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Deliberate Self harm- A Hospital based cross sectional study

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ABSTRACT

Background: Self-harm is a growing concern especially among the teenagers and young adults. Non-Suicidal Self-Injury is defined as intentional destruction of one's body tissue without suicidal intent.

Material and methods: A 2 years' retrospective study from January 2021 to December 2022 comprising of 434 cases of deliberate self-harm that presented at the Trauma center of Jawaharlal Nehru Medical College, A.M.U, Aligarh, Uttar Pradesh.

Results: Total 434 cases of self-harm were examined in which 297 were males while 137 were females. Most of the survivors were from age groups 19-30 years (26.5%) and belonged to rural areas 291 (67.1%). The most common method used for self-harm was taking poison or medicinal drugs (80.9%).

Conclusion: A significant proportion of suicide attempts are impulsive, solitary efforts that are often the result of interpersonal conflicts which can be avoided by supportive communication with the patient.

Keywords: Self harm, Suicide, Poisoning, Hanging, Cut throat.

INTRODUCTION

Globally, there is a serious public health issue with suicide. One of the leading causes of death is suicide, and self-inflicted injury is a common way for people to try suicide worldwide. Intentional self-harm, self-abuse, or suicidal activity, including attempted or successful suicide, are all examples of self-directed violence. The deliberate self-harm (DSH) of teenagers and young adults is a growing source of concern. The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)^[1] has proposed a category of Non-Suicidal Self-Injury (NSSI) since many people who present with acts of self-harm do not have suicidal intent. 'Intentional destruction of one's body tissue without

suicidal intent' is what NSSI is described as. The person acts in this way to either alleviate unpleasant emotions, address interpersonal conflicts, or to elicit pleasant emotions.

It should be noted that the risk of suicide is quite high following a non-fatal act of self-harm, which is why intentional self-injury is frequently linked to a disproportionately high number of completed suicides.^[2, 3] Self-harming behaviour and self-inflicted wounds can, in fact, often signal a need for temporary support, but they can also indicate serious mental health issues and a real risk of suicide.^[4] In this regard, risk factors range from having a family history of suicide to having a chronic illness that could cause pain, having a weak support system, and feeling like a burden

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to others. [5,6] Additional danger indicators include having easy access to lethal means, learning about the suicide of a loved one or acquaintance, and having certain personality traits like impulsivity or poor emotional regulation, using illicit substances, or having an excessive amount of emotional distress. [7,8]

There are no specific medications available to treat self-harming behaviour. To address the underlying problem that is connected to self-injury, doctor may suggest antidepressants or other medications if an individual is diagnosed with a mental health condition like depression or an anxiety disorder. Treatment for these ailments might lessen the desire to harm oneself. The aim of this study is to evaluate which sociodemographic variables and comorbid psychological conditions in individuals are most predictive of self-harm.

MATERIAL AND METHODS

A 2 years' retrospective study was conducted by identifying and reviewing all deliberate self-harm cases that presented at the Trauma center of Jawaharlal Nehru Medical College, A.M.U, Aligarh, Uttar Pradesh from January 2021 to December 2022. This study is based on the record of patients who were brought for medico-legal examination. To achieve

this objective, a documentary data collection form was compiled to capture the relevant information. The details regarding age, gender, marital status, place of incidence, education level, reason and method of self-harm were noted. Ethical clearance was taken for this research from Institutional ethical committee. A documentary data collection form was compiled to capture the relevant information from the patients after obtaining informed consent.

RESULTS

Total 434 cases of self-harm were examined in the Trauma center of Jawaharlal Nehru Medical College over the span of 2 years in which 297 were males while 137 were females. In this study, we found that most of the survivors were from age groups 19-30 years (26.5%) and 31-40 years (22.6%) while least were in age less than 18 years (6.7%) as shown in Table 1.

The majority of victims belonged to rural areas 291 (67.1%) as compared to urban areas 143 (32.9%) as depicted in Table 2.

According to Table 3, individuals who were married were 354 in number (81.6%) followed by unmarried (11.7%) and divorced (6.7%).

Table 1: Distribution of cases according to age and gender

Age group	Male	Female	Total	Percentage
0-18 years	22	07	29	6.7
19-30 years	81	34	115	26.5
31-40 years	66	32	98	22.6
41-50 years	61	31	92	21.2
51-60 years	41	18	59	13.6
>61 years	26	15	41	9.4
Total	297 (68.4%)	137 (31.6%)	434	100

Table 2: Distribution of cases according to place of residence

Place of residence	No. of cases	Percentage
Rural	291	67.1
Urban	143	32.9
Total	434	100

Table 4 depicts that 147 individuals (33.8%) were illiterate, 109 (25.1%) had primary level education, 97 (22.4%) had secondary level education while 81 (18.7%) were graduates.

In the detailed evaluation of the different qualitative aspects, the history about the precipitating factor was taken and it was seen that majority of the participants reported relationship problem (25.6%),

financial problem (20.1%), job related stress (15.2%) and love failure (11.7%) as major precipitating factor (as shown in Table 5).

The most common method used for self-harm was taking poison or medicinal drugs (80.9%) followed by hanging (9.9%), cut injury to wrist (4.8%) and cut throat (4.4%) as shown in Table 6.

Table 3: Distribution of cases according to marital status

Marital status	No. of cases	Percentage
Married	354	81.6
Unmarried	51	11.7
Divorced	29	6.7
Total	434	100

Table 4: Distribution of cases according to education level

Education level	No. of cases	Percentage
Illiterate	147	33.8
Primary	109	25.1
Secondary	97	22.4
Graduate	81	18.7
Total	434	100

Table 5: Distribution of cases according to reason or precipitating event

Precipitating event	No. of cases	Percentage
Relationship problem	111	25.6
Financial problems	87	20.1
Job related stress	66	15.2
Love failure	51	11.7
Physical illness	49	11.3
Death of loved one	41	9.4
Failure in exams	29	6.7
Total	434	100

Table 6: Distribution of cases according to method of self-harm

Method of self-harm	No. of cases	Percentage
Poison/Drug	351	80.9
Hanging	43	9.9
Cut injury to wrist	21	4.8
Cut throat	19	4.4
Total	434	100

DISCUSSION

The current research attempted to analyze various risk factors of deliberate self-harm. The results from statistical analysis indicate that relationship problems, financial problems, job related stress and love failure to be the significant predictors of deliberate self-harm. Bhattacharya et al.^[9] and Sarkar et al.^[10] classified hospitalized cases of self-harm into two categories based on intentionality, lethality, mode, and age i.e., Failed suicide (those with high intent to die) and Deliberate self-harm (those with low intent to die).

Astonishingly, family interpersonal problems seemed to be the most frequent background stresses or triggering concerns in a rural society where joint family structures are so important to a way of life. The robust joint family system, long thought to be protective against suicide, paradoxically appears to be the most frequent initial cause for suicide attempts in our study. This stands in direct contrast to the often used suicide literature, especially that from Western nations where being alone is a major risk factor.^[11,12]

The high incidence of self-harm amongst males (68.4%) as shown in this study is easily comprehensible by the fact that males are more often exposed to the stress of day to day life, occupational hazards, financial difficulties, loss of job, discord at home and workplace etc which is similar to study conducted by Rabi et al.^[13] but in disparity to Suyemoto^[14] in which self-harm is more common in females as compared to male population.

Ingestion of agricultural poisons including pesticides, insecticides along with celphos and medicinal drugs (80.9%) accounted for the vast majority of attempts in our study mostly because these are readily available and accessible to everyone which is similar to study conducted by Mohanraj et al.^[15] This trend is due to the gradual urbanization of the country and easy availability of over the counter drugs both in urban as well as in rural areas.

CONCLUSION

Poisoning is the most frequent way of deliberate self-harm among patients, which is a very prevalent condition. These preliminary data show that a significant proportion of suicide attempts are impulsive, solitary efforts that are often the result of interpersonal conflicts. Contrary to expectations, young males appear to be trying suicide in higher numbers. The findings of this study are helpful in identifying patients who are likely to intentionally injure themselves. The involvement of family and friends should be taken into account in programs designed to stop intentional self-harm. To avoid relying on dubious online sources, it is strongly advised that family and friends build up a line of supportive communication with the patient. In order to ensure that the patient receives the care they require, the doctor and hospital staff should establish a cooperative therapeutic relationship with them. They should also inform the patient and their family members about their condition and diagnosis.

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DNA extraction from lip cosmetics' prints: A Review

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ABSTRACT

Background: Persistent use of lip cosmetics makes them one of the most regular evidence in crime against females, with this concern, plenteous work has been done to differentiate various types of lip cosmetics on basis of their composition. However, the forensic and DNA perspective regarding the same remains unexplored to a huge extent.

Study: We looked at the DNA implications of lip stains as well as several ways for extracting DNA from lip cosmetic prints in this work.

Conclusion: We came to the conclusion that DNA profiles created from lip cosmetics imprints are extremely valuable in forensic examination for personal identification because they are regarded the most crucial type of transmission traces and are equivalent to finger-marks.

Keywords: lip prints; lip cosmetics; touch DNA; DNA profiling

INTRODUCTION

Any physical aspect can be used to link a suspect to a crime as the need for law enforcement to present sufficient physical evidence to identify a perpetrator at a crime scene develops. Establishing a person's identity is a very laborious task. Human identification based on biometrics has become increasingly prevalent in recent years. Humans can be identified on the basis of their physical traits without the use of any external keys in these methods. Individuals, living or deceased, are identified on the basis of the premise that each person is unique and that no two people are alike. Personal identity is becoming increasingly vital in criminal investigations and genetic research, not just in legal medicine. Trace evidence is taken into account for this reason as these are minute pieces of evidence that

can be overlooked by a perpetrator at a crime scene. DNA can then be processed from this evidence or rather say Touch DNA can be obtained from this evidence. DNA transferred from shed epithelial cells or any other material biological in nature from a donor to a recipient which may be an item or an individual during physical contact is defined as "Touch DNA." This sort of material is regarded as an important resource to investigators yet has a pivotal part in forensic lab work.

MATERIAL AND METHODS

This review is organized in two broad categories: integrants of lip prints and its forensic evidentiary value. We have collected the data from printed data as well as electronically available data in forms of research papers and literatures.

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Lip Prints

Lip prints, like fingerprints, footprints, and palm prints, are defined by the presence of lines and wrinkles. Dactyloscopic traces and Lip imprints have similar values. Lip imprints, like fingerprints and tooth prints (Bite marks), can be used to identify someone. Lip prints are one-of-a-kind and do not alter throughout a person's life. When the valleys and folds of the labial mucosa come in direct contact with a surface, they generate a lip print. Cheiloscropy is a technique used in forensic investigations that deals with the study, classification, analysis, and comparison of imprints of lip prints. Lip prints are frequently discovered in rapes, murders, and break-ins. Individual identification of humans is possible thanks to traces with clear lines and individual elements. They resemble other chemical and biological remnants in their appearance. The lips unite the facial skin, that is Para keratinized stratified squamous epithelium, towards the mucosa of the oral cavity, which is moist non-keratinized to Para keratinized stratified squamous epithelium¹. Different zones present in the lip of human are shown in Figure 1. Among these zones exists a vermilion zone, which is a convergent area of red-colored tissues. In forensic examination techniques, this vermilion zone is usually referred to as 'lips'. Lip prints are commonly found on drinking glasses, paper napkins, cigarette butts, duct tapes, or even on the skin of the person.

Lip impressions at the scene of the crime may adhere to the following:

1. Visible lip prints: Imprints that can be seen with the naked eye. They need not require any extra processing to be visualized.
2. Latent lip prints: Imprints that are not visible to human eyes. They need prior development for visualization.
3. Plastic lip prints: These prints are found on pliable substances i.e., Soap, wax, etc. These prints although visible to unaided eyes but sometimes need further development to visualize.

Cosmetics

Cosmetics are items designed to be applied on the body of a person to cleanse, enhance, or change their look². The most popular cosmetics are utilized on the lips. They have been used for at least 5000 years, and a significant number of women still describe them as a beauty enhancers³. There are many different kinds of lip cosmetics such as lipsticks, lip liners, lip balms, lip gloss, etc.⁴. Lipsticks are used to add color to the lips, but lip balms have shown to be effective in preventing dryness and healing chapped lips.

Because of this characteristic, lip cosmetics are one of the most commonly seen pieces of evidence in crimes against women. The mutual exchange theory put forward by Sir Edmond Locard states that whenever two substances come in touch, materials will be exchanged. When it comes to lip makeup, this idea is valid as well. Lip balms and lipsticks are lip cosmetics that are the simplest to get onto the criminal's possessions, especially in situations of sexual assault, kidnapping, and murder. This is a result of their widespread usage. The stains left behind by lip cosmetics are easily discoverable on items like glasses, cigarettes, mirrors, tissue papers, and in certain circumstances, even on an individual's skin. These stains are among the most crucial pieces of evidence found at each crime scene that may be used to directly connect the victim and her attacker.

