.3% among R1-R3 in comparison with 69.1% of R4 (table 2).

Overall remarks

The present study showed that 69.6% of survey respondents feel confident in treating children with DKA with the highest average score of confidence (2.16) on 0 to 3 score among R3 trainees (table 1). On the other hand, most participants (91.3%) think that there is a need for more DKA training/ education sessions. No statistical significance at level of confidence was noted between senior and junior residents.

Discussion

Hyperglycemia, metabolic acidosis, and ketonemia are major components of DKA [13]. DKA is reported to cause more than 100,000 hospitalizations in the United States each year [14]. The degree of knowledge about DKA and confidence in managing pediatric patients with acute DKA in Iraq was assessed in this study.

The study revealed that majority of residents had sufficient understanding of how to start insulin therapy and to decide when to shift the patient from IV insulin to subcutaneous (SC) insulin. Meanwhile, survey results regarding overall knowledge about fluid management in DKA were satisfactory. Most participants were aware of appropriate calculation of IV fluids administration rate in DKA. These results were in line with a study done among pediatric residents in Bahrain [15] although the present study showed relatively higher awareness among Iraqi pediatric residents.

Similarly, the results regarding the confidence level scale, which ranged from poor to very good, revealed that the bulk of residents in R2-R4 training years evaluated themselves as "good" while R1 evaluated themselves as "very good". This could be due to the overconfidence of year one residents which could be associated with less competence in the management of DKA during the early years of training. As a result, this issue is important when it comes to supervising and helping the junior residents when it comes to commencing DKA management.

Senior residents involve their seniors only when the patient's condition is becoming challenging to manage. This could represent the trainees' maturity and trust in DKA management which was also concluded by Roland et al study [16]. Saying that, The British Society of Pediatric Endocrinology and Diabetes (BSPED), advocates for consulting a more senior doctor whenever a patient with DKA is identified, despite feelings of self-management confidence, because patients might swiftly deteriorate [17].

A previous study in the United Kingdom [18] assessed the knowledge of low-ranking residents about DKA and its management. The majority of residents were able to accurately diagnose DKA. Similarly, the study in Bahrain by Hasan et al. [15] found that 65% and 86.4% of R1-R3 and R4 residents, respectively, were able to correctly diagnose DKA. However, in the present study, the results are lower than those reported in the above studies where only 20.7% of R1-R3 and 45.5% of R4 correctly identified the diagnostic criteria for DKA.

In the first 12 hours of DKA care, the majority of residents in our survey, as for Bahraini pediatric residents [15], demonstrated a response to hourly glucose monitoring. Meanwhile, it is accepted that all DKA patients regardless if they are in shock or not should receive an IV fluid bolus of 10 ml/kg of 0.9% NaCl over 30 minutes ,this was reported by the updated National Institute of Clinical Excellence (NICE) [19], which is fortunately the response of majority of our pediatric residents.

The number of residents who consulted the on-call pediatric endocrinologist varied with 33.3% of R1-R3 and 54.5% of R4 who consulted while the patient is in the emergency room. However, these results are higher than pediatric residents in Bahrain (21.1%, 36.4% respectively) [15]. It appears that the decision was made solely based on the individual's own preferences, rather than on the basis of seniority or confidence. This might require additional research, and residents should be given clear guidelines on when to consult subspecialists. Different guidelines strongly urge involving responsible seniors and residents should

be provided with clear guidelines regarding that.

Several studies have demonstrated the value of using developed management pathways in minimizing medical errors and variances in practice. The use of a DKA management pathway improved overall patient care in previously published study in the United Arab Emirates [20]. Our study revealed that residents have adequate background knowledge about DKA management, but it is suggested that workshops on proper management of DKA should be provided to residents in Iraqi hospitals. One way to raise awareness of residents on DKA management is to have hands on sessions or utilize clinical scenarios with established DKA management according to guidelines. The usefulness of this has been reported in multiple trials, the most recent of which was completed in 2016 [21].

Conclusion

In conclusion, the results of the survey questionnaire demonstrated that pediatric residents in Iraq have fair knowledge and confidence in management of DKA in children. Gaps in knowledge of correctly diagnosing DKA and subsequently its management were identified. The authors suggest that more teaching sessions regarding proper management of acute DKA in children should be made available to residents during early years of training. In addition, there is a need for an updated national protocol informed by evidence-based medical reports and public health studies in this region.

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An Outline on Awareness and Knowledge of Healthcare Ethics and Medico-legal Aspects among Budding Doctors in a Tertiary Care Hospital

Yogesh C[1], Narendhiran S[2], Amirthvarshan A[3]

[1]Associate Professor, Department of Forensic Medicine, Velammal Medical College Hospital & Research Institute, Madurai, Tamil Nadu, [2]Undergraduate, [3]Medical Officer, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu

Abstract

Introduction: Numerous litigations have been filed against doctors in the recent past by the patients on account of medical negligence, unethical behaviour and unethical association with allied healthcare industries.

Objectives: This study aims to study the awareness of healthcare ethics among budding doctors (CRRIs and Post graduate students) in a tertiary care hospital.

Materials and Method: A descriptive cross sectional study was conducted among 100 young doctors working in a tertiary care hospital in Coimbatore, Tamil Nadu using a self-structured questionnaire in September 2018 and the results were tabulated.

Results: Of the 100 doctors, 50 were CRRIs and 50 were post graduates with 55.1% of the doctors able to answer accurately for the questions on knowledge of medicolegal aspects.

Conclusions: Our study concludes that the interns and post graduates are aware of the ethical aspects and medicolegal issues in their practice but lacked the finer details in them. However definite steps are needed to improve the overall knowledge and awareness on healthcare ethics and its implications in young medical professionals.

Key Words: *Ethics; Medicolegal issues; Awareness; Consent; Curriculum.*

Introduction

Medical profession is considered as a most pious profession all over the world. It is not a mathematical process but a service-oriented liberal profession having a self-regulating code of ethics[1]. Actually, doctors are generally seen as healers and saviours. At the same time, livelihood of doctors and the medical fraternity depends on patients. In medicine, professionalism connotes not only knowledge and skills, but also character, especially

Corresponding Author:
Narendhiran S,
Undergraduate, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu.
Email: narensathyamoorthy@gmail.com
Phone: 9952534226

compassion and ethics[2]. Legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

An organized, reviewed and widely accepted system of principles and values that medical physicians refer to in times of need is called medical ethics[3]. These values include autonomy, beneficence, non-maleficence and justice. Three other values that add to this ethics discussion are dignity, truthfulness and honesty. These are the six basic moral principles of medical Ethics given by James Childress and Tom Beauchamp, in their famous book, Principles of biomedical ethics[4]. Medico-legal code practiced around 2200 BC, during the rule of the King of Babylon is the oldest known code of medico-legal conduct[5]. Hippocratic Oath recognized medicine as craft that a physician practices over his patients. This led to the famous saying of ''First do no Harm''[6].

We witness today a fast pace of commercialization and globalization on all spheres of life and the medical profession is no exception to these phenomena. As a result, the doctor-patients relationship has deteriorated considerably[7]. As the medical profession has been brought under the provisions of the Consumer Protection Act, 1986, the patients have an easy method of litigation. There should be legal awareness among doctors that will help them in proper recording of medical management details. This will help them in defending their case during any allegation of medical negligence[8].

There is a need for skills and knowledge related to ethics, which is as fundamental to the practice of medicine as basic sciences or clinical skills. This will enhance safe health care delivery in an unbiased standardized way. The trainee period is a critical time for fostering ethical reasoning[9] as this period brings out real time experience with the concern and care of the patients. Hence this study targeted the interns and post graduates testing their knowledge and awareness about medical ethics and medicolegal issues working in a tertiary care hospital in South India.

Methods

A descriptive cross sectional study was conducted among 100 medical apprentice (CRRIs and Post graduate students) working in a tertiary care hospital in South India in the year of September 2018. It was based on content analysis where a self-designed structured questionnaire comprising of 20 questions related to the knowledge and awareness of medical ethics and medicolegal issues were used to obtain the data.

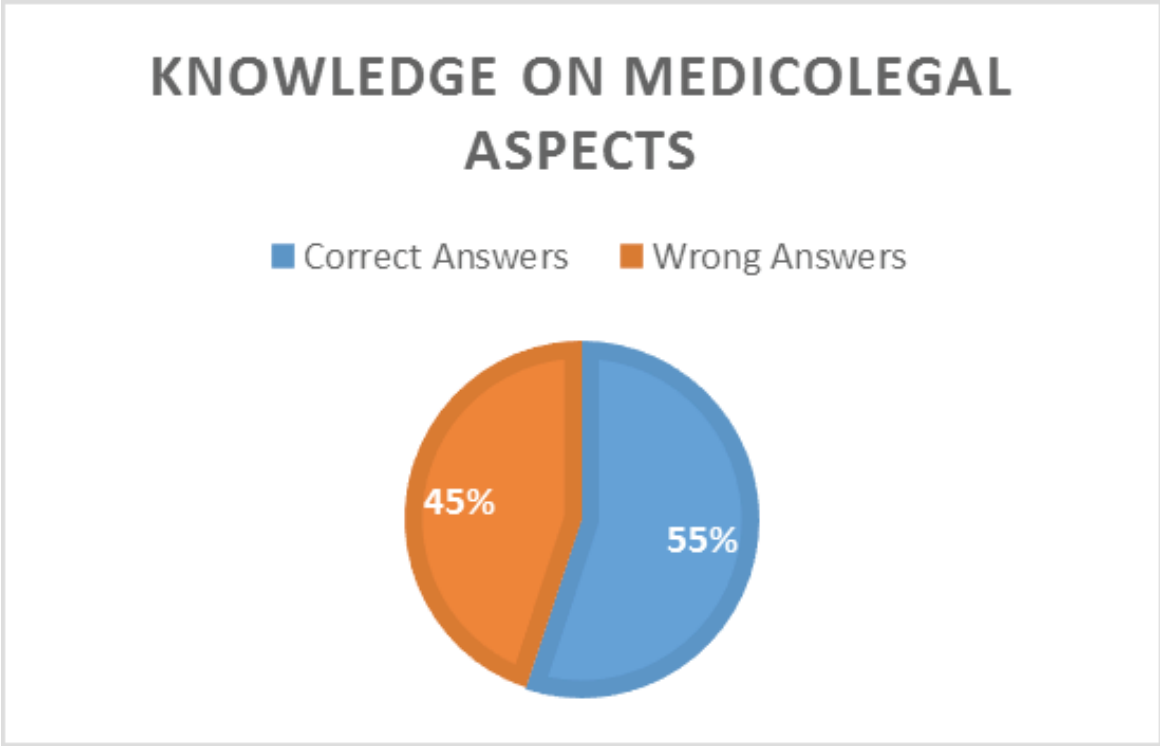
All those who gave consent were included in the study. Doctors who just finished their post-graduation were not included in the study. The data was analysed and results were tabulated using simple tables and pie charts. Percentage calculations were made for better statistical reporting.