Numerous studies have been conducted to evaluate and study different lip cosmetic kinds in terms of the color and composition using chromatographic and analytical methods. However, there are still many unresolved questions regarding the forensic and DNA components of the case.

Components of lip cosmetics

A specific combination of waxes, pigments, and oils are used to create a standard lipstick. Emollients, which are often substances like Lanolin, Shea butter, etc., are made from 41% to 79% of their composition. Beeswax,

polyethylene, and other structural agents (15–28%) are also used. It has a pigment content of 3–10%, a luster agent content of 0–10%, and a preservative and antioxidant content of 0.2–0.5%⁵. In order to improve the wearability of the lipstick and make it “kiss-proof,” some contemporary lipsticks contain water-insoluble colors, silicone resins, polydimethylsiloxane, and other ingredients. From the viewpoint of makeup durability, this would be quite useful. However, it is not a very healthy option because many lip cosmetics include heavy metals like Antimony, Lead, or Mercury coupled with other carcinogens like Castor oil, Formaldehyde, and other chemicals that are known to induce toxicity in the body when used frequently⁷.

History

- R. Fischer, an anthropologist, discovered the biological quirks of furrow networks in the reddish region of human lips in 1902.
- One of France’s top criminologists, Edmond Locard, invented the use of lip imprints for identification verification in 1932.
- In 1950, Le Moyne Snyder proposed expanding the use of lip impressions as identification documents. He provided a great example of how lip prints helped forensic investigators.
- Dr. Martins Santos developed a basic classification system for lip prints in 1960 and said that all of these lip characteristics can also be useful for identifying a person.
- To gather important information for later applications in forensics, Suzuki conducted a detailed investigation in 1967 that included the measurement of lips, rouge color, and application, as well as the extraction technique.
- In 1971, Suzuki and Tsuchihashi conducted research and created their classification system for lip impressions.
- In 1972, Mc Donnell studied the lip impressions of a set of identical twins

and found that, save from their lip imprints, the twins seemed to be similar in all other respects.

- Cottone described cheiloscopy as one of the particular methods used for personal identification in his 1981 book ‘Outline of Forensic Dentistry.’
- Kasprzak conducted a 5-year research on 1500 persons in 1990 to explore the potential applicability of lip prints.
- In his 1981 book “Outline of Forensic Dentistry,” Cottone listed cheiloscopy as one of the specific procedures used for personal identification.
- In 1990, Kasprzak performed a five-year study with 1500 people to examine the possible use of lip prints.
- In the year 2000, Mercedes Alvarez Segu⁸ commissioned research in which persistent lipstick latent impressions were collected on numerous surfaces that would have gone unnoticed at a crime scene. The results revealed that identifiable lip imprints were being retrieved lasting 30 days.
- In 2001, a research by Laurence G. Webb et al.⁹ that used a few lip cosmetics that produced complete DNA profiles to analyze a variety of individual features was published.
- A research on the capacity to piece together important genetic information using lip impressions left on the skin as well as any potential lipstick interference with STR typing was published in 2009 by Barbaro A. et al.¹⁰

1. Lipstick lip prints as biological evidence

Lip prints were once restricted to cheiloscopy tests, which had a limited capacity for successfully identifying people based on the lines and wrinkles visible on lip traces. However, if there is wear and tear from stains, the admissibility of these prints as evidence in a court of law may be disputed. Lip cosmetic prints tend to transmit various cellular components along with the pigment

to whatever surface they come into contact to. According to several investigations, DNA can be successfully recovered from both highly and somewhat permeable surfaces, proving that DNA could be retrieved from old lip imprints. However, due to undetectable prints, this capability is not often used to its fullest extent⁸. Lip cosmetics not only make them noticeable but also simplify and streamline the detecting procedure. The development and production of “kiss-proof lipsticks” have led to an increase in the use of water- or oil-based makeup removers. These solutions make it simple to remove makeup without damaging your lips from vigorous rubbing. These makeup removers include cotton swabs, cleaning milk, Micellar water, and others. To remove the lipstick, these materials are placed over the wipes and pressed on the lips. If found at a crime scene, these wipes and swabs can have significant forensic importance.

Types of cellular material found in lip cosmetics print

The number of individuals interested in learning more about the cellular composition of surfaces a person has touched in any way has significantly increased since the launch of the Touch DNA idea. However, the DNA found in these samples is quite limited. According to research, some cellular elements together with pigments and wax may be transferred during physical contact between a victim and the offender, especially when any lip makeup is involved¹⁰.

It is possible to identify cell-free DNA in some instances, as well as nucleated, enucleated, fragmented, and corneocytes in lip prints. The outermost epidermal layer of the lips' nucleated cells, which can generate the most DNA, are anticipated to shed off¹¹. These prints may also contain saliva, more skin cells, and cells from the upper lip. Enucleated cells, similar to those found in fingerprints, can be detected in lip prints. Because saliva is transferred to the lips' outer layers during eating or licking, the nucleated

cells may be moved there⁹. *Factors affecting the amount of DNA deposit*

The quantity of cellular material and DNA deposits found in these prints depends on several variables. These variables include the type of lip product used, the person's health, whether or not they have eaten anything, the surface onto which the prints are transferred, etc¹². The major deciding factor for the amount of DNA deposited in every individual is their shedder status. It describes a person's propensity to transfer genetic material to surfaces and items they contact. Numerous studies have revealed that some people “shed” more DNA than others.^{13,14} Although it has been suggested that persons who routinely lose some DNA are either “excellent” shedders or “poor” shedders, There is proof that the amount of DNA that is deposited differs from person to person as well^{13,14,16}. It suggests that while some traits tend to have a consistent impact on a person's shedder status over time, situational factors including behavior, context, and involvement can also have an impact. The amount of DNA deposited in lipstick lip prints is also influenced by how long the cosmetic was worn.

According to a few studies, lip prints on glass slides may successfully and abundantly demonstrate the deposition of cellular material, ranging from 4 cells/mm² to 37 cells/mm² for the upper and lower lips, respectively¹⁷. However, depending on an individual's gender and shedder status, these statistics may vary¹⁶. These slides display a significant quantity of cell debris and cellular components devoid of nuclear material.

Transfer Of Foreign Materials

Contact with any alien or undesirable item has a major negative impact on the quality of cellular extracts. It is due to the exchange that will happen and might modify the outcomes of DNA profiling. The potential source of these foreign elements might be any sexual activity, before or after application, eating or drinking anything, applying or blending makeup with one's hands or nails, using a common product or applicator

that is used by several people, etc. If more than one makeup product, such as a moisturizer, foundation, or primer, is used before applying the lip product, the outcome may be altered. In these circumstances, the DNA profile may have a lower yield, several separate profiles, or mixed profiles¹⁸.

2. Extraction and DNA profiling from lip cosmetic's prints

Numerous scientists have worked for visualizing the latent lip prints by using the nucleic acid dye Diamond™ and examining them using a Dino-lite microscope. Its advantage is that the PCR processes are unaffected. Several kits, including Chelex¹⁸, the QuantiBlot kit, and the QIA fast PCR purification kit¹⁹, can carry out the process of DNA extraction and purification. AmpFISTR Profiler Plus™ PCR Amplification kits can be used for profiling. This aids in the study of the Amelogenin gene and nine STR loci. Analogous steps can be taken to examine the prints on samples of lip cosmetics. There may be certain artifacts that may be seen using a fluorescence microscope at particular wavelengths.

CONCLUSION

People of both genders use lip cosmetics extensively to accentuate their beauty worldwide. They are often employed, making them significant evidence in a court of law. There is disagreement among experts as to how much DNA could be extracted from the prints of lip cosmetics. It is simple to predict that the prints left behind during the transfer of lip cosmetics can be seen as a potential source of evidence carrying not only cheiloscopic but genetic value as well, given the emergence of novel concepts like Touch DNA and Trace DNA as well as prior works have been done on the successful extraction of genetic content from the lip imprints and even latent lip imprints. These prints can prove their competence from a forensic as well as legal perspective increasing the evidentiary value of these prints.

Conflict of Interest:

Authors declare no conflict of interest

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Study on acute poisoning cases brought for Medico Legal Autopsy in Gandhi Medical College, Secunderabad

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ABSTRACT

Background: Regular epidemiological investigations are essential for gaining insights into the incidence of poisoning in various geographical areas. The purpose of this study was to assess the characteristics and trends of deaths due to poisoning in Gandhi Medical College, Secunderabad.

Methods: Hospital records, inquest reports, post-mortem reports and toxicological analysis reports were analysed among various age groups, sex, type and manner of poisoning. Snake bite poisoning cases were excluded.

Results: Out of 318 cases, we got positive toxicological analysis report for 287 (90.2%) cases. In our study predominance of male cases 259(81.45%) compared to female cases 59(18.55%) reported. In the age group most involved was 21-30 yrs 107 cases (34%) followed by 31-40 yrs 82 (26%), 41-50 yrs 49 (15%). Organophosphate poisoning reported in high number of cases 189(65.85%) followed by paraquat poisoning 44(15.33%), tablet poisoning 23(2.01%), Sulphuric acid poisoning 22(7.67%) and others 9 (3.14%) (Rodenticide, phenol, pyrethroid, nitrite). In manner of death suicidal cases 311(97.80%) reported more followed by accidental cases 7 (2.20%). In suicidal cases, economic constraints as a reason were outnumbered 209 cases (67.20%) followed by health issues 52(16.72%), academic failure 35(11.25%), love failure 15(4.82%). In region wise, rural areas reported more cases 244(76.73%) when compared to urban area 74 (23.27%). In season wise, more cases reported in April to July 148 cases (46.50%) followed by December to March 97 cases (30.5%), August to November 73 (23%). Zero homicidal poisoning noted.

Conclusion: Organophosphate poisoning in active male population of rural areas with economic constraints were reported to be predominant.

Keywords: Organophosphate, rural areas, suicidal cases, poisoning.

INTRODUCTION

Poison is defined as any substance in any form, entering a living body through any route or coming in contact with the body surface that will produce ill health or death by its local or remote action. Poisons were known to human from the prehistoric era. References about poisons and toxic agents can be obtained from

ancient Egyptian, Babylonian, Chinese and Indian scriptures and records [1]

Poisoning both accidental and intentional are a significant contributor to mortality and morbidity throughout the world. According to WHO three million acute poisoning cases with 2,20,000 deaths occur annually. Acute poisoning forms one of the commonest causes

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of emergency. Pattern of poisoning in a region depends on variety of factors such as availability of poisons, socio economic status of the population, religious and cultural influences and availability of drugs.^[2]

Death consequent to poisoning will be considered as unnatural and must require meticulous investigation and scrupulous post mortem examination ^[3]. For the better prevention and saving the life of patients, sound knowledge of the type of poisoning and intention of act is essential.^[4]

The knowledge regarding the cases of acute poisoning is still inadequate in our country. Many studies even though done, could not resolve the difficulties in determining the detailed profile of poisoning cases. In order to overcome this, we, therefore formulated pattern of acute poisoning in our Gandhi hospital morgue.

MATERIALS AND METHODS

A retrospective study was conducted on 318 dead victims of suspected acute poisoning brought to the Gandhi Hospital mortuary, Secunderabad by police for medico legal autopsy. The samples (viscera and blood) collected during autopsy were sent for toxicological analysis to the Telangana state government forensic science laboratory (TSFSL) to detect poison. The poisoning data procured from the reports generated by TSFSL. Socio demographic data were obtained from the autopsy reports, police inquest reports and other hospital medical records.

Inclusion and Exclusion criteria

All cases which were treated and referred to Gandhi Hospital from throughout Telangana and other neighbour states during the period of 2020 year were included in this study. Covid positive cases and snake bite poisoning cases were excluded.

Manner of the death

The manner of death of these poisoning cases in the present study whether it is suicidal,

homicidal or accidental were decided based on (i) History given by the patients at the time of admission in the hospital, (ii) in cases of brought dead, history from the deceased relatives (iii) autopsy findings and (iv) police inquest reports.

RESULTS

Out of 318 total acute poisoning cases 287 cases were found to be positive for poisoning by laboratory tests. 31 cases were found negative for poisonous substances.

Males were predominating over females with 259 out of 318 cases compared to females 59.

The highest incident of poisoning cases noticed in young individuals as 92 belonged to the age group of 21-30 years with 59 males and 33 females

The different types of poison substances detected on laboratory examination of the viscera and blood samples preserved during autopsy

Organophosphate poisoning cases were highest (189) followed by paraquat (44), sulphuric acid (22),

Based on manner of death, the maximum number of cases 311 were suicidal, following 07 cases which were accidental. Among suicidal cases, economic constraint cases were highest (209) followed by health issues (44), academic failure (25) and love failure (13).

Based on socio demographic distribution of cases, rural cases (244) were topped compared to urban areas (74).

Table 1: Gender wise distribution

Age	Male	Female	Total	Percentage
0-10	5	2	7	2.20%
11--20	17	10	27	8%
21-30	88	19	107	34%
31-40	70	12	82	26%
41-50	43	6	49	15%
51-60	32	9	41	13%
61-70	2	0	2	1%
>70	2	1	3	1%
Total	259	59	318	100%

Table 2: Age wise distribution

Gender	Cases	%
Male	259	81.45%
Female	59	18.55%
Total	318	100.00%

Table 3: Type of poisons

Type of Poison	Cases	%
Organophosphate	189	65.85%
Paraquat	44	15.33%
Sulphuric acid	22	7.67%
Rodenticide	4	1.39%
Phenol	1	0.35%
Pyrethroids	3	1.05%
Nitrites	1	0.35%
Tablet poisoning	23	8.01%
Total	287	100.00%

Table 4: Manner of Death

Manner of Death	Cases	%
Accidental	7	2.20%
Suicidal	311	97.80%
Homicidal	Nil	Nil
Total	318	100.00%

In season wise, more cases reported in April to July 148 cases (46.50%) followed by December to March 97 cases (30.5%), August to November 73 (23%).

DISCUSSION

Out of 318 cases, we got positive toxicological analysis report for 287 (90.2%) cases. In our study predominance of male cases (81.5%) compared to female cases (18.5%) reported. The same reports were observed with study by Singh B et al⁴, Goswami O et al⁵, Parekh U et al⁷, Bhat NK et al⁸, Karikalan T et al⁹, Gupta BD et al¹⁰, Mugadlimath A et al¹¹, Antara Debbarma et al¹⁴. In contrast to our study female cases were outnumbered in Taruni NG et al⁶, Dash SK et al¹². In the age group most involved was 21-30 yrs 107 (34%) followed by 31-40 yrs 82 (26%), 41-50 yrs 49 (15%). The same reports were observed with study by Singh B et al⁴, Goswami O et al⁵, Dash SK

Table 5: Reason for Suicide

Area	Cases	%
Urban	74	23.27%
Rural	244	76.73%
Total	318	100.00%

Table 6: Region wise distribution

Reason for Suicide	Cases	%
Economic constraints	209	67.20%
Health Issues	52	16.72%
Academic Failure	35	11.25%
Love Failure	15	4.82%
Total	311	100.00%

Table 7. Season wise distribution

Months	Cases	%
April-July	148	46.54%
Aug-Nov	73	22.96%
Dec-Mar	97	30.50%
Total	318	100.00%

et al¹². In the study of Gupta BD et al¹⁰, 21-30 years outnumbered followed by 11-20 years, 31-40 years. Organophosphate poisoning reported in high number of cases 189(65.85%) followed by paraquat poisoning 44(15.33%), tablet poisoning 23(8.01%), Sulphuric acid poisoning 22(7.67%) and others 9 (3.14%) (Rodenticide, phenol, pyrethroid, nitrite). The same reports were observed with study by Singh B et al⁴, Goswami O et al⁵, Taruni NG et al⁶, Parekh U et al⁷, Bhat NK et al⁸, Karikalan T et al⁹, Gupta BD et al¹⁰, Dipayan Deb Barman et al¹³, Antara Debbarma et al¹⁴. In manner of death suicidal cases 311(97.80%) reported more followed by accidental cases 7 (2.20%). The same reports were observed with study by Singh B et al⁴, Goswami O et al⁵, Taruni NG et al⁶, Parekh U et al⁷, Bhat NK et al⁸, Karikalan T et al⁹, Gupta BD et al¹⁰, Mugadlimath A et al¹¹, Dipayan Deb Barman et al¹³. In region wise, rural areas reported more cases 244(76.73%) when compared to

urban area 74 (23.27%). The same reports were observed with study by Singh B et al.^[44], Goswami O et al^[5], Taruni NG et al^[6], Parekh U et al^[7], Bhat NK et al^[8], Karikalan T et al.^[9], Gupta BD et al.^[10], Mu gadlimath A et al.^[11]

CONCLUSION

Suicide an impulsive act due to failure of a person to get adjust to surrounding environment and unable to cope up to stress for which they are exposed. Loss of human life due to suicide poses a threat to the country and its economy. Skilful people are the asset of the country. Males in their 3rd decade from rural group with financial constraints are most effected when compared to others with organophosphate poisoning. India being an agrarian country, most of the people were engaged in agriculture related works where people have easy access to agriculture related chemical products which increasing the number of acute poisoning cases. Government should try to decrease mortality due to poisoning by taking welfare measures for the farmers also increase minimum support price for crops and also make arrangements to get crop loans at cheaper rates along with insurance of the crops. Literacy should be increased as a literate person can depend other than agricultural related jobs. Public should be educated regarding safe preservation of the chemicals which decreases accidental poisoning. Health infrastructure to be improved in rural areas so that poisoning cases will be treated effectively in golden time which decreases mortality. High mortality causing drugs like paraquat which has no antidote should be banned by the government and should go for another alternative drug.

DISCLOSURE

- No conflict of interest found with the authors.
- Self-funding
- This research work has been approved by the ethical committee of Gandhi Medical College, Secunderabad.

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Post Mortem analysis of electrolytes in vitreous humour to determine time since death

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ABSTRACT

Background: It has been found that so many biochemical materials, including electrolytes, remain remarkably stable after death while others show varying degrees of change; hence, the analysis of electrolytes in vitreous humour has great medico-legal importance.

Method: 95 autopsies were studied by making a puncture 5–6 mm away from the limbus by using a 10 ml sterile syringe and 20 gauge needles. Aspirated vitreous was poured into a rubber stopped vial. The collected fluid was sent to the biochemistry department for electrolyte analysis. The analysis was carried out using the iron selective electrode method, and the results were noted and compared.

Results: The PM interval for 27 cases (28.4%) was < 12 hours, 32 cases (33.6%) was between 12-24 hours, and 36 cases (37.8%) was >24 hours. In the study of different electrolytes, the sodium chloride value remained insignificant, but the potassium value had a highly significant p value ($p < 0.001$). The highest mean value of potassium 10.62 (± 1.90) in accidental falls and least in snake bite deaths was 6.7 (± 0.23).

Conclusion: The present pragmatic study has proved that vitreous potassium is the single best parameter to estimate and predict post mortem death accurately.

Keywords: iron selective electrode, vitreous humour electrolyte, autopsy, Maharashtra.

INTRODUCTION

The objectives of conducting medico-legal autopsies are to determine the cause of death and to estimate time since death⁽¹⁾. Estimation of TSD is one of the most important aspects of a medico-legal study⁽²⁾. Many physiochemical changes begin to take place in the body immediately or shortly after death and progress in a fairly orderly fashion until the body disintegrates⁽³⁾. Each change has its own time factor or rate. Unfortunately, these rates of development of postmortem changes

are strongly influenced by unpredictable endogenous and environmental factors. Consequently the longer the postmortem interval (PMI), leads to the wider the range of estimates as to when it probably occurred.

The post-mortem changes used for estimating the TSD are several and based on different parameters: purely physical processes (body cooling, hypostasis), metabolic processes (supravital reactions), autolytic (loss of selective membrane permeability diffusion) physiochemical

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process (spacing rigor. mortis) Microbial actions (putrefaction) Vitreous humour is a fluid that is relatively protected from post-mortem degradation and contamination due to its post mortem stability. Biochemical constituents of vitreous humour proportion vary due to delay in post-mortem. It has been found that the some biochemical material remains remarkably stable after death ⁽⁴⁾. Hence, an attempt was made to evaluate the quantity and quality of electrolytes in vitreous humour in different cases post mortem.

MATERIAL AND METHOD

95 (Ninety five) autopsies were carried out in the mortuary of the Government Medical College, Aurangabad-431001, Maharashtra.

Inclusive Criteria

The dead bodies aged between 16 to 60 years with crystal clear vitreous humour were selected for study.

Exclusion Criteria

Murder cases, custodial deaths, decomposed bodies, bodies with damaged eyeballs due to assault trauma, RTA, one eyed dead bodies, and visibly discoloured samples were excluded from the study.

METHOD

Vitreous humour was collected by making a puncture 5–6 mm away from the limbus using a 10 ml sterile syringe and 20 gauze needles. Aspirated vitreous was poured into a rubber-stop vial. Normal saline is injected into the eye for cosmetic purposes. The collected specimen was sent to the department of biochemistry for biochemical analysis. It was immediately centrifuged for ten minutes at 3000 revolutions per unit of supernatant fluoride for the iron selective electrode method, and reports were studied accordingly.

Observation and Results

Table-1: Causes of deaths was 36 (37.8%) RTA, 17 (17.8%) were burns, 15 (15.7%) poison, 9 (9.47%) hanging, 6 (6.31%) accidental fall, 4 (4.21%) Electro citation, 3 (3.15%) natural death, 3 (3.15%) head injury, 2 (2.10%) snake bite

Table-2: Study of post-mortem intervals – 27 (28.4%) had > 12 hours, 32 (33.6%) 12-24 hours, 36 (37.8%) > 24 hours

Table-3: Study of different electrolytes in post-mortem cases

Sodium – range value 114 to 182 and average finding was 145.5 (\pm 15.4) and $p > 0.86$

Table 1: Reason for Death of post-mortem cases

Cause of death	No of cases	Percentage
RTA	36	37.8
Burns	17	17.8
Poison	15	15.7
Hanging	9	9.47
Accidental fall	6	6.31
Electrocution	4	4.21
Natural death	3	3.15
Head injury	3	3.15
Snake bite	2	2.10
Total	95	99.69

RTA = Road traffic Accident

Table 2: Study of post-mortem intervals

PM Interval	No of cases	Percentage (%)
< 12 hours	27	28.4
12-24 hours	32	33.6
> 24 hours	36	37.8
Total	95	99.8

Table 3: Study of different electrolytes in post-mortem cases

Electrolytes	Range value	Average value mean	P value
Sodium	114 to 182	145.5 (\pm 15.4)	p>0.86
Chloride	119.3 to 151.3	123.95 (\pm 15.2)	p>0.15
Potassium	6.02 to 8.05	12.35 (\pm 1.6)	P<0.001

Potassium value is highly significant

Table 4: Study of mean value (SDI) of electrolytes in different post mortem cases

Cause of death	No. of (Na)	Sodium (Na)	Potassium (K)	Chloride
Accidental fall	6	155.34 (\pm 14.4)	10.62 (\pm 1.90)	134.72 (\pm 16.3)
Burns	17	140.6 (\pm 14.2)	10.02 (\pm 2.30)	17.36 (\pm 10.52)
Electrocution	4	146.32 (\pm 15.08)	9.23 (\pm 0.32)	124.23 (\pm 7.32)
Hanging	9	140.8 (\pm 5.48)	10.52 (\pm 3.23)	119.6 (\pm 2.80)
Head injury	3	135.32 (\pm 4.62)	8.51 (\pm 0.66)	113 (\pm 3.42)
Natural death	3	148.23 (\pm 6.47)	9.22 (\pm 2.42)	132.30 (\pm 3.82)
Poison death	15	145.24 (\pm 9.79)	8.27 (\pm 1.82)	117.69 (\pm 8.62)
RTA	36	146.77 (\pm 11.29)	10.28 (\pm 2.56)	126 (\pm 11.47)
Snake bite	2	132.4 (\pm 5.29)	6.7 (\pm 0.23)	120.3 (\pm 15.27)

Chloride - range value 119.3 to 151.3 average finding was 123.95 (\pm 15.2) and p>0.15

Potassium - range value 6.02 to 8.05 average finding was 12.35 (\pm 1.6) and p<0.011 (p value was highly significant)

Table-4: Study of Mean value of electrolytes in different PM cases

- In accidental fall - 115.34 (\pm 14.4) sodium, 10.62 (\pm 1.90) potassium, 134.72 (\pm 16.3) chlorides
- In Burn cases - 140.65 (\pm 14.2) sodium, 10.2 (\pm 2.30) potassium, (k) 117.56 (\pm 0.52) chlorides
- Electrocution - 146.32 (\pm 15.08) sodium, 9.23 (\pm 0.2) potassium, 124.23 (\pm 7.32) chlorides

- Hanging - 140.8 (\pm 5.48) sodium, 10.52 (\pm 3.23) potassium, 119.6 (\pm 2.80) chlorides
- Head injury - 135.32 (\pm 4.62) sodium, 8.51 (\pm 0.66) potassium, 113 (\pm 6.42) chlorides
- Natural death- 148.23 (\pm 6.47) sodium, 9.22 (\pm 2.42) potassium, 132.30 (\pm 3.82) chlorides
- Poisoning - 145.24 (\pm 9.79) sodium, 8.27 (\pm 1.82) potassium, 117.69 (\pm 8.62) chlorides
- RTA - 146.77 (\pm 11.29) sodium, 10.28 (\pm 2.56) potassium, 126 (\pm 11.42) chlorides
- Snake bite - 132.4 (\pm 5.29) sodium, 6.7 (\pm 0.23) potassium, 120.3 (\pm 15.27) chlorides

DISCUSSION

Present post-mortem analysis of electrolytes in vitreous humour in Maharashtra autopsies. The cause of death was 36 (37.8%) RTA, 17 (17.8%) burns, 15 (15.7%) poison, 9 (9.47%) hanging, 6 (6.31%) accidents falling, 4 (4.21%) electrocution, 3 (3.15%) natural death, 3 (3.15%) head injury, and 2 (2.10%) snake bites (Table 1). 27 (28.4%) cases PM interval was < 2 hours, 32 (33.6%) had 12-24 hour intent, and 36 (37.8%) had > 24 hour interval (Table 2). In the study of different electrolytes - 6.02 was the range value, 12.35 (\pm 1.6) was obtained, and $p < 0.001$, the p value was highly significant (Table 3). In the study of the presence of potassium in different PM cases, the highest value of potassium was 10.62 (\pm 1.90) in accident falls, and the least value was observed at 6.77 (\pm 0.23) in snake bite cases (Table 4). These findings were more or less in agreement with previous studies (5)(6)(7).