Results

Of the 100 young doctors, 50 were male and 50 were female. 50 were CRRIs and 50 were Post graduate students. Of the 20 questions, 13 questions were related to the awareness of medical ethics and the remaining 7 questions were related to the knowledge on medicolegal issues. 76% of the budding doctors were in favour of mandatorily using the generic names in prescription and 83% of

them were against in receiving gifts from healthcare or pharmaceutical companies. 98% of the doctors were on the same page for acquiring informed consent for any major/minor surgery.

With regard to knowledge on medicolegal issues, the mean of all the responses was calculated and only 55.1% of the doctors were able to answer all the questions correctly with 44.9% getting it wrong for all the questions. Table 1 explains the responses to all individual questions on awareness of healthcare ethics. Table 2 details about the responses for the assessment of knowledge on medicolegal issues. Pie Chart 1 describes the accurate knowledge on medicolegal aspects of budding doctors.



Pie Chart 1 : Knowledge on Medicolegal Aspects

Table 1: Awareness of Healthcare Ethics

Questions	Yes	No
Ethical conduct only to avoid legal actions	10%	90%
Hiding facts in explaining the diagnosis	25%	75%
Exposing a corrupt colleague	57%	43%
Revealing patient condition to a relative without patient consent (adults)	12%	88%

Cont... **Table 1: Awareness of Healthcare Ethics**

Mandatory to use generic names	76%	24%
Display doctors' fees	41%	59%
Receive gifts from healthcare companies	17%	83%
Accept hospitality for doctors' family members from healthcare companies	25%	75%
Punishment for accepting gifts and hospitality	51%	49%
Informed Consent essential for all major/minor operations	98%	2%
Refusal of treatment for violent patients	46%	54%
Treat children without consent in non-emergency cases	23%	77%
Ethics in regular medical curriculum	85%	15%

Table 2: Knowledge on Medicolegal Aspects

Questions	Right	Wrong
Recommended Continuing Medical Education Hours – 30 hours	20%	80%
Maintenance of OPD Record – 5 years	52%	48%
Maintenance of IP Record – 10 years	48%	52%
Maintenance of Medicolegal Registers – 10 years	80%	20%
Punishment for attacking healthcare professionals under Medical Protection Act – 3years + fine	51%	49%
Medical Negligence comes under Consumer Protection Act	65%	35%
Passive Euthanasia is legal in India	70%	30%

Discussion

The success of a health system depends on the medical personnel equipped with the requisite knowledge, skills and attitudes towards patient rights[10]. Ethical conflicts are common during the initial years of a medical professional's career which makes the inculcation of a sound foundation in medical ethics essential. Negligence in the medical world has assumed great importance in relation to the medical malpractices suits in various countries in Asia, Europe, USA and more so in India[11].

There is growing public awareness regarding the ethical conduct of medical practitioners, and complaints against physicians appear to be escalating. The changing doctor-patient relationship and commercialization of modern medical practice has affected the practice of medicine. In our study, 90% of the respondents have realised the true potential of understanding ethical practice and not merely as to avoid legal actions. This is improved when compared to the study done by Biswajit et al in West Bengal in 2009[12] where only 31.1% were positive about the importance of ethics.

Clinical medicine is thought to be shifting toward a patient-oriented contract, and in this model, a patient's right to autonomy as expressed by the term 'informed decision'. With regards to consent in medical practice, 98% of our responders gave a positive reply as it is a quintessential component before any surgery, similar to the study done by Kheir et al[10] where 99% agreed to the same. Majority of our participants(75%) were against in hiding information while explaining the diagnosis and 88% were rightly not interested in explaining the patient condition to his/her relative without his/her consent. This reflects that awareness among health professionals is high with regards to informed consent and ethical aspects surrounding consent as litigations against doctors are on hike which is an issue of immediate concern[10].

Our study revealed that nearly half of the doctors were not sure of treating a violent patient- this is in accordance with the study done by Jasuma et al in Vadodara[13] and this is because there is no clear cut law on patient's care in Indian scenario; however fundamental rights enshrined in the constitution say that patient has a right of access to health care[14]. Around 77% of our doctors stayed away from treating minors or children without consent from parents or guardians in non-emergency situations similar to the study done by Mayuresh et al in Maharashtra and Haryana[15].

A study done by Biswajit et al[12] showed 59.9% agreed to use brand names while prescribing drugs whereas our study showed 76% wanted to make generic names mandatory while prescribing drugs. This increase in voice of opinion can attributed to various factors like changes in prices of drugs in various brands, the economical tightness among people and also may be due to the inclination of doctors towards certain brands favouring some pharmaceutical companies. Our study strongly condemned against receiving gifts (83%) or accepting hospitality for themselves or their family members (75%) from healthcare companies but stayed neutral on whether strict punishments should be given to those who accept the offers. A French study by Goupil et al[16] showed that doctors who do not receive gifts from pharmaceutical companies have better drug prescription efficiency indicators

and less costly drug prescriptions than those who receive gifts.

Today, the fundamental principles of medicine insist that doctor should be aware about various medico-legal issues, understand the nature of these obligations and fulfill these obligations to best of his ability. Our study revealed only 55% of the doctors were rightly able to address all the medicolegal questions hurled upon them. This is correlating with the study done by Makhani et al[17] where 52.91% doctors were able to respond maximum medicolegal questions correctly clearly explaining the need for more training and education on medicolegal issues.

Continuing Medical Education (CME) is an educational activity that contributes to maintaining, improving and updating a physician's knowledge, expertise and professional performance. In April 2011, the MCI passed a resolution on CME, by which it was made mandatory for all doctors to attend a minimum of 30 hours of CME in every 5 years, failing which their registration to practice would be suspended[18]. This was the most lacking area in our study where only 20% of them were aware about the guidelines and this calls for a serious look into incorporating CMEs into regular practice particularly relating to ethics and medicolegal issues.

As per the DGHS vide letter No. 10-3/68-MH dated 31-8-68, medicolegal records and in patient records should be maintained for 10 years and out patient records for 5 years[19]. Since March 2018, passive euthanasia is legal in India under strict guidelines. Patients must consent through a living will, and must be either terminally ill or in a vegetative state[20]. All these recent updates have not reached many of the young professionals that again demands the inclusion of medical ethics as a part of curriculum which in turn 85% of our participants obliged to.

There are various reasons for low knowledge and awareness on ethics as quoted by Makhani et al[17] which says lack of regular CMEs on medical ethics and medico-legal issues, over-confidence, less significance to medical jurisprudence during undergraduate curricula, near zero exposure to these issues during post-graduation were some of the commonly cited reasons. Due to the limited knowledge by the health professionals, there is an increased risk of malpractice, especially from complex case situations. In addition, the expanding patient population is becoming more knowledgeable and aware of their rights, consequently taking action by contacting the consumer forum to lodge their complaints[21]. No matter what branch of medicine or surgery the graduate enters he/she will always have to face medico legal problems one or the other day during his professional life[22]. There is always a continuum between practice and education because a medical career is one of life-long learning.

Conclusion

Our study concludes that the interns and post graduates are aware of the ethical aspects and medicolegal issues in their practice but lacked the finer details in them. To strengthen ethical reasoning and judgment in decision making, clinically oriented pedagogical measures like case studies, seminars, interactive workshops, utilising the work experience of multidisciplinary medical expertise, is needed. The medical ethics, acts

related to medical practice should be emphasized in the MBBS and also in post graduate syllabus and examinations. Subsequent studies using larger sample and bigger questionnaire would give better perspective of awareness of the issues under consideration. However definite steps are needed to improve the overall knowledge and awareness on healthcare ethics and its implications in young medical professionals.

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Socio-Legal Study of the Migrant Workers: A Special Reference to Covid-19

Zahid Lateef Bhat

Student of Master of Law, School of law Raffles University, Jaipur, Rajasthan

Abstract

This research paper is a study on the situation of Migrant Workers, and hardships faced by them in this pandemic. This paper will try to analyse on whom the responsibility lies, whether the Central Government was at fault or the respective State Governments need to be held accountable. This paper will revisit the plethora of laws we have for migrant workers but lack effective implementation. This paper will also address the effects of migrant labours both short term and in long term, and how the Supreme Court could have taken a more proactive path to tackle the situation. Finally this paper will try to suggest some practical recommendations that can be implemented and will improve the situation.

Keywords: *Centre-State Accountability, Inter-State Migrant Workmen Act, Ill-effects on migration of labours, Supreme Court's late cognizance.*

Introduction

Government is by all accounts taking a ton of proactive measures to genuinely look at the spread of Covid, the other side of this doesn't look splendid. The situation of thousands of traveler laborers strolling back to their local spots from significant urban communities can be felt and seen on TV stations by everybody. A great many of them were on the streets, strolling many kilometers with youngsters and their pitiful things. The accounts of the disappointed working individuals lost in the hold of the organization's apathy and lockdown is the same old thing toda. The lockdown in India has affected the vocations of an enormous extent of the country's almost 40 million inner transients.

We disparaged the part travelers played in the Indian economy. We have neglected to perceive their commitment. We realized they existed however never recognized their quantum[30].

The suffering monetary variations have surfaced by and by under the public eye during the cross country lockdown in India following the worldwide pandemic. The financial separation was recognizable in the pictures of India's rich and working class applauding on the porches and overhangs of their homes and the bleak pictures of millions of helpless strolling on the streets deprived of food, water and public vehicles, to arrive at home. At the point when this characterizing picture of India has shaken the public soul, the political lack of concern and the administrative failure to handle the transient issues have turned into the platitude in the conversations and discussions around the issue.

If I have to die, I will die at my home

"I need to see my better half and children. I need to get back. Work can stand by, At the present time, I need to be with my family. On the off chance that I need to kick the bucket, I will pass on in my home. How might I get by here without food, cash and a safe house" one development laborer from Bihar, working in Bengaluru. This longing to return home, not in view of cash or absence of work, however the dread of not having the option to see your family is totally justifiable.

We can see the case of the province of Gujarat which organized extravagance transports for 1,800 pioneers from the state abandoned in Uttarakhand to get back in spite of the lockdown in Spring or why the Indian government gave residents abroad a couple of days' notification to get back prior to stopping all flights. In any case, this motivation is infrequently recognized with regards to traveler work.

On 23rd Walk, an hour after Indian Leader Narendra Modi stretched out a cross country lockdown to contain the spread of the Covid, a large number of traveler laborers assembled close to a rail line station in Mumbai city. There had been bits of gossip about train administrations restarting, and the specialists had assembled opposing guidelines of social removal, putting themselves as well as other people in danger. They requested that specialists mastermind transport to send them back to the places where they grew up and towns so they could be with their families. Around a similar time, in the western province of Gujarat, many material specialists fought in Surat city, requesting a section home. What's more, after a day, there was shock in the capital, Delhi, when a few hundred travelers were found living under a scaffold along the Yamuna stream. The waterway here takes after a sewer and the bank is tossed with waste. [31]

The issue looked by the transient laborers because of the lockdown is regular, in light of the fact that a greater part of traveler laborers have lost their positions as well as they are not in any event, getting two dinners per day in spite of cases by the focal and state governments that everybody is being given food. They had no other alternative except to leave for their homes.