Vitreous humour in the eyes is anatomically separated and well protected; sterile fluid resistance to putrefaction for a long time/ Energy metabolism continues for a relatively long period. The diffusion process is slower in vitreous humour when compared to other body fluids. It is reported that sodium concentration by iron elective electrode, method did not show any significant relation between sodium concentration in vitreous

humour and time since death (TSD) ⁽⁸⁾⁽⁹⁾. It was also that, the samples were analysed on Easylyte, plus NA/K/CL were analysed, and sodium and chloride had no significant correlations ⁽¹⁰⁾.

The potassium concentration in vitreous humour had a significant correlation, and the p value was highly significant ⁽¹¹⁾. It was seen that the vitreous humour potassium concentration was directly proportional to the increase in post-mortem interval (PMI) (linear arithmetic relationship). The calcium concentration in vitreous humour ranged from 2.4 to 9 mg / dl with a mean of 5.08 mg/ dl and a p -value of 0.86. The correlation was found to be statistically insignificant ⁽¹²⁾. Similarly, it was found to be insignificant when correlated with concentration on vitreous humour. The rise in potassium level is due to the autolysis of vascular choroids and retinal cells in the eye. There was a linear increase in vitreous potassium level with the rise of PMI. This indicates that, rise in potassium levels after death has a strong correlation with PMI.

SUMMARY AND CONCLUSION

In the post-mortem analysis of electrolytes in vitreous humour at our centre in Maharashtra, there was a significant elevation in potassium levels correlated with PMI. Hence, potassium level elevation has medico-legal importance, followed by time since death. The present study demands a large number of autopsies with the latest biochemical technologies to confirm these significant results.

LIMITATION OF STUDIES

Owing to the small number of dead bodies and the lack of the latest instruments, we have limited findings and results.

- **This research work has been approved by the ethical committee of Govt. Medical College, Aurangabad, 431001, Maharashtra.**
- **No conflict of interest**
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Analysis of Lip Prints as an Indispensable Tool for Identification and Sexual Dimorphism- A Cross Sectional Study

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ABSTRACT

Introduction: Cheiloscopy is one of the investigative methods that utilises the anatomy and morphology of lips to identify individuals by their lip prints. Lip prints are a distinctive pattern made up of ridges and grooves on the labial mucosa, or sulci labiorum; cheiloscopy is the study of such patterns.

Material and Methods: The study group comprised of 50 males and 50 females aged between 18 and 25 years in the Department of Forensic Medicine and Toxicology, Jawaharlal Nehru Medical College, AMU, Aligarh for a period of 1 year i.e., from August 2021 to September 2022.

Results: Each individual lips were divided into 4 regions- upper right, upper left, lower right, and lower left and a total of 400 lip regions (100x4) were assessed for 6 types of lip groove patterns- Type I, Type I', Type II, Type III, Type IV, and Type V as per the Suzuki and Tsuchihashi classification. The most common type of lip print pattern in males was Type III (32.5%) while in females it was Type II (36%).

Conclusion: Lip prints are distinctive to each person and can be used to identify a person and ascertain their gender.

Keywords: Cheiloscopy, Lip print, Identification

INTRODUCTION

Identification is the determination of the individuality of a person whether living or dead.¹ Just like Dactylography and DNA fingerprinting which have been successful in personal identification, cheiloscopy or lip print scan be instrumental in identifying a person positively and can be used to validate the presence or absence of a person at the scene of crime. The lips perform numerous functions such as eating, drinking, speaking, and emotional expressions, while sensory function for sensuality and sexuality is

achieved by a complex system of muscles and supporting structures.²

Fischer initially reported grooves on both the upper and lower lips in 1902, and Locard later suggested the cheiloscopic technique in 1932 for identifying individuals as well as analysing crime scenes.³⁻⁵ In his book "Homicide Investigation," published in 1950, Synder additionally addressed the relevance of the lip grooves' uniqueness as a distinctive character, similar to the ridge patterns found on fingerprints. Dr. Martin Santos developed a straightforward system for categorising lip

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prints in 1960 and suggested that these lip characteristics may be utilized in personal identification.⁶ The first study in Europe on lip prints was conducted in Hungary in 1961 after these prints were discovered on a glass door at the crime scene. And at this point, it was established that lip traces might be used for criminalistics identification.⁷ The practical use of extracting lip prints in forensic science was first described by Suzuki in 1967. Later, in 1970, Suzuki and Tsuchihashi gave the grooved lip prints the term *Figura linearum labiorum rubrorum*. Additionally, McDonell examined the lip prints of identical twins in 1972 and discovered that while they were similar in every way, their lip patterns were different. Cheiloscopy was listed by Cottone in his book "Outline of Forensic Dentistry," published in 1981, as one of the particular techniques for individualization.

Similar to fingerprints, palm prints, and footprints, the pattern of wrinkles on the lips has particular characteristics. Lip prints are distinctive and consistent throughout the course of a lifetime. These patterns are distinguishable as early as the sixth week of intrauterine life.⁸ The furrows or grooves on the labial mucosa or sulci labiorum form a characteristic pattern called lip prints, the study of which is referred to as Cheiloscopy. It can also be defined as a method of identification of a person based on distinctive arrangements of lines present in the zone of transition of human lip, between the inner labial mucosa and outer skin or as a discipline dealing with lines appearing on red part of the lips.

At crime scenes, lip prints may be found on a wide range of items, such as drinking glasses, cigarette butts, tissues, or napkins. Both direct inspection and photography permit more accurate and comprehensive interpretations needed for lip print investigations. To identify suspects and further corroborate their presence at the crime scene, it is crucial to properly investigate the distinctive characteristics of lip prints. The oily and moist secretions from sebaceous and salivary glands situated

at the vermilion border which is the sharp demarcation between the lip and the adjacent normal skin, and subsequent moisturization from the tongue facilitates the formation of a latent lip print whenever there is contact with lips leaving behind an important form of transfer evidence.

In postmortem analysis, lip groove patterns have to be acquired within 24 hours of death to avoid any possible postmortem degradation of lip mucosa.⁹ The objective of this study is to assess the distribution of lip print pattern among males and females and to evaluate the lip print patterns for their uniqueness.

MATERIAL AND METHODS

The present study was conducted in the Department of Forensic Medicine and Toxicology, Jawaharlal Nehru Medical College, AMU, Aligarh for a period of 1 year i.e., from August 2021 to September 2022. The study sample comprised of 100 medical students of North India i.e. 50 males and 50 females aged between 18 and 25 years for assessing the pattern of lip prints. People with congenital lip abnormalities, chapped lips, sores on the lips, people who are allergic to lipstick, and who have had surgery on their lips in the past were not included in the study. The participants were given a detailed explanation of the study's protocol and objectives before their informed consent was sought.

Cellophane tape, white paper, a magnifying glass, and a dark red lipstick were the materials utilised to record the lip groove patterns. Before beginning the procedure, the individual lips were wiped with a damp tissue. With a single, delicate stroke, the lipstick was equally distributed on the vermilion border of both lips. The test subjects were instructed to rub both lips together to spread the lipstick. Individuals were then asked to relax without stretching their lips.

Cellophane tape was used to lift the lip groove patterns on the upper lip from one side

to the other, and then the tape was adhered to white bond paper as a permanent record. For the lower lips, the same procedure was done. The remaining lipstick was removed from the lips with a tissue before being thoroughly washed after applying the lip groove designs to the bond paper. By predominantly descending a perpendicular i.e. vertical line from the philtrum of the lips and horizontal line between the upper lip and lower lip, the lip groove patterns were divided into four regions: upper right region, upper left region, lower right region, and lower left region. Under a magnifying glass, the obtained lip groove patterns were thoroughly studied. The quantity, length, branching, and combinations of the lines and furrows were recorded.

RESULTS

A total of 100 individuals were included in the study, comprising of 50 males and females each, in the age group of 18 to 25 years. Each individual lips were divided into 4 regions- upper right, upper left, lower right, and lower left and a total of 400 lip regions (100x4) were assessed for 6 types of lip groove patterns- Type I, Type I', Type II, Type III, Type IV, and Type V as per the Suzuki and Tsuchihashi classification. In the present study, no one had a single type of lip print in each of the four compartments, and no two or more people shared a lip print pattern of the same kind. Different patterns could be seen in each lip print. The lip print appeared to be a combination of different types of grooves rather than just one type.

When the overall pattern was assessed among all the lip quadrants of the study subjects, it was found that branched (27.2%) and intersecting (25.2%) pattern was most common, both among males and females. However, the least common was the reticular pattern seen in 11% individuals as depicted in table number 1. Among males, it was found that intersected pattern was most common in all compartments i.e. 32.5%, while the least common pattern was the vertical pattern i.e. Type I and Type I' having 7.5 and

6% respectively as seen in table number 2. According to table number 3, on evaluation of the lip prints of the females, it was found that branched pattern was most common in all compartments i.e. 36%, while the least common pattern was the reticular and undetermined i.e. 5.5% and 5% respectively.

In the present study, in right upper region of the lips, the most common type of pattern in male was Type III (30.5%) and in females the most common type of pattern was Type II (37.5%). In left upper region, the most common type of pattern in male was Type III (34%) and in females the commonest pattern was Type II (35.5%). In left lower region, the most common type of pattern in male was Type III (33%) and in female the most common type was Type II (34.5%). In right lower region,

Table 1: Distribution of Lip groove patterns

Lip groove pattern	Number (100x4)	Percentage
Type I	46	11.5
Type I'	51	12.8
Type II	109	27.2
Type III	102	25.5
Type IV	44	11
Type V	48	12
Total	400	100

Table 2- Distribution of Lip groove patterns among males

Lip groove pattern	Number (50x4)	Percentage
Type I	15	7.5
Type I'	12	6
Type II	37	18.5
Type III	65	32.5
Type IV	33	16.5
Type V	38	19
Total	200	100

Table 3- Distribution of Lip groove patterns among females

Lip groove pattern	Number (50x4)	Percentage
Type I	31	15.5
Type I'	39	19.5
Type II	72	36
Type III	37	18.5
Type IV	11	5.5
Type V	10	5
Total	200	100

Table 4- Distribution of lip groove pattern according to lip quadrant

Lip quadrant	Gender	Most common type of pattern	Percentage
R i g h t Upper	Male	Type III	30.5
	Female	Type II	37.5
L e f t Upper	Male	Type III	34
	Female	Type II	35.5
L e f t Lower	Male	Type III	33
	Female	Type II	34.5
R i g h t Lower	Male	Type III	31.5
	Female	Type II	36.5

the most common type of pattern in male and female was Type III(31.5%) and Type II (36.5%) as depicted in table number 4.

DISCUSSION

Lip prints are considered one of the most essential types of transfer evidence, making them particularly helpful in forensic investigation as well as personal identification. In Poland in 1966, the first cheiloscopy breakthrough was made when a burglary incident window pane revealed a lip print. After conducting the examination, the expert came to the conclusion that the trace

of lips found at the site did not belong to the suspect.¹⁰

Suzuki and Tsuchihashi^{11,12} created a new classification of lip prints by referring to the grooves on the labiorum rubrorum as "sulci labiorum rubrorum" and the lip prints made up of these grooves as "Figura linearum labiorum rubrorum," or simply "lip print." According to the shape and direction of the grooves, lip prints were divided into six categories. The patterns on the lips are most frequently categorized using this system. Suzuki and Tsuchihashi's classification of lip prints is as follows-

1. Type I- A clear-cut line or groove running vertically across the lip
2. Type I'- Straight grooves that disappear half way into the lip instead of covering the entire breadth of the lip or partial-length groove of Type I
3. Type II- A branched groove
4. Type III- An intersected groove
5. Type IV- A reticular groove
6. Type V- Grooves that do not fall into any of the above categories and cannot be differentiated morphologically

Various studies have shown conflicting results about the lip print pattern in males and females. In the current study, the most typical lip print pattern in both males and females was determined using the quadrant approach. This technique split the lip prints into four distinct quadrants, and each quadrant was examined independently for males and females. After the analysis, it was discovered that no two people or more have lips that are alike, proving that a person's lip print is a significant and distinctive characteristic.

The most common lip print pattern among males in our study was type III which was in accordance with studies conducted by Saraswati et al¹³, Gupta et al¹⁴ and Bajpai et al.¹⁵ and contradictory to studies conducted by Sharma et al¹⁶ and Babu et al.¹⁷ On evaluation of the lip prints of the females, it was found that branched pattern i.e. Type II was most

common in all lip quadrants which is similar to studies conducted by Patel et al¹⁸ and Bidal et al¹⁹ while contradictory to studies conducted by Verghese et al²⁰ and Ashwini rani et al.²¹

The studies on Indian population have produced conflicting findings, Vahanwala and Parekh²² reported in their study in Mumbai that Type I was the most prevalent while Sivapathasundharam et al²³ concluded that in Indo-Dravidian population Type III was most common type of lip pattern. According to Maheswari and Gnanasundaram²⁴ Type II lip groove pattern is more frequent among Indian population.

CONCLUSION

Every person has a different lip groove pattern, and depending on a person's gender, certain patterns are more common than others. Cheiloscropy is a simple and reasonably priced technique that has to be applied thoroughly to larger samples and in various global populations. To be an effective tool, a database on various lip prints in various populations must be assembled. When no other traditional methods of identification are available, lip prints are just as reliable as finger prints for criminal identification. The usage of this method in routine civil and criminal litigation needs to increase, though, as far as the Indian judicial system is concerned. Cheiloscropy can be used as an effective tool in the identification of the persons from pieces of evidence that may be left behind from lip prints.

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Conflict of Interest- None

Ethical Clearance- Taken from Institutional Ethical Committee

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Pattern of Occurrence of Natural Deaths – A 3 years retrospective study

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ABSTRACT

The present study has been carried out to find the occurrence of natural deaths and the diseases causing them in Eastern part of Bengaluru with special emphasis on histopathological correlation. Medico legal autopsy cases with history of Natural Death over period of three years between January 2019 to December 2021 were included in this study. A total of 799 cases were autopsied at our Institute during that period, out of which 104 deaths (13.01 %) were due to natural deaths, The highest number of cases were observed in the age group of 21-30 years (n=29, 27.9 %), Maximum cases (n=12, 11.5%) of cases were found in January month, Majority of the cases were due to the diseases of Cardiovascular system (n=67, 64.1 %) followed by diseases of Respiratory system (n=23, 22.2 %), Maximum cases of natural deaths were due to coronary artery disease (n=44, 42.3%), followed by pneumonia (n=13, 12.5%).

Keywords: *Natural Death; Coronary Artery Disease; Pneumonia.*

INTRODUCTION

The WHO (world health organisation) defines sudden death as a death occurring less than 24 hours from onset of symptoms, which is otherwise not explained / death known not to be violent or instantaneous for which no cause can be discovered / death without sign of disease.¹ Death is said to be natural when it occurs due to natural disease or pathological condition, old age, disability or devitalisation, in which death is not intended or attempted and also does not occur accidentally but one that is primarily

attributed to an illness or an internal malfunction of the body not directly influenced by external forces.^{2,3}

An apparently healthy individual of any age when dies suddenly and unexpectedly, without any pre indication or even in case of natural death under suspicious state, with no medical attention and possibility of any disease being responsible for it being considered remote, a suspicion of foul play, injury, poisoning may arise in the mind of officials responsible for the certification of death.⁴

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Determination of cause of death in natural deaths, particularly when the death occurred suddenly, unexpectedly, or in the young, is an important part of forensic autopsy practice, for reasons including the following:⁵

- Performance of a complete and thorough autopsy on apparent natural deaths can provide valuable information in the interest of public health by identifying public health risks and monitoring disease trends.
- Identification of disease processes and patterns provides epidemiological data that can be used to control disease outbreaks, identify changes in disease patterns, or to identify reportable diseases.
- The timely and accurate diagnosis of medically important diseases can have a significant impact on the relatives of the deceased by allowing them the opportunity to seek treatment for certain hereditary diseases in which the presenting symptom may in fact be sudden death.

Sudden natural deaths constitute a significant proportion of deaths, which undergo medicolegal autopsies. A suspicion of foul play is raised when healthy persons without any significant previous history of illness were found dead. Further, the suspicion over the cause and manner of death increases if the terminal event occurs unnoticed or unobserved by anyone. In such cases, the exact cause of death may be established

only after a thorough investigation and autopsy.⁶

MATERIALS AND METHODS

The present study was carried out retrospectively by collecting 3-years data of all the medicolegal autopsies of natural deaths brought to the Morgue of East Point College of Medical Sciences and Research Centre, Bengaluru from January 2019 to December 2021. Relevant data on natural deaths was collected from the police inquest, autopsy and histopathology reports. Finally, the obtained data were tabulated and analysed.

RESULTS

A total of 799 cases were autopsied at our Institute during the study period, out of which 104 deaths (13.01%) were due to natural deaths (Fig. 01). Males (n=89, 85.6 %) outnumbered females (n=15, 14.4 %) (Fig. 02). The highest number of cases were observed in the age group of 21-30 years (n=29, 27.9%), followed by 31-40 years (n=23, 22.1 %) and 41-50 years (n=22, 21.6 %) (Table. 01). Maximum cases (n=12, 11.5%) of cases were found in January month, followed by (n=11, 10.6%) in February, while least incidence was found in April and June (n=6, 5.8% in each month) (Table. 02). Majority of the cases were due to the diseases of Cardiovascular system (n=67, 64.1 %) followed by diseases of Respiratory system (n=23, 22.2 %), Other causes include gastrointestinal/hepatic diseases (n=5, 4.8%),

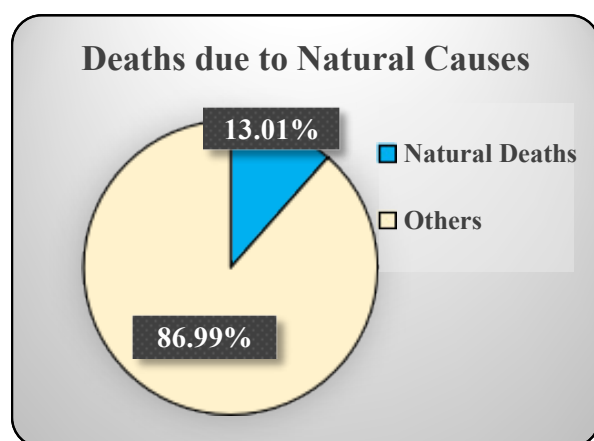


Fig. 1: Deaths due to Electrocution

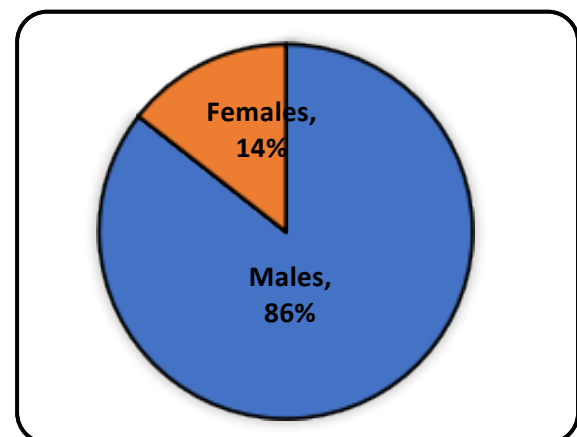


Fig. 2: Sex wise distribution of Cases

Table 1: Distribution of cases according to age

Age Group	Male (%)	Female (%)	Total (%)
0 - 10	0 (0)	2 (13.3)	2 (1.9)
11 - 20	0 (0)	1 (6.7)	1 (0.9)
21 - 30	27 (30.3)	2(13.3)	29 (27.9)
31 - 40	20 (22.5)	3(20)	23 (22.1)
41 - 50	20 (22.5)	2 (13.3)	22 (21.2)
51 - 60	12 (13.5)	2 (13.3)	14 (13.5)
>60	10 (11.2)	3 (20)	13 (12.5)
Total	89	15	104

Table. 2: Month-wise Distribution of cases

Month	No. Cases	Percentage
January	12	11.5
February	11	10.6
March	10	9.6
April	6	5.8
May	8	7.7
June	6	5.8
July	7	6.7
August	7	6.7
September	8	7.7
October	10	9.6
November	10	9.6
December	9	8.7
Total	104	100

Table. 3: Distribution of cases according to involvement of Body System

System Involved	No. Cases	Percentage
Cardiovascular	67	64.4
Respiratory	23	22.2
Gastrointestinal	5	4.8
Genitourinary	3	2.9
Central Nervous	2	1.9
Miscellaneous	4	3.8
Total	104	100

Table 4: Distribution of Sudden Death Cases According To Etiology.

System Involved	Etiology	No. Cases	Percentage
Cardiovascular	Coronary Artery Disease	44	42.3
	Cardiac Hypertrophy	6	5.8
	Acute myocardial infarction	6	5.8
	Chronic myocardial infarction	7	6.7
	Bacterial Pericarditis	3	2.9
	Other Causes	1	0.9
Respiratory	Pneumonia	13	12.5
	Pulmonary Tuberculosis	2	1.9
	Emphysema	2	1.9
	Pulmonary Edema	6	5.8
Gastrointestinal	Cirrhosis of Liver	3	2.9
	Gangrenous Intestine	1	0.9
	Other Causes	1	0.9
Genitourinary	Chronic Pyelonephritis	2	1.9
	Glomerulosclerosis	1	0.9
Central Nervous	Intracranial Haemorrhage	1	0.9
	Tumours / Malignancy	1	0.9
Miscellaneous		4	3.8
Total		104	100

genito-urinary system diseases (n=3, 2.9%), central nervous system diseases (n=2, 1.9%) respectively (Table. 03).

Maximum cases of natural deaths were due to coronary artery disease (n=44, 42.3%), followed by pneumonia (n=13, 12.5%). While in four cases (3.8%) of sudden death, cause of death could not be revealed, even after thorough post mortem examination & other investigations (Table. 04).

DISCUSSION

In the present study, the incidence of natural death cases was 13.01 %, which was close to Rana M N, Anil R. Pandey A R (10 %) ⁷, Rao (8.67%) et al ⁸. In contrast higher incidence of sudden natural deaths was seen in other studies done by Obiorah (55.6%) et al ⁹, Escoffery and Shirley (51.3%) et al ¹⁰, Nordrum (27.8%) et al ¹¹. Higher incidences of sudden natural death cases in those studies may be due to different life styles of people, geographical area and different types of cases as these studies were done outside India.

In our study male predominance was observed (n=89, 85.6 %). The findings are in consistent with the studies done by Pathak and Mangal (63.33%) ¹². Rana M N and others (84.79%) ⁷. Chaturvedi M et.al (76.6%) ¹³.

In the present study Most of the cases fell in the age group of 21-40 years (n=52, 50 %). The finding is in consistent with the work of Gupta BD et.al ¹⁴, Jani CB et.al ¹⁵ and Pathak A et.al ¹². Majority of the studies done in India are showing the maximum numbers of sudden natural deaths in middle aged people (31-40 years). More number of young adultscases are being reported with sudden deaths in the recent past. It may be due to urbanization, westernization of our population, sedentary life style, habits, stress, lack of regular exercise and lack of regular medical check-up or follow-up.

In the present study, maximum cases of sudden natural deaths (11.5%) were found in the month of January, followed by month of February (10.6%). Accordingly,

from our study, it is shown that most cases of sudden natural deaths were found in the winter season. It coincides with studies done by Bhagora R L ¹⁶, Chin-Tun Hung et al. ¹⁷. Low temperature has a harmful effect on blood pressure, and can alter the myocardial oxygen supply, increase ventricular wall strain, cardiac exertion and oxygen demand, and reduce coronary blood flow.

In the present study we observed that maximum deaths were related to diseases of cardiovascular system constituting to 64.1 % which is similar to other similar studies done by Puranik (56.4%) et al ¹⁸, Azmak (55%) ¹⁹ and Rana M N et.al (54.38 %) ⁷. Preponderance to cardiovascular system could be due to changing ways of living, food habits- high concentration of fatty or junkfoods, stress, lack of exercise with sedentary lifestyle and extreme indulgence of younger adults in predisposing factors like smoking and alcoholism.

In our study we found diseases of respiratory system as second most common cause of sudden natural deaths (22.2%) which is similar to studies done by Rao D S et.al (27.45%) ⁸ and Escoffery and Shirley (23%) et al ¹⁰, Rana M N et.al (23 %) ⁷.