The way was getting wicked in the blood of their feet as they strolled. Large numbers of them had lost lives while strolling under the searing sun without food or water.

This is exceptionally shocking in which neither host states nor home states need to assume their liability. The host states are stressed over traveler distress and about the trouble of giving safe houses and arrangements while likewise guaranteeing that they keep social removal and lockdown rules. The home states, nonetheless, dread an unexpected spray in cases, trouble in endeavoring to uphold 14-day isolates and the potential for the returnees to overpower medical services offices that are not ready for enormous numbers.

Who will take the accountability?

No one is prepared to assume the liability, the eternity attempt at finger pointing proceeds just to clean the weight off of their head. The focal government reminded states and association regions that it was their obligation to guarantee that traveler laborers were not passed on to stroll

on interstates or along the railroad tracks or cycle their direction home when consent has been given to sort out transport for their drive. Yet, was there any vehicle accessible in all actuality?.[32]

The State Government was disregarding the liability of facilitating the transients, since movement was impossible right now. So which is right? Is the Association government to blame for not aiding the transients get back or is the separate State Government to blame for neglecting to recognize that the wellbeing emergency could spread the nation over with the travelers? The straightforward truth is there are no basic answers.

Both the Association and the State governments couldn't see the traveler laborers out and about strolling a great many kilometers. In any case, why this segregation when the Middle mounted a gigantic mission named "Vande Bharat" to bring back Indians abandoned abroad, it has not shown a similar enthusiasm in attempting to get helpless laborers home, why it took such a long time for the "Shramik Unique".

Another significant misfortune we confronted is that India has no focal library of transient laborers regardless of passing enactment 40 years prior to build up such a data set. They weren't canvassed in arrangement circles. We talk just about brilliant urban communities, presently we understand that urban areas need transients.

What is the Legal Position of Union and State in this Matter-

Article 217 read along with 'list 1', under the seventh timetable unmistakably makes reference to 'thing 81', specifically, "between state movement and between state isolate" to be a force of the middle. The focal government alone is enabled to manage this as a general rule, and between state transient laborers are certainly a piece of the 'power' and the obligation. The rundown of states' forces and obligations obviously don't specify 'bury express transients' nevertheless that doesn't acquit them absolutely, as they are the two beneficiaries of such work and exporters too. The Simultaneous Rundown of forces on which the middle and states can both enact and direct has many applicable sections. Thing 22 notices "worker's organizations, mechanical and work debates" whole thing 24 refers to "government assistance of work" and associated issues.

All the previously mentioned legitimate arrangements have helped coordinate work generally, however the sloppy area was consistently a totally dark region under the light. It's obviously true that worker's guilds made a big deal about their own charge paying individuals and in getting further gains for them. They are halfway to fault for overlooking the incredible majority of the nebulous casual labor force.[33]

What Ideally the Governments should have done-: Governments need to address the difficulties confronting inner travelers by remembering them for wellbeing administrations and money move and other social projects, and shielding them from segregation, Seeing that administration strategy reactions to the Coronavirus emergency have to a great extent avoided transients and their families back home. It ought to be a three sided measure: the focal government, the states to which the transients have voyaged, and those from where they hail.

Also, with regards to Private managers, they should search for help from the public authority, they ought not take advantage of laborers, exploit the public authority all things being equal. Try not to belittle the travelers' knowledge. They are daring people. They are war legends in their homes, simply that they are battling destitution.

What the Governments actually did-: Boss priest of UP suspended 35 out of 38 work laws for a time of three years, through a mandate called 'Uttar Pradesh Impermanent Exclusion from Certain Work Laws Law, 2020. India should stay a popular government. Laborers, and the individuals who talk for their benefit, should be heard while outlining or evolving guidelines.

Their voices should not be hushed by mandates. Albeit the Mandate was subsequently repudiated however this shows the expectation of the Public authority. On the off chance that they have done it today, they can rehash it tomorrow.

At long last practically following 2 months, when all attempt at finger pointing was finished, when there were no answers to counter, when a large portion of the laborers previously arrived at their home shoeless, our administrations with the participation of Service of Rail lines began running in excess of 100 Shramik Uncommon Trains each day to take the specialists to their homes.

Did India lack in Making proper laws?

Very much like our huge populace we have plenty of Work Laws and actually like our helpless traveler laborers no one thinks often about those Laws. We should recollect that change relies upon execution of Laws and not simply on wanting to make Laws.

With only 6 crore of the labor force was in what we call the coordinated or industrial facility mines-administrations area. Yet, this minority is, noticeable, vocal, generally unionized and clearly hoards practically every one of the advantages under the work laws, yet shouldn't something be said about other 40 crore who are working in sloppy areas.[34]

Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979-: The vast majority of us would not have found out about this demonstration before the transient work and lockdown circumstance. The Janata party government passed this Demonstration. It commanded that project workers who send out specialists to different states need to enroll at the two closures and take licenses. The individuals who utilize in excess of five transient workers are compelled by a solemn obligation to give legitimate wages, lodging, clinical offices, pass-books, uprooting stipend and whatever else that the public authority of visionaries could cobble together. This implies that if a foundation is denied from utilizing traveler laborers from different states in the event that they don't have a declaration from the concerned position. A similar law applies to the workers for hire too who utilize laborers from one state and send them in different states.

The Demonstration accommodated, in addition to other things, equivalent/comparative wages for the comparable idea of work material to the nearby laborers (Segment 13),

Removal stipend of half of month to month wages or Rs 75 whichever is higher (Segment 14)

Home excursion remittance for between State laborers (Area 15).

The law accommodates prison term of as long as one year and fine of Rs 1,000 for disregarding any contained arrangements.

The Demonstration in its present structure is excess and brimming with escape clauses and necessitates an aligned Change to guarantee the wellbeing and privileges of transient laborers.

The Unorganised Workers' Social Security Act, 2008

It was sanctioned on 30-12-2008 with an expectation to guarantee government backed retirement and government assistance of chaotic laborers and to execute the public safety Social Plan. The Demonstration explicitly means to oblige the requirements of the specialists of the chaotic area.

Area 3 of the Demonstration orders the Focal Government to form plans for the chaotic laborers on issue identifying with: Life and inability cover; Wellbeing and maternity benefits; Advanced age assurance; and Some other advantage as might be controlled by the Focal Government.

To partake in the advantages of these plans by the Focal Government, the Demonstration commands the sloppy laborers to get enlisted.

In Area 10 of the Demonstration, a sloppy laborer is needed to present an application to the Region Organization after which the Region Organization gives a character card by which the specialist will be relegated to a novel distinguishing proof number (UIN).

The Contract Labor (Regulation and Abolition) Act, 1970

After autonomy, India attempted to develop its independent economy.This Demonstration of 1970 means to shield the interests of contractors who enjoy all types of provisional work in specific foundations and its abrogation in specific conditions.

Area 2(1)(b) characterizes provisional work as: "A worker will be considered to be utilized as "provisional work" in or regarding crafted by a foundation when he is recruited in or regarding such work by or through a project worker, with or without the information on the vital business."

Permit to the workers for hire enrolls conditions that order the project workers to satisfy every one of the fundamental conveniences as the Public authority might consider fit to force as per the guidelines, under Area 35. As it has been featured in the news that project workers are not paying wages to the everyday wage laborers because of the lockdown regardless of the Public authority rules this would have resulted in infringement upon the Demonstration and such licenses ought to have been disavowed. Be that as it may, no such activity was started.

A Ray of Hope for the Future-: Presently, there are 44 work laws in the country. The Focal Government needs these 44 laws to be coded under 4 laws-Compensation Code, Modern Wellbeing and Government assistance, Federal retirement aide and Mechanical relations. The Word related Security,

Wellbeing and Working Conditions Code should be taken up in the following meeting of parliament. It was presented in the Lok Sabha in July 2019 and cleared in February this year by the Standing Panel with Resistance individuals on it. The Code is as yet forthcoming to be passed in Rajya Sabha. This code looks to subsume 13 out of 44 old work laws, including the awfully incapable Between State Traveler Laborers Act, 1979.[35]

WHAT WILL HAPPEN NEXT: EFFECTS OF MIGRATION OF LABOUR

Regardless of whether the enterprises are permitted to restart appropriately sooner rather than later, they will confront a monstrous lack of labour(both Gifted and Incompetent), since a significant number of the laborers who might typically accomplish the work have voyaged home or if nothing else coming back. Travelers establish some 30%-40% of the economies of numerous urban areas. You can't run the economy without them. You can resume ventures, yet how might they work without transient specialists. One would already be able to feel the shortage in Kerala.

However, this methodology overlooks that the transients are people, quit considering them similarly as assets.

These extravagant terms Lockdown/Open 1.0, 2.0 and so forth, will probably begin another period of issues for workers, as the likelihood of abuse might rise fundamentally in the pockets where there is an oversupply of laborers in a couple of regions. The double-dealing of the work class might ascend after the lockdown is lifted, as an ever increasing number of individuals attempt to recover their positions and monetary wellbeing, making an oversupply on the lookoutt. As individuals are now frantic to get wages, work, or methods for business.

There will be work shortage zones and work overflow locales. In the work overflow regions, the circumstance will be dreary as there will be a bounty of returning specialists with somewhat higher abilities, and along these lines the abuse could initiate.

Post-Coronavirus, the ordinary relocation passages are probably going to change and Significant distance movement will be influenced. Someone coming from the North-East to Kerala may not come any longer. Since distance is presently an issue, it will likewise rely upon how they were treated during the lockdown.

Traveler workers presently have a chance to rebuff their managers. Would you be able to give them an appropriate compensation when they returned? Businesses need to choose, not travelers.

Effect on Labours in Gulf Countries-: There is the impact of oil costs and decrease sought after for oil, which has been an extra tension on the economy of the Bay nations. This impact prompts diminishing the public authority's capacity to give assurance to unfamiliar laborers. The way that transients can't send cash home since they have either lost their positions or are not acquiring however much they used to, will bring down settlements returning to families. There is a normal fall of 20% in settlements toward the South Asia district, and specifically, to India.

On the positive side, there is plausible that Organizations and bosses may be more specialist

centered and subsequently the laborers' government assistance measures like food, transport,stay, and so forth, will acquire priority and the wages may likewise ascend in the dread of losing labor force.[36]

ACTIONS BY SUPREME COURT: IT'S TOO LATE NOW

An instance of leaving it past the point of no return and doing too little to even consider making all the difference. To start with, it showed total insensitivity in excusing it wild; then, at that point it showed detachment passing on it to the middle and states to sort something out; before a time of abnormal humiliating quietness which was filled by the thunder of shock as High Courts got the clubs; at long last bringing about a late section into the issue through this suo moto case. On 26th May, The Supreme Court took suo motu insight into the predicament of transient workers who are abandoned in various pieces of the country. The top court said that there have been slips on piece of Center and State governments and quick measures are needed to be taken to give travel, asylum and food to transient workers[35].