CONCLUSION

From the present study we can conclude that diseases of the cardiovascular system are the major contributing factor for sudden natural deaths especially coronary insufficiency or coronary artery disease. The age distribution shows that involvement of younger age group appears to be slightly higher in the recent past. Changing life style, food habits, addictions, stress are some of the contributing factors. Awareness on routine health check-up amongst the general public would help to reduce the incidence of such deaths. Further, a thorough post-mortem examination and histopathological and laboratory diagnosis always helps in avoiding unnecessary litigations in such cases.

Conflict of Interest – Nil.

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Ethical Clearance- Approval taken from Institutional Ethical Committee.

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Perception of Medical students about Forensic Medicine subject- A survey based study at Govt. Medical Institute situated in hilly region of Uttarakhand State

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ABSTRACT

The main aim of teaching Forensic Medicine in our nation to develop doctors who are knowledgeable and well aware about medico-legal Responsibilities in the practice of medicine. Forensic medicine and toxicology are required to be taught to MBBS undergraduate during their second professional year, which lasts 18 months in India. The study was done among a total of 352 MBBS undergraduates of VCSGGIMS & R Srinagar Pauri Garhwal Uttarakhand after dividing them in to three groups. The Students were asked to express their responses on a scale with grading from 1 to 5 on a questionnaire for survey. 84.9% students strongly or somewhat had agreed that the subject has utility after MBBS course for delivering health services especially in Government Health centre and While 5.1% strongly or somewhat had disagreed with it.

Keywords: Medico-legal investigation, perception, interest, scope, questionnaire.

INTRODUCTION

Forensic medicine and toxicology are required to be taught to MBBS undergraduate during their second professional year, which lasts 18 months in India. The subject teaches MBBS undergraduate about the legal obligations of doctor (Medical jurisprudence) as well as the legal aspects of poison (Forensic Toxicology) and legal aspects of medicine. The main aim of teaching Forensic Medicine in our nation to develop doctors who are knowledgeable and well aware about medico-legal Responsibilities in the practice of medicine.¹

It is concerning since the way forensic medicine is currently taught to students in

India is unable to adequately impart clinical knowledge in managing medico-legal issues.²

According to section 39 of the Indian Criminal Procedure Code, anyone who finds that someone has committed a crime involving the human body must inform the appropriate law enforcement agency, such as the police or the magistrate.³

Being able to treat patients who are suffering as a result of a crime committed by anyone, exposes a medical professional to such knowledge regarding the commission of a crime on a regular basis. A medical professional is legally required to gather all relevant evidence from the body of patients

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that may aid in the investigation of the crime, in addition to giving this information to the police and magistrates. A doctor has the right and duty to evaluate a medical issue and determine whether or not criminal activity may be possible.

MATERIAL AND METHODS

The study was done among a total of 352 MBBS undergraduates of VCSGGIMS & R Srinagar Pauri Garhwal Uttarakhand after dividing them in to three groups. The first group (Group A, n = 149) was comprised of

students who had no exposure to the subject, the second group (Group B, n = 105) was comprised of students who are undergoing Forensic Medicine and Toxicology (FMT) training and the third group (Group C, n = 98) was comprised of students who have completed training in the subject. The Students were asked to express their responses on a scale with grading from 1 to 5 on a questionnaire for survey. The questionnaire had a total of 15 out of 21 selected questions whose validity was determined before the survey and the questions with the validity value ≥ 0.8 were retained in the survey.

Grading- 1-strongly agree, 2-somewhat agree, 3-don't know ,4-somewhat disagree ,5-strongly disagree

(please mark 1,2,3,4 or 5 in the brackets provided after each question)

1. You have heard about Forensic Medicine subject before joining MBBS course ().
2. Forensic Medicine is interesting ().
3. In MBBS curriculum, Forensic medicine is an important subject ().
4. The subject is not used to its maximum benefit potential in medico-legal investigation in India As compared to developed countries like USA ().
5. You may choose the subject as your career option ().
6. The role of doctor is very important to solve various crimes as a part of investigation ().
7. Efficient utilization of the subject in medico legal investigations has potential to help in delivering justice to the victim ().
8. Standard operative procedures (SOP's) are required for proper implementation of subject in clinical practice ().
9. The present application of knowledge in medico legal investigations is adequate in India ().
10. You often dislike the subject as it deals with the dead/decomposed bodies ().
11. You are discouraged to choose the subject as your carrier option as it involves legal cases and you are supposed to attend the courts ().
12. Students and general public are less aware about the utility and scope of the subject in medico-legal Investigations ().
13. Teaching of the subject with real examples can affect your interest in the subject ().
14. The TV programmes like CID, movies related to forensic detectives generate the interest about the subject ().
15. The subject has utility after MBBS course for delivering health services especially in Government Health centre ().

Name of the Participant:

Batch

Signature

VCSGGIMS & R SRINAGAR PAURI GARHWAL UTTARAKHAND

RESULTS

- There was a total of 352 Students who participated in the study. The response wise analysis (Tables 1, 2, 3, and 4) shows that 78.1% students strongly or somewhat agreed that they had heard about the subject before joining MBBS at VCSGIMS & R SRINAGAR PAURI GARHWAL UTTARAKHAND. While 14.4% strongly or somewhat had disagreed with it.
- 84.9% students have found the subject interesting while 7.3% found it as not interesting.
- A total of 90.6 students think that the subject has some utility in MBBS curriculum while 4.54% think it as of no utility.
- The 74.4% students think that the subject is largely unexploited of its potential in medico legal investigations in India, other country like USA, while 10.5% students disagree with it.
- When a question related with the subject as their career perspective in future was asked then only 72.7% agreed to opt it as their career option in future and 8.2% disagreed to it while 19% students express their responses as can't say anything.
- The role of doctor is very important to solve various crimes as a part of investigation 86% students strongly or somewhat agreed. While 7.3% strongly or somewhat had disagreed with it.
- 87.7% students strongly or somewhat agreed, that the efficient utilisation of the subject can yield high quality medico legal investigations. While 4.8% strongly or somewhat had disagreed with it.
- 86.3% think that there is lack of clinical application of the subject at present and 5.6% think that the present application of the subject in medico-legal investigation is inadequate in India.
- 44% students strongly or somewhat agreed that the present application of knowledge in medico legal investigations is adequate in India and While 29.5% strongly or somewhat had disagreed with it.
- 20.4% students strongly or somewhat agreed that, they dislike the subject as it deals with the dead/decomposed bodies and While 63% strongly or somewhat had disagreed with it.
- 44.8% of them are discouraged to choose the subject as their career option because it deals with the legal cases and they are supposed to attend the court cases later on. While 34.6% strongly or somewhat had disagreed with it.
- 82.6% agree that the students and the general public are less aware about the scope and utility of the subject in medico legal investigations. While 5.9% disagreed.
- 83.2% students strongly or somewhat had agreed that if teaching of the subject with real examples can affect interest and While 7.9% strongly or somewhat had disagreed with it.
- 87.2% students strongly or somewhat had agreed that the TV programmes like CID, movies related to forensic detectives generate the interest about the subject and While 5.9% strongly or somewhat had disagreed with it.
- 84.9% students strongly or somewhat had agreed that the subject has utility after MBBS course for delivering health services especially in Government Health centre and While 5.1% strongly or somewhat had disagreed with it.
- The overall questionnaire response were 1-strongly agree, 2-somewhat agree, 3- don't know, 4-somewhat disagree, 5-strongly disagree tabulated and analysed (table-5).

Table 1: Responses to the study questionnaire by study Group A

A	strongly agree		somewhat agree		neutral		somewhat disagree		strongly disagree		total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Q1	55	52.3%	27	25.7%	7	6.6%	12	11.4%	4	3.8%	105	100%
Q2	53	50.4%	40	38%	6	5.7%	3	2.8%	3	2.8%	105	100%
Q3	80	76.1%	10	9.5%	7	6.6%	5	4.7%	3	2.8%	105	100%
Q4	27	25.7%	52	49.5%	19	18%	3	2.8%	4	3.8%	105	100%
Q5	80	76.1%	16	15.2%	4	3.8%	3	2.8%	2	1.9%	105	100%
Q6	78	74.2%	11	10.4%	6	5.7%	6	5.7%	4	3.8%	105	100%
Q7	83	79%	9	8.5%	8	7.6%	3	2.8%	2	1.9%	105	100%
Q8	53	50.4%	37	10.5%	7	6.6%	5	4.7%	3	2.8%	105	100%
Q9	09	8.5%	35	33.3%	25	23.8%	32	30.4%	4	3.8%	105	100%
Q10	07	6.6%	16	15.2%	14	13.3%	29	27.6%	39	37.1%	105	100%
Q11	16	15.2%	41	39%	19	18%	14	13.3%	15	14.2%	105	100%
Q12	23	21.9%	69	65.7%	9	8.5%	3	2.8%	1	0.9%	105	100%
Q13	69	65.7%	20	19%	11	10.4%	3	2.8%	2	1.9%	105	100%
Q14	57	54.2%	38	36.1%	5	4.7%	1	0.9%	4	3.8%	105	100%
Q15	57	46.3%	34	38.9%	10	12%	3	2%	1	0.5%	105	100%

Table 2: Responses to the study questionnaire by study Group B

A	strongly agree		somewhat agree		neutral		somewhat disagree		strongly disagree		total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Q1	55	52.3%	27	25.7%	7	6.6%	12	11.4%	4	3.8%	105	100%
Q2	53	50.4%	40	38%	6	5.7%	3	2.8%	3	2.8%	105	100%
Q3	80	76.1%	10	9.5%	7	6.6%	5	4.7%	3	2.8%	105	100%
Q4	27	25.7%	52	49.5%	19	18%	3	2.8%	4	3.8%	105	100%
Q5	80	76.1%	16	15.2%	4	3.8%	3	2.8%	2	1.9%	105	100%
Q6	78	74.2%	11	10.4%	6	5.7%	6	5.7%	4	3.8%	105	100%
Q7	83	79%	9	8.5%	8	7.6%	3	2.8%	2	1.9%	105	100%
Q8	53	50.4%	37	10.5%	7	6.6%	5	4.7%	3	2.8%	105	100%
Q9	09	8.5%	35	33.3%	25	23.8%	32	30.4%	4	3.8%	105	100%
Q10	07	6.6%	16	15.2%	14	13.3%	29	27.6%	39	37.1%	105	100%
Q11	16	15.2%	41	39%	19	18%	14	13.3%	15	14.2%	105	100%
Q12	23	21.9%	69	65.7%	9	8.5%	3	2.8%	1	0.9%	105	100%
Q13	69	65.7%	20	19%	11	10.4%	3	2.8%	2	1.9%	105	100%
Q14	57	54.2%	38	36.1%	5	4.7%	1	0.9%	4	3.8%	105	100%
Q15	57	46.3%	34	38.9%	10	12%	3	2%	1	0.5%	105	100%

Table 3: Responses to the study questionnaire by study Group C

A	strongly agree		somewhat agree		neutral		somewhat disagree		strongly disagree		total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Q1	58	59.1%	22	20.9%	11	10.4%	5	5.1%	2	1.9%	98	100%
Q2	47	47.9%	33	33.6%	12	12.2%	3	3%	3	3%	98	100%
Q3	69	70.4%	18	18.3%	5	5.1%	4	4%	2	2%	98	100%
Q4	19	19.3%	49	50%	16	16.3%	12	12.2%	2	2%	98	100%
Q5	75	76.5%	13	15.2%	5	5.1%	3	3%	2	2%	98	100%
Q6	67	68.3%	14	14.2%	8	8.1%	5	5.1%	4	4%	98	100%
Q7	71	72.4%	11	11.2%	6	6.1%	7	7.1%	3	3%	98	100%
Q8	53	54.4%	32	32.6%	4	4%	3	3%	6	6.1%	98	100%
Q9	13	13.2%	28	28.5%	24	24.4%	26	26.5%	7	7.1%	98	100%
Q10	4	4%	11	11.2%	9	9.1%	23	23.4%	51	52%	98	100%
Q11	10	10.2%	33	33.6%	13	13.2%	17	17.3%	25	25.5%	98	100%
Q12	17	17.3%	58	59.1%	12	12.2%	7	7.1%	4	4%	98	100%
Q13	56	57.1%	15	15.3%	9	9.1%	12	12.2%	6	6.1%	98	100%
Q14	49	50%	32	32.6%	7	7.1%	3	3%	7	7.1%	98	100%
Q15	42	42.8%	39	39.7%	7	7.1%	6	6.1%	4	4%	98	100%

Table 4: Responses to the study questionnaire by study Group A, B, & C

A	strongly agree		somewhat agree		neutral		somewhat disagree		strongly disagree		total	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Q1	215	61%	60	17%	26	7.3%	31	8.8%	20	5.6%	352	100%
Q2	210	59.6%	89	25.2%	27	7.6%	13	3.6%	13	3.6%	352	100%
Q3	257	73%	62	17.6%	17	4.8%	10	2.8%	6	1.7%	352	100%
Q4	100	28.4%	162	46%	53	15%	25	7.1%	12	3.4%	352	100%
Q5	178	50.5%	78	22.1%	67	19%	16	4.5%	13	3.6%	352	100%
Q6	241	68.4%	62	17.6%	23	6.5%	13	3.6%	13	3.6%	352	100%
Q7	261	74.1%	48	13.6%	26	7.3%	11	3.1%	6	1.7%	352	100%
Q8	189	53.6%	115	32.6%	28	7.9%	10	2.8%	10	2.8%	352	100%
Q9	33	13.2%	122	28.5%	93	24.4%	87	26.5%	17	7.1%	352	100%
Q10	20	5.6%	52	14.7%	58	16.4%	97	27.5%	125	35.5%	352	100%
Q11	39	11%	119	33.6%	72	20.4%	69	19.6%	53	15%	352	100%
Q12	83	23.5%	208	59%	40	11.3%	15	4.2%	6	1.7%	352	100%
Q13	213	60.5%	80	22.7%	31	8.8%	18	5.1%	10	2.8%	352	100%
Q14	195	55.3%	112	31.8%	24	6.8%	6	1.7%	15	4.2%	352	100%
Q15	168	47.7%	131	37.2%	35	9.9%	12	3.4%	6	1.7%	352	100%

Table 5: Overall Students response to Questionnaire

score	Overall score		percentage
1-SA	Strongly agree	2402	45.4
2-SWA	Somewhat agree	1500	28.4
3-DK	Don't know	620	11.7
4-SWD	Somewhat disagree	433	8.2
5-SD	Strongly disagree	325	6.1
	total	5280	100

DISCUSSION

In the present study 84.9 % students found it interesting in contrast to a study in which 83.3% was found it interesting.⁴ In another study in which 43% students found pathology to be the most interesting subject followed by pharmacology (34%), Forensic medicine (17%) and Microbiology as least interesting (6%)⁵. In another study 45.68%⁶ and 68.5%⁷ and students found the subject of pathology interesting and 40.9%⁷ willing to pursue career in it. It is important to comprehend the elements that might improve understanding of the subject. In a study, 39.50% of participants believed that having knowledge of psychiatry improves in understanding forensic medicine⁸. 55.4% of students expressed good attitudes regarding the community medicine course⁹. According to a research, students preferred clinical surgical (50.9%), clinical medical (45.3%), and fundamental medical (3.9%) sciences for their future careers. The reasons for this decision included individual interests, a solid wage, intellectual challenge, and other factors¹⁰. Another study shows that students have a positive attitude toward basic sciences and that they believe that better clinical integration of subjects can considerably enhance their learning opportunities¹¹. When asked if they would choose community medicine as a career, 73.27% of students responded that they would not. This indicates that students are hesitant to choose the field for a career for a variety of reasons, including the pay scale, prestige, fame, and standing in society¹². Pharmacology was one of just 10.93% of students' willing post-graduate subjects to be considered¹³. Despite the fact that less than 30% of the participants thought pharmacology

was a preferred subject and a good option for postgraduate study, the percentage of students who agreed was considerably lower ($p < 0.05$) than the percentage who did not¹⁴. The majority of students—96.5%—agreed that autopsies are essential for medical education. 32.30% of students expressed extreme discomfort during their initial post-mortem examination¹⁵. In accordant with the results of the current study, which showed that 20.4% of the participants dislike the subject for this reason. A large percentage of study participants believed that autopsy would leave the body with noticeable body deformity. The three main reasons why family members or relatives of the deceased refuse to have an autopsy performed are involvement of the police or court (92.1%), lack of use of finding out the cause of death or the manner of death (88.6%), and autopsy delays funeral (83.4%)¹⁶. Consistent with the finding in present study where 82.6% agree that the general public and students are less aware about the scope and utility of the subject in medico-legal investigations. The scientific interest was the main reason students chose to pursue forensics (39.7%), while students who chose not to pursue it had greater levels of death anxiety. The final day of the autopsy seemed to have significant negative predictors, including feelings of anxiety, aversion, and grief¹⁷.

RECOMMENDATIONS

1. A learner-centered approach to teaching is required so that the needs of the students can be better recognized and the subject's curriculum can be appropriately reframed.

2. The job responsibilities of forensic experts must fundamentally shift in order to accommodate the need-based approach, which takes into account the perspectives, roles, and scope of the challenge in various countries.
3. For the subject to generate sufficient interest, scope, and role, further research and innovations are needed.
4. Instead of only relying on theory and textbooks, case-based discussion, problem-based learning, concept-based education, clinical toxicology, and clinical forensic medicine need to be implemented in practice.
5. Forensic specialists have a larger role in the hospital's emergency department and in managing the medico-legal aspects of clinical cases.
6. The current forensic medicine faculty must promote and inculcate the positive
7. Qualities of the specialty.
8. Additional rewards must be given to the faculty members, maybe in the form of remuneration for each medical-legal case or autopsy performed. This could aid in drawing in adequate skilled, intellectually motivated graduates to give the field the prestige it rightfully merits.
9. Students ought to have career counselling and assurances regarding job security and better future prospects if they want to pursue careers in this field.
10. The role of practitioners of this field's numerous policies, particularly those pertaining to the criminal justice system, is anticipated to be expanded by policymakers.
11. Students and the general public need to be made more aware of the subject's importance, particularly in criminal investigations, in order to eliminate the societal stigma that comes with the fact that it involves court proceedings and dead corpses.

CONCLUSION

Due to the rise in sophisticated crimes committed by criminals using modern weapons, this field has gained importance, so its importance as a subject in the undergraduate curriculum should have increased. However, in recent years, attempts have been made to reduce the weight of the subject despite the severe shortage of practitioners in this field. Despite being an essential and significant component of medical education, the subject has mostly remained silent over the recent ups and downs. Although it has had its moments of glory, contributing significantly to the criminal justice system in some locations, it has sadly failed to maintain the momentum and its significance. As a result, it may become even more widely believed among students that forensic medicine and toxicology are not very important to medical practice, have limited application, and do not offer promising job opportunities. Despite having a paradoxically high degree of interest in the subject and considering it to be intriguing and beneficial, the students' fear of dealing with dead bodies and court proceedings and the stigma that goes along with it have further discouraged them from choosing it as a career. Since there is a shortage of forensic specialists, it is necessary to expand the subject's scope and role in order to attract enough qualified students to this field. This will help the field better deal with emerging medico-legal issues, assist the criminal justice system, and give the subject the respect it rightfully deserves. The study has a limitation in that it is based solely on the opinions of students from one institution. Another restriction is the absence of comparable studies in the field, which makes it difficult to obtain comparison data.

Ethical clearance: A prior approval was obtained from the Institutional Ethics Committee

Conflict of interest: None to declare

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An intrauterine fetal death alleged as medical negligence: an autopsy-based case report

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ABSTRACT

Adverse events during the pregnancy deter the mother's health and raise questions regarding the country's existent healthcare. India is among the few nations responsible for two-thirds of all intrauterine fatalities worldwide. Intrauterine deaths risk medical negligence lawsuits by the aggrieved family members against the treating doctors and the hospital authorities. Fetal autopsy forms a valuable audit of clinical care, enables learning about such adverse pregnancy outcomes, and assists in administering justice in medical lawsuits. We discuss a case of a 30-year-old pregnant female at 38 weeks +1 day of gestation. She was reported to a hospital with lower abdominal pain. Per abdomen examination, fetal heart sound was reported to be present, and she was sent home. She presented with complaints of lower abdominal pain, rupture of membrane, and loss of fetal movements the next day and was diagnosed as intrauterine fetal death. The family members alleged it as medical negligence, and the fetus was sent for a medicolegal autopsy. During the autopsy, skin desquamation of about 75% of the total body surface area was present. The umbilical cord stump was dark reddish brown colored. Overriding of the cranial bones was noted. The diaphragm was present at the level of the 4th rib. The lungs were non-crepitant and had liver-like consistency. Hydrostatic and stomach-bowel tests were negative. Cut sections of the lower end of the femur, the upper end of the tibia, and the body of the sternum, calcaneum, and talus showed the appearance of the ossification centers. Medicolegal autopsy helped answer the investigating officer's questions and establish fetal age, time since intrauterine death, and whether the fetus was live or dead born.

Key Words: Fetal death; intrauterine death; fetal autopsy; maceration; medical negligence

INTRODUCTION

The term fetus is used from eight weeks after conception until delivery while in the uterus.¹ Intrauterine death (IUD) is used to describe the death of a fetus that occurs before it is fully

expelled or extracted from its mother and in which the fetus does not respire or display any signs of life, such as a beating heart, a cry, or movement of the limbs. It applies regardless of how long a pregnancy lasts.² According

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to the World Health Organization (WHO), a stillborn baby is born after the 28th week of pregnancy and does not respire or exhibit any signs of life.² IUDs and stillbirths are the most significant reasons for less developed countries' perinatal mortality.¹ Ten countries, including India, is responsible for two-thirds of the global intrauterine fatalities.²

IUDs pose a risk for medical negligence suits against the treating doctors. Medical negligence suits and the outcry by the aggrieved family members give rise to the need for an autopsy. Factors contributing to intrauterine death include maternal, fetal, umbilical cord, placental, and amniotic fluid pathologies.¹ Fetal autopsy is a valuable audit of clinical care and facilitates the learning of adverse events leading to unfavorable pregnancy outcomes. Autopsies also help in the administration of justice in medical negligence claims.^{1,3,4}

Maceration features indicate that the fetus was retained in utero, and the death occurred before the initiation of labor. The skin and soft tissues of a macerated fetus exhibit many alterations.² Determining the precise etiology and time since death in an IUD is essential for an autopsy surgeon, especially in allegations of medical negligence. Establishing an accurate time since death in fetal deaths is tricky for forensic experts due to the absence of validated methods.⁵ Pre-autopsy evaluation of maternal history, clinical documents, team discussion combined with detailed postmortem examination, ancillary investigations, and a multidisciplinary approach will help exclude foul play.⁶ We discuss a case of a 30-year-old pregnant female with a history of childbirth four years back and spontaneous abortion two years back. She presented with complaints of the lower abdominal pain, rupture of membrane, and loss of fetal movements and was diagnosed as intrauterine fetal death, resulting in a medical negligence claim against the hospital and treating doctors.

CASE REPORT

We discuss a case of a 30-year-old pregnant female of Gravida 3 Para 1 Abortion 1 Live 1 in

38 weeks +1 day of gestation. She has no known medical co-morbidities. The first live childbirth was four years back, with a normal vaginal delivery weighing 2.51 kg. Two years back, there was a history of spontaneous abortion at two and a half months of gestation. According to the hospital records, no abnormal findings were detected during the routine antenatal check-ups in the present pregnancy.

The patient presented to the hospital complaining of lower abdominal pain since 10 PM. According to clinical records, the uterus was term size, cephalic in presentation, and fetal heart sound (FHS) was present per abdomen examination. After the examination, the patient returned home. The following day, at 8.30 AM, she again presented to the same hospital with lower abdominal pain and loss of fetal movement since the previous night with membrane rupture. Per abdomen, examination revealed uterus was term size, cephalic in presentation, and FHS was absent. Per vaginal examination showed cervix was 50% dilated, and Os was 1 cm with drainage of tobacco-colored fluid. On ultrasonography also FHS was absent, and the Spalding sign was present. After one and a half hours, under local anesthesia with left mediolateral episiotomy, the patient delivered a dead female fetus weighing 2.2 kg and a placenta weighing 290 grams.

Patient relatives alleged the fetus was alive when the mother was brought to the hospital; delay in attending to the patient and conducting the delivery on the part of the hospital and treating doctors resulted in the death of the fetus. Hence, they filed a negligence suit. The fetus was handed over to police personnel and brought for postmortem examination to our hospital.

• Autopsy findings

External examination (Fig. 1)

- Crown-Heel length (CHL) was 51cm, Crown-Rump length (CRL) was 31cm, and body weight was 2.2 kg.
- Inner canthal distance - 2.3 cm, length of philtrum - 0.8 cm.



Fig. 1 (A) Front of fetus showing skin slippage, umbilical cord, blisters, and lanugo hair. (B) The back of the fetus shows vernix caseosa, skin slippage, and lanugo hairs.