One can't yet ask – was the court truly moved by the situation of traveler laborers and their sufferings in a bungled lockdown that has denied them of their vocations, lives, and respect? Or on

the other hand was it the tempest of analysis from resigned judges, senior legal advisors, and reporters on its inaction that at long last constrained it to 'act'? In case it was the previous, it isn't exactly obvious in the manner in which the procedures have been led in the Supreme Court up until now[36].

High Courts and Empathy-: Orders from High Courts show their earnestness of the traveler laborer emergency and were set apart by compassion for their situation.

On fifteenth May, 2020, the Madras High Court gave a request bound with feeling, something uncommon for the courts. In a habeas corpus request requesting that the public authority produce 400 Tamil specialists stuck in Maharashtra. Around the same time, the Andhra Pradesh High Court referred to upsetting news reports to arrange the state government to take explicit measures under seven distinct heads, including clinical, transportation and food. Moreover, the Karnataka High Court guided the administrations to settle on paying the transportation cost of laborers returning to their towns and towns. It helped the administrations to remember the tremendous commitment the laborers have made to the nation's turn of events, demanding that the chief should approach to help them when they have lost their jobs.[37]

Suggestion and Recommendations

Immediate steps need to be taken:-The public authority needs to give prompt help to in the first place, casual specialists who have lost their positions, and second, to the individuals who are as of now jobless and are searching for the positions.

At the same time, those moving starting with one city then onto the next are held in dread, that they may be conveying the infection. States should gather the information of traveler laborers at the take-off point in the beginning State also on appearance in the objective States. This will assist States with successfully arranging isolate and help measures

for the transient laborers[39]. Additionally under these conditions, the probability that oppression transients would increment is exceptionally high. Governments need to ensure that separation doesn't increment and lead to social pressure.

Following stage to give food to the traveler laborers for that according to the evaluations we have 5 crore huge loads of rice and 3 crore huge loads of wheat in government godowns, a lot of which is best burned-through before decay sets in.

Long Term Plans

Post-catastrophe work of the particular governments is deal with the psychological and actual strength of youngsters and ladies as they need uncommon consideration[42]. Since there will be gigantic and dependable effects on the youngsters[43]. Feminine cleanliness items ought to be given to traveler ladies and juvenile young ladies, each state ought to be coordinated to guarantee legitimate working of sanctuary homes particularly for the convenience of pregnant ladies, lactating moms and kids.[38]

For the previously mentioned arrangements the Integrated Child Development Services–Anganwadi (ICDS-AW) and assistant medical caretaker maternity specialists (ANMs) can extend their effort to remember traveler ladies and kids for the plan and give them additional consideration.

Provide them Alternative form of employment

The worldwide experience shows that movement will proceed as long as there is expectation, yearning, and an elective vocation alternative better than those accessible at home. The objections currently have the assignment to work back better and this is just conceivable when worked with a human-focused methodology at its center[46]. Recall that travelers have seen the world. At the point when the traveler laborers return home, we shouldn't forget right off the bat, that they are individuals. We ought to likewise recollect that these are individuals who have gained abilities. **They can likewise be given seed cash to begin organizations.** Various things should be possible to invite them back and give them help so they can help themselves. They are not returning to remain inactive. Also, they'll be quick to return once the economy resumes. So to hold them in their local places the Union and state governments and regions should give assistance. In this manner we can do a comprehensive improvement of the entire country.

Taking the help of Technology-

In this computerized age, we might put more pressure on block-affixed advanced authoritative methods, similar to brilliant cards for between state laborers. This advanced character card proposition is famously possible — since proportion shops will have information on transient laborers. All we need to do additionally is to think ahead and guarantee that the card is truly multi-reason and introduce a large number of card-perusers at each conceivable point, from rail line stations and transport ends to mail depots and proportion shops. Travelers may simply contact their cards at any area and their appallingly basic 'present dwelling' information would be accessible to an express that is fixated on catching and crunching information.

More effective policies-: On the off chance that at all the States were to foster a movement strategy structure which is clearly the need of great importance then they should look far in excess of the system recommended at the focal government level. There should be an admittance to promising circumstances for occupant's home and out of state inhabitants. In arrangement regions, where transients face segregation because of their extraordinary conditions, uncommon strategy drives ought to be outlined to have uniformity with state inhabitants. Subsequently certain comprehensive strategies and plans could be advanced with the end goal that it would help in carrying traveler workers into the standard and likewise make an administration framework that can tackle the issues in regards to their character. It could make a list for executing different plans for them identified with their financial, ecological and lodging issues, without obstructing the exercises of the nearby local area.

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In Vivo Histological Assessment of Local Application of Fenugreek Seed Oil on Cutaneous Wound Healing

Shatha Hameed Ali[1], Ban A. Ghani[2], Nawar Bahjet Kamil[3]

[1]Post graduate/ College of Dentistry -Kufa University- Najaf- Iraq, [2]Assist Prof; [3]Lecturer/ Collage of Dentistry - University of Baghdad- Baghdad -Iraq

Abstract

Background: Healing is a process that restores the physical integrity of body structures. It is a dynamic, complex, multicellular process that involves the extracellular matrix, cytokines, blood cells, and growth factors. It includes hemostasis ,inflammatory phase, proliferative phase and maturation phase. Studies have shown fenugreek to be an anti-inflammatory agent, which supports its traditional use as a treatment for sore throat, arthritis, and wound healing.

Objective: Histological and histomorphometric assessment of potential activity of fenugreek oil on healing of experimentally induced cutaneous wound in rats.

Materials and methods: Thirty male albino rats (*Rattus norvegicus albinus*)weighing about 250-400gm were used in this study, two circular standardized wounds were performed on rat dorsum with a sterile biopsy punch(5mm) in diameter .The wounds at the right side were left to heal spontaneously as a control ,whereas the left side treated daily with fenugreek seeds oil(0.2ml). Sacrification of animals was done at the end of each healing periods (1^{st} ,3^{rd} , and 7^{th} day) to collect the specimens by cutting the skin about 5 mm around the edges of the wound for histological examination.

Results: Obtained findings showed decrease in mean values of wound contraction with time, as lowest mean value recorded at day 7 at experimental side. inflammatory cells count showed highest mean values recorded in experimental groups at day 1,however mean values of epithelial thickness increased values with time in all groups .

Conclusion: the present study showed that the fenugreek oil was effective for wound healing when applied locally.

Key words*: wound healing, fenugreek seed oil , rats.*

Introduction

Wound healing is a complex biological process that takes place in all tissues in all organs of the body. Various cell types, including keratinocytes, neutrophils, macrophages, lymphocytes, fibroblasts and endothelial cells, are involved in this process [(1),]including tissue inflammation, proliferation, and remodeling [(2).] During the first few days of healing the re-epithelialization of wounds is important for creating a barrier between the outer and inner

environment to allow an undisturbed continuation of nascent repair processes [3]. *Trigonella foenum-graecum* Linn., commonly known as fenugreek is a short annual plant from the Fabaceae family [4] fenugreek is used as a medicine to treat several diseases besides being used as antioxidant [5], against inflammation [6]. when applied to a wound ,it releases its anti-inflammatory properties and works to maintain the healing process and reduces the inflammation fenugreek seeds contain fatty acids which build collagen that promotes wound healing and maintains skin elasticity [7].

Materials and Methods

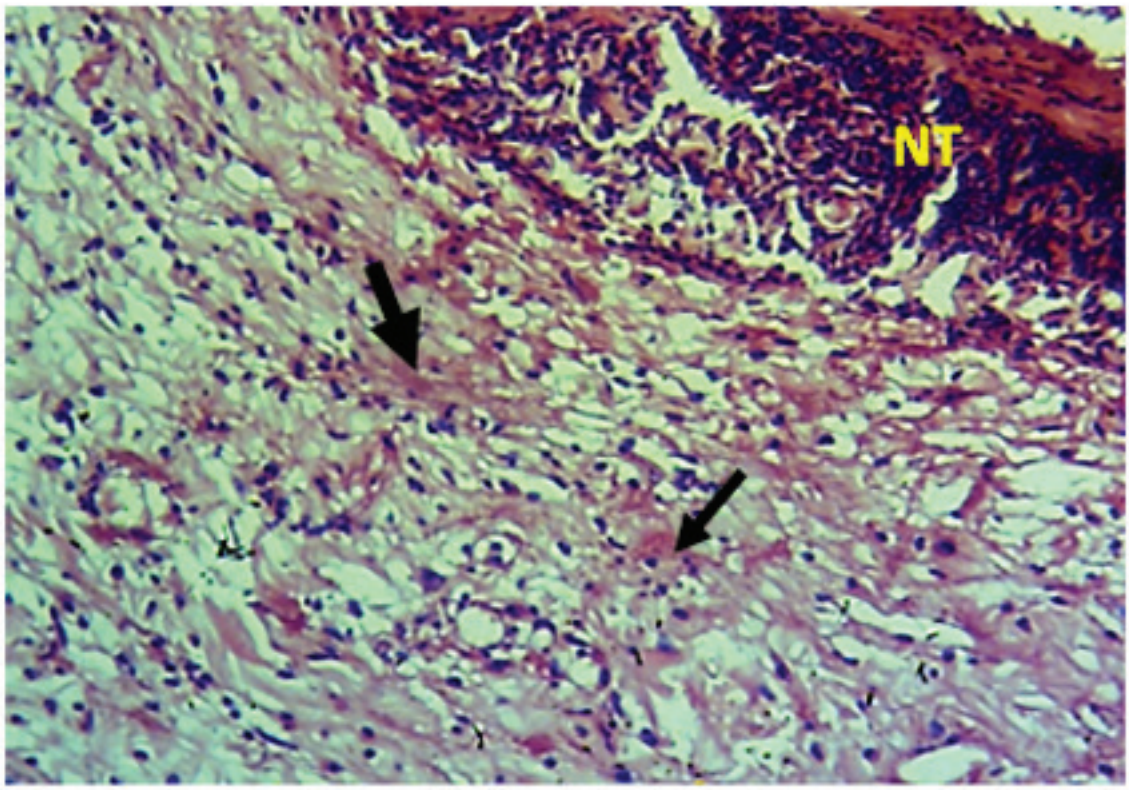
The practical part of this study begun at the animal house of Veterinary Medicine at Al-Kufa University .All of the procedures in the experiment were done in accordance to the animal experimentation ethical principles of (College of Dentistry – University of Baghdad) . Thirty male Albino rats with a body weight of (250–400gm) and aging from (6-9) months were used in this study [8]. All rats were maintained under controlled ventilation conditions, temperature, housing and feeding, and were given a standard diet (pellet) with an easy access to the tap water,theywere randomly divided into three main groups(10 rats in each group) according to the healing intervals (1,3 and7days). All surgical instruments were sterilized by using the oven at 150ºC for one hour. Each animal was weighed to determine the dose of anesthesia required , general anesthesia was induced by intra muscular injection with a mixture of ketamine and xylazine (100 mg/kg and 20 mg/kg, respectively) [9]. Removal of skin hair of the dorsal region was done by using hair removal lotion,then operation site swept by ethyl alcohol(70%)as disinfectant. Two excisional wounds were made at dorsal skin ,with approximately (1.5) cm distance from each other [9] with a biopsy punch of 5 mm of diameter .The two wounds were identified as right side (control) was left to heal spontaneously ,and the left side (experimental) was locally treated with fenugreek essential oil (0.2 ml) by a micropipette .Sacrification of animals was done at the end of each healing period (1^{st} ,3^{rd} , and 7^{th} day) to collect the specimens by cutting the skin about 5 mm around the edges of the wound and were put in a 10% freshly prepared formalin

Results

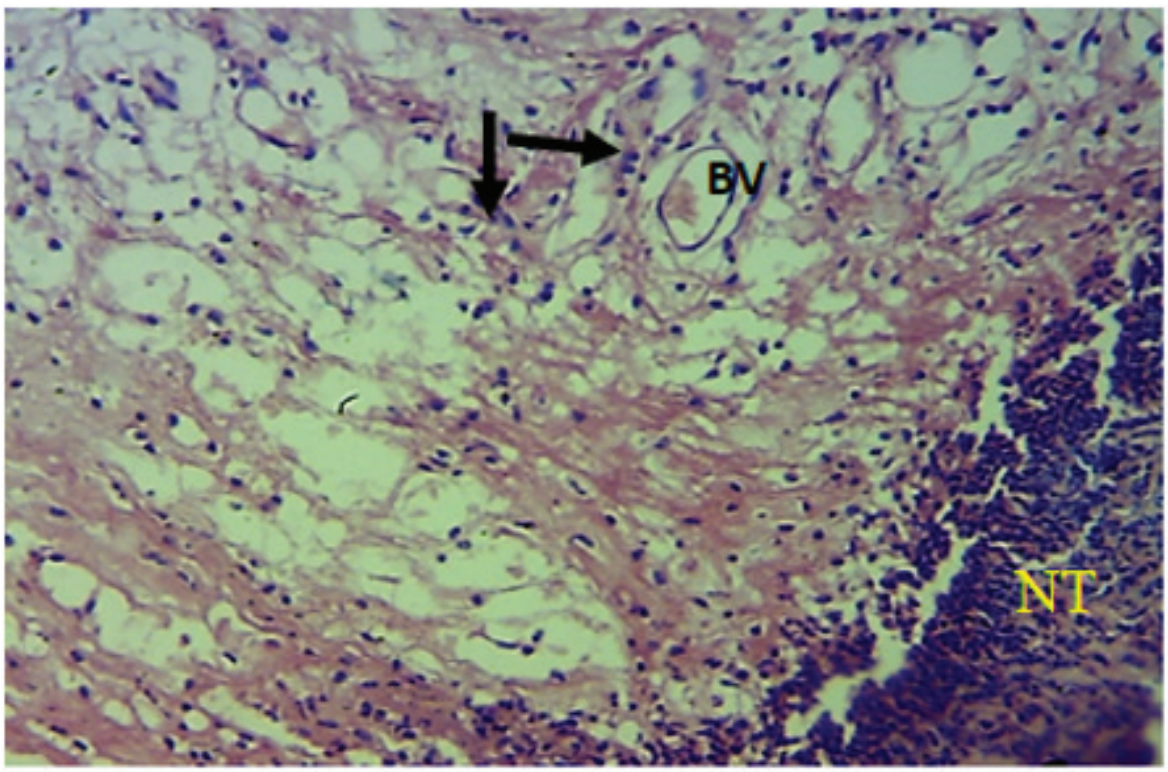
Histological findings

One day duration

Microphotograph of wound site of control group shows necrotic tissue at wound surface .Scattered blood islands and prominent inflammatory cells infiltration adjacent to blood vessels (figure1) ,and after addition of fenugreek oil, it shows wound surface covered by necrotic tissue ,extensive infiltration of inflammatory cells adjacent to congested blood vessels in the dermis(figure2)



Figure(1): Necrotic tissue seen at wound surface(NT) ,blood islands(arrows). H&Ex20



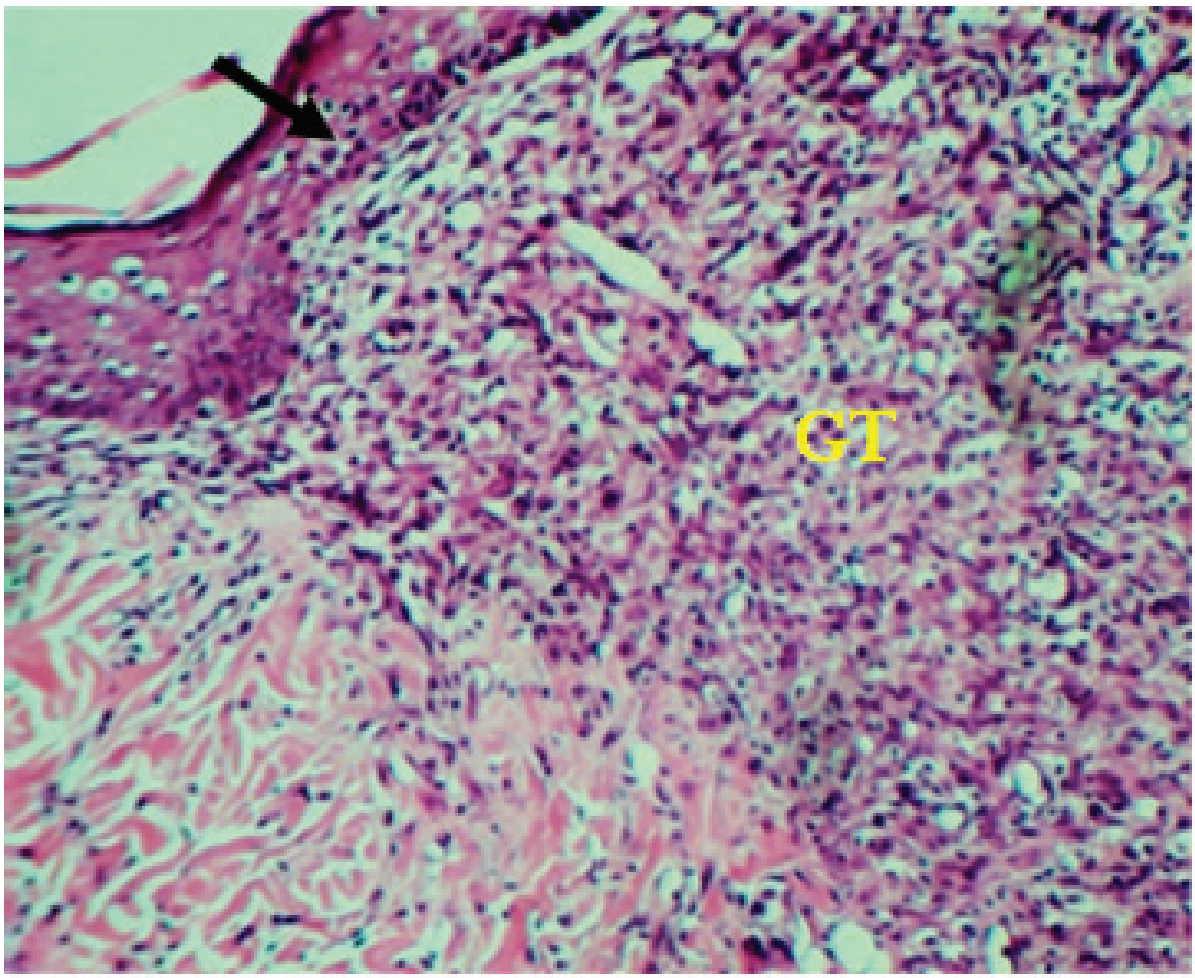
Figure(2):View of wound surface covered by necrotic tissue (NT),inflammatory cells (arrows),blood vessels(BV).H&Ex20

Three days duration:

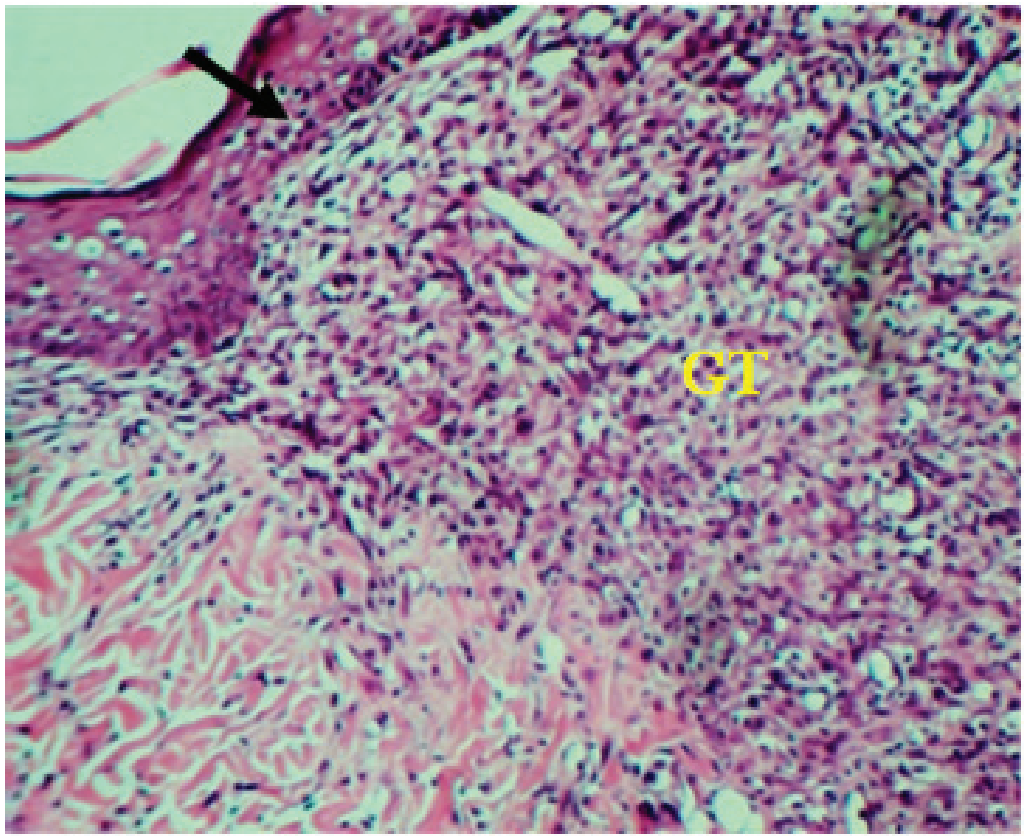
Microphotograph of wound site of control group shows surface sealed by new epithelium demarcated from remnant of necrotic tissue ,newly developing hair follicles in dermis .Other view shows granulation tissue ,fibroblasts. View of wound treated with fenugreek oil shows,new epithelium at surface underlying remnant necrotic tissue ,fibroblast and collagen fibers numerous blood vessels with adjacent few inflammatory cells seen in dermis.

Seven days duration

Histological examination of wound site showed new epithelium sealing wound surface ,granulation tissue with remodeling collagen fibers fibroblasts, and blood vessels(figure3) while after addition of fenugreek oil complete epithelialization noticed,wound site filled with granulation tisssue, blood vessels ,collagen fibers and fibroblasts(figure4) .



Figure(3):View shows surface sealed by new epithelium (arrow),granulation tissue(GT).H&Ex10.



Figure(4):wound site filled by granulation tissue (GT) ,new epithelium at surface(arrow).H&Ex10

Estimation of wound contraction

Results revealed that the recorded mean values of wound contraction decreased with time, the highest recorded values were noticed in experimental and control groups at day 1.Lowest mean value recorded at day 7.as seen in table1 .High significant difference was recorded between control and experimental groups among all durations(1,3 and 7days),these findings are illustrated in figure(5).

Table 3-1: Descriptive statistics of wound contraction in (mm) for both groups in each healing duration

Days	N	Studied groups		Range	T-test	P-Value
		Experimental Mean ± SD	Control Mean ± SD			
Day 1	10	4.26 ± 0.45	4.68 ± 0.29	3.15 – 5.0	4.178	0.001***
Day 3	10	3.72 ± 0.4	4.23 ± 0.31	3.1 – 4.9	4.588	0.001***
Day 7	10	2.82 ± 0.37	3.65 ± 0.43	2.08 – 4.21	4.56	0.001***

*P>0.05non Significant **P≤ 0.05 Significant ***p ≤ 0.01 highly Significant.

*P>0.05non Significant **P≤ 0.05 Significant ***p ≤ 0.01 highly Significant.

Figure(5):Wound contraction among studied groups in different durations

Inflammatory cell parameter

The results showed that mean values were higher in experimental group than control group at day 1 with high significant difference(table2) Whereas no statistical significant difference recorded in means of inflammatory cells between both groups in days 3 and 7 ,these findings are demonstrated in (figure6) as well.

Table (2): Descriptive statistics of inflammatory cells count in each healing duration

Days	N	Inflammatory cells count		Range	T-test	P-Value
		Experiment Mean ± SD	Control Mean ± SD			
Day 1	**10**	137.75 ± 63.37	75.54 ± 18.07	53.25 – 240.5	3.126	***0.006
Day 3	**10**	65.42 ± 73.54	63.09 ± 19.19	10.5 – 224.75	0.110	**0.913**
Day 7	**10**	27.25 ± 5.4	24.27 ± 10.64	8.0 – 43.75	0.788	**0.441**

***p ≤ 0.01 highly Significant

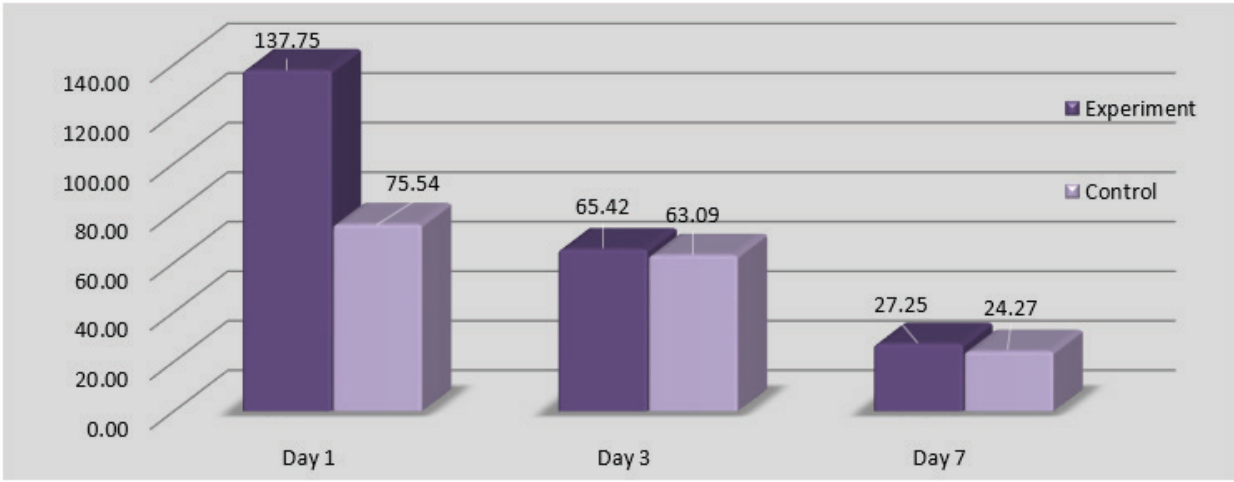


Figure (6): Mean of inflammatory cells in different

Epithelial thickness parameter

Mean values increased with time for all studied groups in different durations.

(table 3) shows comparison in epithelial thickness between experimental and control groups at days 1, 3, and 7with high significant difference between both groups.

Discussion

Wound healing is a complex biological process that takes place in all tissues in all organs of the body. Various cell types, including keratinocytes, neutrophils, macrophages, lymphocytes, fibroblasts and endothelial cells, are involved in this process[(1)]. It consists of tissue inflammation, proliferation, and remodeling[(2)].Fenugreek, when applied to a wound, releases its anti-inflammatory properties and works to maintain the healing process and reduces the inflammation also fenugreek seeds contain fatty acids which build collagen that promotes wound healing and maintains skin elasticity (**Dixit *et al*.,2005)**[(7)].The fatty-acid components of fenugreek oil used in this study in particular poly unsaturated fatty acids such as linoleic acid are effective in wound healing as reported by (**Poljšak *et al*.,2019)** [(10)].Incisional and excisional models commonly use rat's dorsum as the wound site since such site keeps the animal from reaching and manipulating the wound, besides rat's ready availability, low cost, and small size, with more economical and efficient use of limited laboratory space and housing facilities**(Wanda and Wysocki ,2008)**[(11)].

Wound contraction is the centripetal or concentric reduction in size of an open wound, is essential to second-intention healing, caused by movement of fibroblasts in granulation tissue collagen and pulling forces of granulation tissue myofibroblasts on the skin edges (Swaim *et al*.,2001) [(12)].However wound contraction, is usually more rapid than epithelialization and since new tissue is not created, causes a decrease in the overall healing time of rat wounds (Mogford and Mustoe,2001) [(13)].Wound healing begins with hemostasis at the site of injury, progresses to an inflammatory phase

followed by proliferation of the epithelial and matrix components, and ends with laying down of a highly organized collagn matrix(**Velnar *et al.,* 2009)** **(14)**.During inflammation phase, the granulation tissue is composed predominantly of inflammatory cells, mainly neutrophils that are recruited to the wound site and removed during the progression of the repair process **(Gurtner *et al*.,2008)(15).**In this study results showed marked increase in the inflammatory cells in the experimental group at day 1 as compared to control group, and remained slightly higher at experimental side at remaining durations in agreement with results concerned with inflammatory cells scoring which were obtained by **Marcos *et al*., ,2011(16)** who studied the effect of Brazilian green propolis in tissue repair of cutaneous wounds inWistar rats, and they found that at days1 and 3 the treated wounds demonstrated significant bigger means for inflammatory cells **.**The decrease in inflammatory cell mean values with time could be explained according to studies by **Kaur and Kapoor in2002(17)** who reported that fenugreek have antioxidant properties which can accelerate process of wound healing . Epidermal healing, or re epithelialization, is the renewal of the epidermis that has been damaged by a wound or a burn**(Rittié,2016)(18)** Epithelialization is the process by which cells from the epidermis at a wound's edge proliferate and migrate to cover the surface of the cutaneous defect **(Swaim *et al*.,2001)** **(12).**

The results of this study revealed that epithelialization was more accelerated in experimental group as the mean values of epithelial thickness was higher than that in control ones with high significant difference between studied groups and they increased with time which indicates rapid epithelialization and collagenation of proliferation phase in agreement with **(19)** who applied different concentrations of hydroalcoholic extract of *Trigonella foenum graecum* to evaluateit's proliferative action of skin wound of healing in albino rats which showed faster rate of epithelization in treated groups when compared with control ones.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: None

Funding: Self-funding

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Cytotoxic Effect of Modified Gutta Percha by Incorporating Bioactive Glass 45S5 and Chitosan Particles As Potential Root Canal Filling Material

Ahmed I AL-Jobory[1], Raghad AL-Hashimi[2]

[1]Post Graduate, Department of Aesthetic and Restorative Dentistry, College of Dentistry, Tikrit University, Tikrit, Iraq, [2]Asist Prof/ Department of Aesthetic and Restorative Dentistry, College of Dentistry, University of Baghdad, Baghdad, Iraq

Abstract

Aim: To investigate the cytotoxic effects of modified bioactive and antimicrobial gutta percha on the fibroblast cells.

Methods: The cytotoxic effects of modified bioactive and antimicrobial gutta percha on the fibroblast cells were investigated using Methylthiazol tetrazolium (MTT) assays at different times 24, 48 and 72 hours.

Results: there is no significant difference between controle and new modified gutta percha at first 24 hrs. while with time at 48 and 72 hrs. there were significant difference.

Conclusion: Bioactive bioglass BG45S5 and chitosan showed *in vitro* cytotoxic effects when mixing with gutta percha in fibroblast cells as demonstrated by MTT assays, although toxic effect was observed mostly as the same to control gutta percha.

Keywords: *Gutta percha, bioactive bioglass BG45S5, chitosan, MTT assay, fibroblast cells, cytotoxic effect.*

Introduction

Root canal treatment is one of the techniques practiced most commonly in dentistry to save the tooth and keep it in a functional position in the oral cavity. The final filling of RCT is called obturation and biocompatible material used to fill the root canal is called an obturating material [(11)]. Their basic function is to fill the root canal and seal the apical foramen. The basic objectives of root canal obturating materials according to Noort, are to provide a clean canal, free of bacteria and other debris, provide an apical seal to prevent the fluids from tissues to enter into the canal, irritants leaving the canal and to prevent recontamination due to oral micro-organisms [(23)]**.** Since its introduction in dentistry, gutta-percha has been the most widely used solid-core root canal filling material [(9,20)]**.** demonstrated that gutta-percha appeared to be the least toxic material in studies in vitro. They also pointed out that composition of gutta-percha points for root canal filling may vary according to the manufacturer and that each brand should be

evaluated separately for its toxicity. Considering that the real composition of gutta-percha mixtures is not provided by any manufacturer, it can also be assumed that it may vary with batches. The commercially available materials are although biocompatible but not bioactive. One of the recent trends in endodontics has been the development of obturating materials that are capable of bonding to canal wall dentin to eliminate interfacial gaps coronally and apically [10,9]. Dentin adhesive technology has been adapted from restorative dentistry and applied to obturating materials through hybrid layer formation [12].

With an era of biomimetic dentistry, Bioactive materials proved useful biological healing and beneficial for the tissues. Bioactive materials can define as "a compound when implanted into the body does not produce any injurious effects and also has the ability of eliciting a response from living tissue, organisms or cell such as inducing the formation of hydroxyapatite.". For a material to be Bioactive it must be bactericidal, bacteriostatic, sterile, stimulate reparative dentine formation, and maintain pulp vitality. A bioactive material consists of bioactive calcium phosphate ceramics, bioactive glass ceramics and bioactive composite [8]. The interaction between bioglass (as biomaterial) and simulated body fluid is important in order to predict the apatite surface layer formation, which is able to chemically interact with bone tissue [4]. Likewise, bioactive glasses of the SiO2-Na2O-CaO-P2O5 system have been shown to possess antimicrobial activity through the release of ionic alkaline species. These can be used as dentine disinfectants to offer an alternative to calcium hydroxide [13].

Chitosan, a natural and non-toxic polymer, is produced by the deacetylation of chitin and has received considerable attention in a wide range of applications due to their biological (anti-microbial, bio-adhesive, bio-compatible, and binding agent) properties. These advantages and applications of chitosan suggest its potential usage in root canal treatment and some authors have already carried out some preliminary assays in this field [5].

Methodology

A- Fabrication of new bioactive gutta percha:

The total amount of the Gutta Percha (Dentsply Maillefer, Switzerland) was weighed by four digits sensitive balance ADAM AFA-210LC (UK) which was 1.5 gm. The filer weights were 1% for bioactive powder 45S5 (MO-SCI, USA) and chitosan (SHAANXI SANGHERB BIO-TECH INC, China) where they incorporated by replacement of 0.015 gms (for each filer) of the Gutta-Percha with same weights of powder. So, these percentages were clinically applicable (ISO 6876/2012 standards).

Fabrication of Gutta Percha

Gutta percha points (1.5 gms) were taken and placed in glass beaker. The beaker has been placed in electrical oven CARBOLITE (UK) at 200ºC for 15min. the beaker has been taken out of the oven, then the gutta percha points became semi-soft. A small chloroform (Riedel-de Haën, German) amount (5ml) has been added to the beaker to solve the gutta percha with continues moving of solvent with glass stick till complete solvent of gutta percha and become like suspension of liquid [11].

Preparing of filers

The bioactive bioglass (with weights 0.015gms represent filler percentage 1%) was dissolved in formic acid (SCR-China) (5ml) and stirring for 3 days until all particles was dissolved. Then the chitosan (with weights 0.015gms represent filler percentage 1%) has been dissolved in 1.0% of the acetic acid (MERCK- German) (v/v) by using magnetic stirrer.

The viscous chitosan was adding to previous viscous bioactive bioglass and mix by using a magnetic stirrer. All the viscous mixture of bioactive bioglass and chitosan was adding and mixed together and the total fillers weight was 0.03gm.

Mixing the gutta percha with filers

All the mixture of filler was adding slowly to solvent gutta percha and mixed with a magnetic stirrer till the materials acquired a semi viscous state, it placed in glass preti dishes until complete drying and setting.

Preparing of sample as a disk

A mold was design and fabricated to acquired materials to produce a 5mm width and 2mm height of materials. A 0.035gms of materials was selected and add to cylinder of fabricated devices and a constant scrowing for 1 min was applied to materials to obtained a homogenous disc for all groups.

Fig (1-1) Special mod ready to compress the mixture.

Fig (1-2) Special mod parts.

Fig (1-3) disc of gutta percha (0.035 grms) with 5mm width and 2mm height.

Fig (1-3) disc of gutta percha (0.035 grms) with 5mm width and 2mm height.

B- Cytotoxicity study of new bioactive gutta percha

Cell Line (Human Dermal Fibroblast, neonatal) & Cell culture

Those cells underwent a small number of the population doublings, which is why, they are more representative of main functional tissue component from which they have been obtained, compared with the continuous (tumors or artificially immortalized) cell lines, which makes the primary cells into more representative model for in vivo states [24]. Cells were cultured in Dulbecco's Modified Eagle medium (Life Technologies, Inc., Rockville, MD, USA) supplemented with heat-inactivated fetal bovine serum (10%; Sigma-Aldrich, St. Louis, MO, USA), streptomycin, penicillin (1%), and glutamine (2 mmol/L).

Biological activity

Methylthiazol tetrazolium (MTT) assays were carried out at the Natural Product Research and Drug Discovery Centre, Department of Pharmacology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia.

Cytotoxicity assay (MTT assay)

MTT (3-(4,5-dimethylthiazol-2-yl)-2–5-diphenyltetrazolium bromide) assay is one of the most commonly used colorimeteric assay to assess cytotoxicity or cell viability [1].

The MTT assay was carried out in the fibroblast cell line to determine the cytotoxicity activity of new bioactive gutta percha. New bioactive gutta percha was dissolved in dimethyl sulfoxide (DMSO) to produce a stock solution and serial dilutions were prepared (0.78125-200 μg/mL). Control gutta percha, were added to fibroblast cells and the cell cultures were incubated for 24,48 and 72 hrs in a CO_2 incubator. MTT (5 μg/mL) was added to each well and the plates were incubated further for 1-4 h. The media was removed and DMSO was added to each well to solubilize the formazan crystals. The absorbance was measured by the use of a Hidex Chameleon microplate reader (LabLogic Systems Ltd., Sheffield, United Kingdom) at 575 nm.

Data

Data were collected using Excel (Microsoft Office 2010, Microsoft Corp., Redmond, WA). SPSS software (IBM Software, version 22) was used to analyze the data.

MTT results

The dose-response (mean and standard deviation) of fibroblast cells treated with new bioactive gutta percha was illustrated in table (1-1).

MTT (3-(4,5-dimethylthiazol-2-yl)-2–5-diphenyltetrazolium bromide) assay is one of the most commonly used colorimeteric assay to assess cytotoxicity or cell viability [1]. This assay determines principally cell viability through determination of mitochondrial function of cells by measuring activity of mitochondrial enzymes such as succinate dehydrogenase [21].

In this assay, MTT is reduced to a purple formazan by NADH. This product can be quantified by light absorbance at a specific wavelength. Return to our results, there is no significant difference between controle and new modified gutta percha at first 24 hrs. while with time at 48 and 72 hrs. there were significant difference.

Table (1-1) Means and standard deviation for new gutta-percha.

Row state		Control			New bioactive gutta percha		
		Mean	SD	No.	Mean	SD	No.
1	24	84.799	1.238	3	81.790	1.447	3
2	48	78.318	2.892	3	73.302	1.580	3
3	72	73.765	1.238	3	69.445	1.104	3

Table (1-2) A one-way ANOVA test for new gutta-percha at different time value.

Sidak's multiple comparisons test	Significant?	Summary	Adjusted P Value
Control - sample			
24	No	ns	0.1437
48	Yes	-	0.0104
72	Yes	-	0.0262

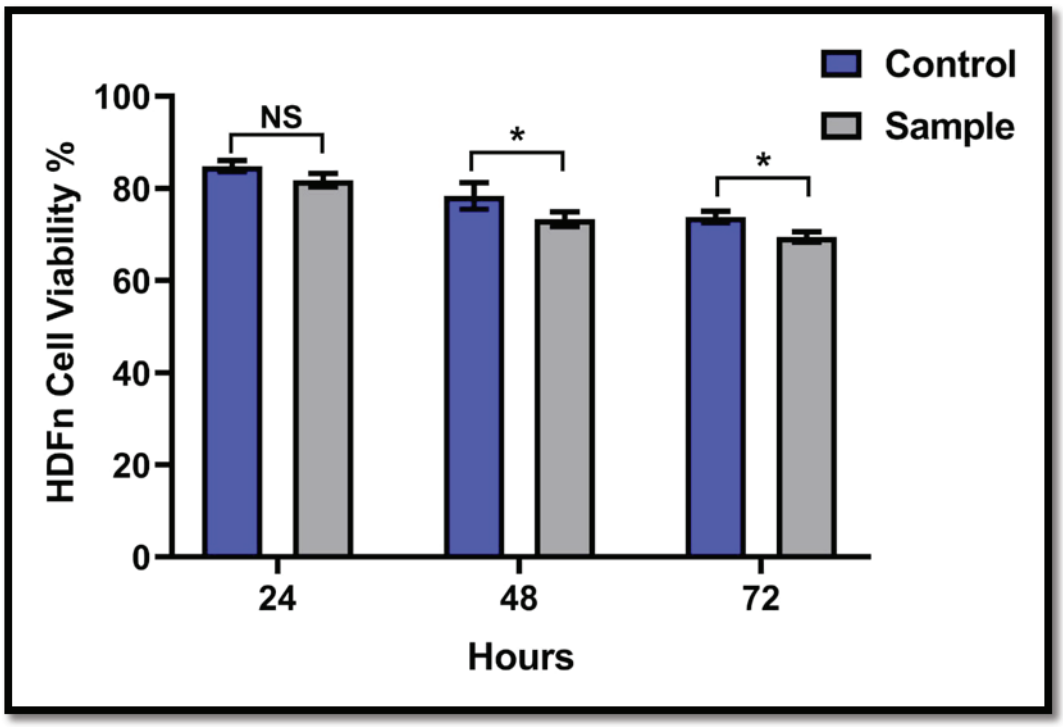

Fig. (1- 4) MTT assay bar-chart for new gutta-percha in different time intervals.

Discussion

The gutta-percha inertness has been challenged via [17] showing that the material might have high toxicity in specific tissue culture assays. A study conducted by [16] **(A&B)** indicated that the cones of gutta-percha have fairly slow acting, weak, yet considerable inherent antimicrobial property that is due to the zinc oxide component. A study conducted by [6] indicated that the human pulp fibroblasts remains round and were failing in attaching and proliferating around cut gutta-percha points.

The dentinal tubules allow diffusion of materials placed into the root canal system. Furthermore, contact of these materials with periodontal tissues may occur via the apical foramen or accessory root canals. In this context the toxicity of a substance, i.e. its biocompatibility in contact with surrounding tissues, plays an important role. Primary toxicity can be investigated by means of gingival fibroblasts as so-called "target cells," whereas the reaction of in vivo tissue depends on further parameters such as salivary flow rate and resident bacterial flora, mechanical, and chemical stimuli during food intake, hormonal status, and this agree with [22].

In our study, the results showed that the experimental gutta percha with no significant difference at 24 hrs. with control gutta percha, this may be due to no low concentration of bioactive glass and chitosan as fillers, and the zinc oxide was the prominent material at first time. This was agreement with [18] as high content related to zinc oxide in the formulations of gutta-percha explaining the toxicity regarding gutta percha points. Also, our results agree with [14] how concluded the adding cytotoxicity is increased via adding a glass to gutta percha points. After period of time; the experimental gutta percha have significant difference with control gutta percha; this due to fact that the bioactive glass and chitosan have bactericidal properties and when mixed with gutta percha it showed more toxicity (increase in the number of dead cells), this agreement with [3]. Another fact may be due to the activity of fillers, cause the ionic release anticipated to enhance the material's bioactivity leading to the cytotoxicity to be increased. This agree with [14].

Conclusion

Bioactive bioglass BG45S5 and chitosan showed *in vitro* cytotoxic effects when mixing with gutta percha in fibroblast cells as demonstrated by MTT assays, although toxic effect was observed mostly as the same to control gutta percha.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: None:

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Occlusal Interferences Removal Influenced the Condylar Angular Inclination in Patients with TMJ Internal Derangement

Zena Kamel Kadhem [1], Fawaz Aswad[2]

[1]Lecturer/ College of Dentistry, Mustansiriyah University, Baghdad, Iraq,
[2] Prof. Dr. College of dentistry. University of Baghdad, Iraq

Abstract

The aim of the Study: is to discuss the role of occlusal interferences on angular condylar inclination in patients with TMJ internal derangement. And to demonstrated that the digital guiding of the selective digital occlusal adjustment (enameloplasty) are more accurate and time saving.

Materials and Methods: Eighty-four patients with full dentition and angle class I diagnosed with DC/TMD criteria, teeth contact registered digitally by using T-Scan NOVUS device, Cadiax Compact II axiographic device was used to control the Sagittal Condylar Inclination (SCI) and Bennett angle (BA) before and after occlusal interventions (occlusal adjustment and occlusal splint).

Results: Eighty-four patients (76.2% females: 23.8% male) were participated in this study with age range (19-45 years old), highly prevalence of occlusal interferences was reported. No significant differences in (SCI) before and after occlusal interventions, Bennett angle demonstrated a significant difference before and after occlusal interventions.

Conclusion: The Transverse Condyle Inclination (Bennett angle) highly influenced by the occluding teeth. Enameloplasty that had been done in this study showed significant effects on Bennett angle. Therefore, any full mouth rehabilitation should be carefully evaluated to avoid abnormal condylar inclination and result in abnormal joint structures relationship.

Key words: *Cadiax, T-Scan, Occlusal interferences, condyle inclination, Bennett angle.*

Introduction

Occlusion is the first and probably the most controversial etiologic factor of TMD. The presence of Working side interferences is considered by some authors to be a predisposing factor for disk displacement [1,2]. Non-Working Side Interference are associated with an increased risk of bone loss, mobility and TMJ dysfunction [3]. Condylar position may also play a significant role in the etiopathogenesis of TMJ disorders [4].

Temporomandibular joints may be harmed especially in atypical protrusive interferences or by moving the mandible into a physiologically unsound position leading to muscle pain (myalgia)[5]. The premature or interfering contacts points are lead to destructive forces through the masticatory system

and result in parafunction effects such as clenching [6,7].

Quantitative occlusal analysis techniques have been developed to overcome the limitations of qualitative assessment, such as subjective interpretation. The T-Scan system accuracy for recording the results was confirmed by multiple accuracy studies [8,9]. In addition, many researchers emphasise the importance of electronic axiography in differential diagnostics of mastication organ dysfunctions, through accuracy and precision of the measurement data obtained [10,11,12].

Materials and Methods

The participants were recruited from the attendants to the teaching clinic of oral medicine in the teaching hospital of College of Dentistry/ University of Baghdad the period from April 2019 to January 2020. The study protocol was approved by the ethical committee of the College of Dentistry/ University of Baghdad. An informed consent was obtained from the patients. According to the inclusion criteria and DC/TMD of Schiffman[13] *et al.,* at 2014, eighty-four patients with TMJ internal derangement (disc displacement) of both genders were selected to participate in the present study.

Digital evaluation of occlusal interferences of all the included subjects was performed using the T-Scan occlusal imaging and analysis system (T-Scan NOVUS, Tekscan, Inc., S. Boston, MA, USA). TMJ axiographic evaluation was measured with Cadiax Compact II by (GAMMA Medizinisch-wissenschaftliche Fortbildungs) for TMJ registration. These clinical examinations were done by one examiner supervised by special expert. The inclusion criteria were: subjects should have full dentition with Angle class I relation, with no signs and symptoms any systemic diseases.

Occlusal interventions included: Occlusal adjustment OA (enameloplasty) guided by T-scan[14], and combination of occlusal splint (OS) and occlusal adjustment (OA). Occlusal splint also adjusted digitally by T-scan. The right and left sagittal condylar inclination (SCI) and Bennett angle (BA) were registered before occlusal interventions and after one month.

Statistical analysis: data analysis approaches were demonstrated by the application of the statistical package (SPSS) ver. (22.0). Descriptive data analysis presented in Mean value and Standard Deviation. Matched Paired-Samples T Test procedure compares the means of two variables for a single group. Likelihood Ratio test: Is assesses the goodness of fit of two competing statistical models. Significant at $P<0.05$.

Results

Eighty-four subjects (76.2% females: 23.8% male) were participated in this study with age range (19-45 years old) had full dentition and angle class I. Table (1) is showing the distribution of the Occlusal Interferences in the TMJ ID group for different studied locations with comparison's significant through a contingency table, with comparison's significant using Likelihood Ratio test.

Table (1): Distribution of [Occlusal Interference test] in the studied groups among different studied locations with comparison's significant

Group	Resp.	Centric Relation		Right Lateral				Left Lateral				Protrusion	
				W		N		W		N			
		No	%	No	%	No	%	No	%	No	%	No	%
TMD Group	No	3	4	74	88	28	33	75	89	28	33	23	27
	Yes	81	96	10	12	56	67	9	11	56	67	61	73
	Total	84	100	84	100	84	100	84	100	84	100	84	100
C.S. P-value		P=0.000 HS		P=0.000 HS		P=0.003 HS		P=0.000 HS		P=0.003 HS		P=0.000 HS	

(*) HS: High Significant at P<0.01; S: Significant at P< 0.05; NS: Non Significant at P> 0.05; [Testing based on Binomial test, and LRT: Likelihood Ratio test]. W: working side interference; N: non-working side occlusal interference

Occlusal interferences in all locations registered a highly significant difference at P<0.01. Table (2) is showing the summary statistics and comparisons significant concerning studied angular measurements of "RSCI, and LSCI" parameters in relative to different treatments, "OA and OA+OS", before and after treatments.

Table (2): Summary statistics concerning studied angular "RSCG, and LSCG" in relative to effectiveness of studied treatments.

Parameters	Treatments	Period	Mean	SD	SE	MD	MP t-test	P-v. (*)
RSCI	OA	Before	49.15	7.83	1.75	-2.60	-1.43	0.168 NS
		After	51.75	6.06	1.36			
	OA+OS	Before	46.25	11.43	2.56	2.20	0.55	0.588 NS
		After	44.05	10.08	2.25			
LSCI	OA	Before	46.05	7.36	1.65	-0.35	-0.22	0.832 NS
		After	46.40	7.21	1.61			
	OA+OS	Before	43.25	8.48	1.90	-1.60	-0.74	0.471 NS
		After	44.85	7.93	1.77			

(*) HS: Highly Sig. at P<0.01; S: Sig. at P<0.05; NS: Non Sig. at P>0.05.

Test Statistics: Matched Paired t-test.

Results showed that there were no significant differences (P>0.05) for testing mean differences in relative to effectiveness of studied treatments, either in RSCG, or in LSCG angular. Table (3) shows summary statistics and comparisons significant concerning studied angular measurements of the "R BA, and LBA" in relative to different treatments, "OA and OA+OS", before and after treatments. Results shows that no significant differences were accounted at P>0.05 for testing mean differences in relative to effectiveness of combination treatment, either in RBA, or in LBA angular measurements, except highest level of change was associated with the application of "OA" treatment in relative to both RBA which registered a highly significant difference at P<0.01 and LBA which also registered a significant difference at p<0.05.

Table (3): Summary statistics concerning studied angular "RBA, and LBA" in relative to effectiveness of studied treatments

Parameters	Treatments	Period	Mean	SD	SE	MD	MP t-test	P-value
RBA	OA	Before	9.00	4.51	1.01	1.55	3.007	0.007 HS
		After	7.45	2.52	0.56			
	OA+OS	Before	7.60	3.87	0.87	1.40	1.986	0.062 NS
		After	6.20	1.96	0.44			
LBA	OA	Before	7.70	3.60	0.80	1.40	2.237	0.037 S
		After	6.30	2.39	0.53			
	OA+OS	Before	7.70	3.13	0.70	0.65	1.092	0.288 NS
		After	7.05	2.68	0.60			

(*) HS: Highly Sig. at P<0.01; NS: Non Sig. at P>0.05; Test Statistics: Matched Paired t-test; RBA: Right Bennett Angele; LBA: Left Bennett Angle.

Results showed that no significant differences were accounted at P>0.05 for testing mean differences in relative to effectiveness of combination treatment, either in RBA, or in LBA angular measurements, except highest level of change was associated with the application of "OA" treatment in relative to both RBA which registered a highly significant difference at P<0.01 and LBA which also registered a significant difference at p<0.05.

Discussion

Some studies, however, have indicated that the role of occlusion in TMD is more important than generally accepted, especially in internal derangements of the temporomandibular joint (TMJ)[15,16]. Few papers published which performed digital guided adjustment for both occlusal interventions modalities (enameloplasty and occlusal splints)[17,14]. The use of the dynamic recording T-Scan device in the present study avoided many of the problems apparent when using static recording methods to observe occlusal contacts at different lateral mandibular positions. This study also in agreement with Jussila et al., (2018)[18] study which documented that one of the common occlusal disturbances were interferences in working side mandibular movements. Non-working side interferences are highly destructive for joint and dental structure due to the amount and direction of force generated (Haralur, 2013)[19]. Huang et al., (2006)[20,21] published two articles and documented that the presence of the occlusal interferences leads to changes of the condylar position during lateral movements of the lower jaw and lead the occurrence of a laterodeviating forces on the mandible.

Bennett movement is very critical because there is a continuous contact of the occlusal surfaces particularly during immediate side shift. Thus a laterosuperior movement of the rotating condyle will require shorter posterior cusps than will a straight lateral movement; likewise, lateroinferior movement will permit longer posterior cusp than will a straight lateral movement [22].

Bennett angle that registered in the present study are similar to what reported in pervious study done by Schierz et al., in (2014)[23]. The present study is one of the few papers to also assess Bennett angle. Although Payne in (1997), evaluated the components of BA, immediate side shift (in mm), and the angle of progressive side shift PPS. The mean PSS angles he found were about 6° with a range from 0.3- 12°. The mean of BA registered in the present study is consisted with Payne's PSS angles and others previous studies [24-]. Bennett angle registered a significant difference after the removal of occlusal interferences by the occlusal adjustment (enameloplasty) alone.

The statistical analyses of the present study were in agreement with study indicated that the range of SCI between (25 and 45∘)[29,30]. The present study demonstrated a higher mean of SCI in patients with TMJ internal derangement than that documented in previous study done by [23,31] (Więckiewicz et al., 2014; Schierz et al., 2014). Correct understanding of dynamic occlusion is very critical in differentiating between the normal and pathological occlusal parameters. Sagittal condylar inclination showed a non-significant differences in the group patients whom received both occlusal interventions (OA+OS).

Conclusion

The horizontal condylar inclination highly influenced by the occluding teeth. Enameloplasty that had been done in this study showed a significant effect on Bennett angle in patients with TMJ internal derangement. Any full mouth rehabilitation, occlusal adjustment, should be carefully evaluated to avoid teeth contacts with occlusal interferences

that lead to abnormal condylar inclination and so result in abnormal joint structures relationship.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: None

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