- Head circumference - 29 cm, Chest circumference - 29 cm, Abdominal circumference - 24 cm.
- Scalp hair - dark, 3 cm in length.
- Vernix caseosa was present on the trunk, lower limbs, and buttocks.
- Slippage and skin desquamation involving 75% of the total body surface area was present.
- Multiple small blisters were present on the right side of the chest.
- Nails crossed beyond the tip of fingers.
- Lanugo hairs were present over the chest and shoulders.
- The umbilical cord stump was dark reddish brown, Length 20.5 cm, and ligated. The cut section showed three vessels with obliteration of the right umbilical vein.
- No gross features of congenital anomalies were present.
- Internal examination
 - The scalp was edematous, and blood-stained fluid oozed out on the incision. There was an overriding of both frontals, both parietal and occipital bones. **(Fig. 2)** The brain was softened and congested.
 - The diaphragm was present at the level of the 4th rib.
 - Lungs were collapsed, weighing 30 grams together, reddish brown, smooth surface with a sharp border, liver-like consistency, and were non-crepitant. The hydrostatic test was negative. **(Fig. 3)**
 - The stomach and intestines were empty and unremarkable. Breslau's second life test, or Stomach-bowel test, was negative. **(Figure-3)**

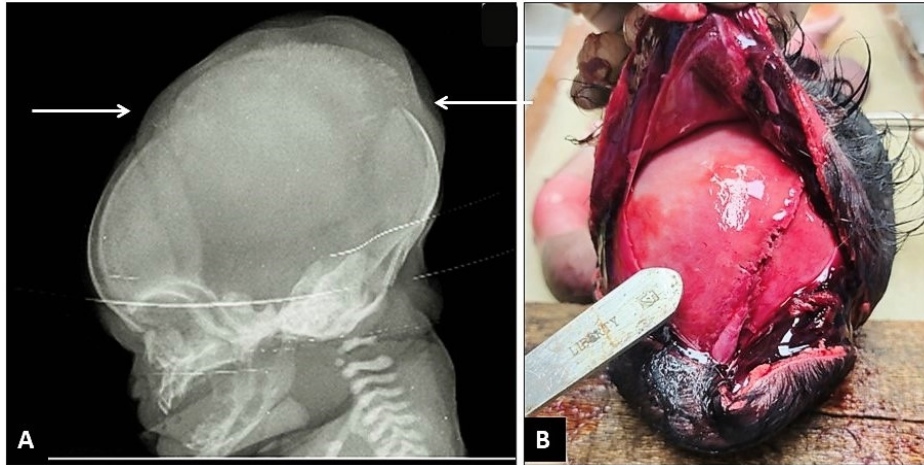


Fig. 2 (A) Postmortem x-ray of skull showing overriding of cranial bones and edema of the scalp. (B) Gross image showing overriding of cranial bones and edema of the scalp

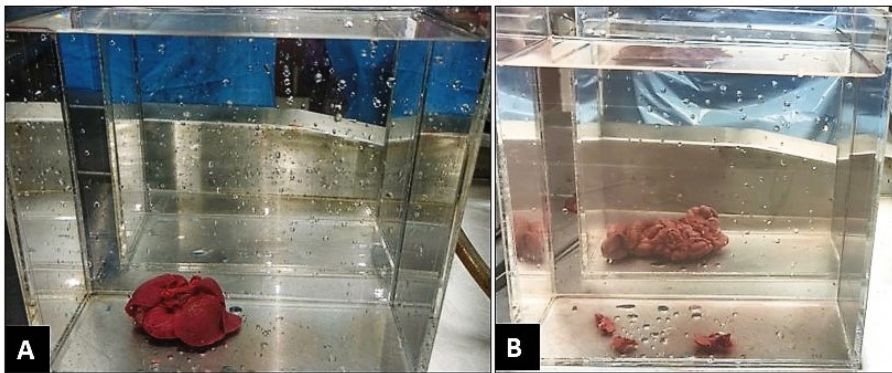


Fig. 3 (A) Heart along with both lungs sunk during the hydrostatic test. (B) Bits from both lungs and stomach with intestine sunk in hydrostatic and Breslau's second life test.

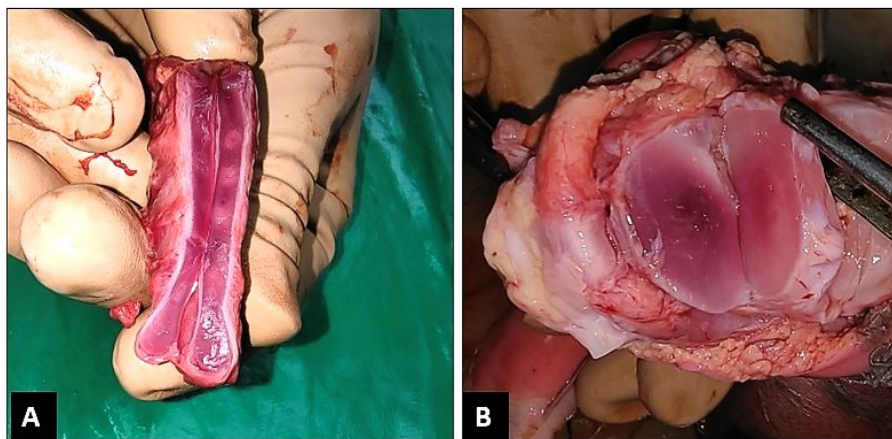


Fig. 4 (A) Shows the appearance of ossification centers in the sternum. (B) Shows the appearance of ossification centers in the lower end of the femur.

- Other internal organs were unremarkable, and no gross congenital anomalies.
- The cut section of the lower end of the femur, the upper end of the tibia, the body of the sternum, the calcaneum, and the talus showed the appearance of the ossification centers. (Fig. 4)

DISCUSSION

This case illustrates the importance of an autopsy where medical negligence claims were made against the doctors for fetal mortality. The role of postmortem examination was to determine whether the fetal death occurred before or after the mother was taken to the

hospital and also to ascertain the cause of death. In a dead born, maceration is a process of skin and tissue changes and stops once the fetus is delivered.^{7,8} The precise dating of fetal maceration is of utmost importance, and ideally, the fetuses should always be examined with the placenta.⁸ Time interval between IUD and delivery of fetus has been described based on skin color, desquamation, and collapse of skull bones.^{8,9}

Genest et al. showed high accuracy in estimating the time interval between death and the fetus's expulsion based on gross and histological evaluation of organs and placenta.⁹⁻¹¹ The earliest maceration changes are the dark discoloration of a normal yellow-tan umbilical cord with skin changes.¹² Loss of basophilia in internal organs is a histological marker for estimating the time since death in intrauterine fetal deaths.^{10,13,14} In our case, extensive skin slippage (>75% of the body) was present. The umbilical cord showed red-brown discoloration with softening. Blebs are present over the skin on the right side of the neck. Edema of the scalp with blood-stained subscalpal region, as found during early maceration stage.¹⁵ Overriding cranial bones were present, establishing a time interval between death to the expulsion of the fetus of at least four days. No meconium leak was present, establishing the fetal death time of fewer than seven days. The position of the diaphragm at the 4th rib and the findings of lungs were consistent with that of unrespired lungs.^{7,13}

The ossification centers appear as red coloration on the cut surface of the bones.⁸ In this present case, four ossification centers in the sternum's body, the femur's lower end, and the upper end of the tibia had appeared, suggesting a term fetus.⁷ Patil et al. studied CRL and CHL in dead-born fetuses. For 36-39 weeks of gestation, CRL was found to be 32 cm to 38.5 cm and CHL 46 cm to 52 cm.¹⁶ In our case, CRL was 31 cm, and CHL was 51 cm.

Bonetti et al. discussed pathologies related to IUDs and stillbirths.³ The Fetal-associated pathologies contributed to 18.55% of deaths,

while a study by Bhale et al. identified fetal cause in 42.42% of cases.^{3,17} Among fetal causes, congenital malformation accounted for 21.7% to 71.42%. Infection, fetal growth restriction, twin-twin transfusion, and other fetal causes are also present.^{3,17,18} Placenta contributes to a significant number of IUDs and stillbirths. Bonetti et al. and Bhale et al. identified placental pathologies in 21.77% and 27.27% of cases studied for IUDs.^{3,17} The major placental causes include abruption and insufficiency [3,17]. Bhale et al. observed gross placental abnormalities in 7 (21%) cases out of 33, including infarction in most cases, and other gross features were nodular masses and bulky and edematous placenta [17]. Recent infarct appears red and old infarct is pale and hard. Placenta disc usually weighs 500 grams near term, if <350 grams or >700 grams is indicative of pathology. The standard dimension is 18 cm, oval, round, and thickness of 2 to 2.5 cm; the thickness of <1 cm or >3 cm indicates a pathology.¹³ According to hospital records, in our case placenta, weighed only 290 grams pointing towards a pathology. Definite placental pathology could not be commented upon in this case due to the unavailability of the placenta.

The opinion given in our case is as follows:

1. The age of the fetus was a term fetus (9 to 10 months of intra-uterine life).
2. No definite cause of death could be ascertained due to extensive maceration changes and non-availability of the placenta. Histopathological examination of the viscera showed extensive autolytic changes.
3. The time from IUD to delivery was around four to seven days.
4. Dead born fetus.

Our postmortem examination contradicted the allegations that the fetus died of delay in attending to the patient and conducting the delivery.

CONCLUSIONS

Whenever an intrauterine fetal death happens, the prospect of facing a litigation claim poses a

dreadful situation to obstetricians or treating doctors. The question arises

1. Why has the death occurred?
2. Did the mother timely attend her antenatal clinic and follow the advice?
3. Whether proper antenatal and hospital care was provided?

Intrauterine fetal compromise in late pregnancy should be detected on time, and proper investigation and intervention to prevent such a misadventure. In India, there is no system for routine autopsies on fetal fatalities. Thus, the cause of intrauterine fetal deaths remains 'undetermined' in many cases, making doctors vulnerable to protect themselves in future lawsuits. Ensuring proper storage of all the evidence in fetal deaths, such as health records and the fetus with umbilical cord and placenta, will shield the treating doctor against any medical negligence suits in the future. It will enable the forensic pathologist to conduct a thorough autopsy with all the tools and give a more accurate opinion on the case.

Declarations

Conflict of Interest: There is no conflict of interest.

Source of Funding: Nil.

Ethical Clearance: Not required.

Informed consent: Informed consent is taken for scientific publication from the family member of the deceased.

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Importance of Wearing Helmet in Preventing Death due to Motor Cycle(Bike) Accidents.

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ABSTRACT

Road traffic injuries are a major public health problem and a leading cause of death and injury around the world. Each year nearly 1.2 million people die as a result of road crashes, and millions more are injured or disabled. According to the National Highway Traffic Safety Administration (NHTSA), motorcycle riders are 26 times more likely to die in a traffic collision than passenger vehicle occupants, and 5 times more likely to be injured. In a study conducted by NHTSA on 104,472 motorcyclists injured in traffic crashes, 15 percent of helmeted and 21 percent of unhelmeted riders suffered TBI. A helmet aims to reduce the risk of serious head and brain injuries by reducing the impact of a force or collision to the head. A helmet works by, reducing the deceleration of the skull, spreads the forces of the impact over a greater surface area and by preventing direct contact between the skull and the impacting object. Present study was carried out in Mahadevappa Rampure Medical College, Kalaburagi with the aim to know cause of death in deaths due to bike accidents autopsied at Mahadevappa Rampure Medical College, Kalaburagi between 2011 to 2016(6-year retrospective study). Results of the study shows that out of 100 cases, in 65 cases cause of death was head injury and in 35 cases it was hemorrhagic shock, septicemia, multi organ failure and others. In 48% of cases injuries were seen in thoracic region and in 40% of cases abdominal injuries. Whereas in 34 cases except intracranial hemorrhage no other injuries were seen on the body. The present study shows that maximum deaths can be prevented by wearing a proper protective helmet.

Keywords: Head injury, Bike accident and Helmet.

INTRODUCTION

Road traffic injuries are a major public health problem and a leading cause of death and injury around the world. Each year nearly 1.2 million people die as a result of road crashes, and millions more are injured or disabled¹. In low-income and middle-income countries, car

ownership and use rates are generally much lower than in high-income countries. However, the ownership and use of motorcycles and other two-wheelers is generally relatively high – for example, in India 69% of the total number of motor vehicles are motorized two-wheelers, considerably higher than in high-

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income countries². "India tops the world in road crash deaths and injuries. It has 1 per cent of the world's vehicles but accounts for 11 per cent of all road crash deaths, witnessing 53 road crashes every hour; killing 1 person every 4 minutes," the report said. In the last decade, 13 lakh people died and another 50 lakh got injured on Indian roads, according to The 2019 World Bank report, titled 'Guide for Road Safety Opportunities and Challenges³. Motorcycles are less stable than cars and less visible to other drivers. In a crash, motorcyclists lack the protection of an enclosed vehicle. According to the National Highway Traffic Safety Administration (NHTSA), motorcycle riders are 26 times more likely to die in a traffic collision than passenger vehicle occupants, and 5 times more likely to be injured. In a study conducted by NHTSA on 104,472 motorcyclists injured in traffic crashes, 15 percent of helmeted and 21 percent of unhelmeted riders suffered TBI, Traumatic brain injury accounted for 54 percent of the riders within this group who did not survive⁴. In regard to helmet use, numerous observational studies demonstrate that motorcycle helmets reduce the risk of death and head injury up to 42% and 69%, respectively^{5,6}. According to study conducted by Alok Kumar Mathur and others, among 1,17,553 two wheelers observed, almost two-fifth drivers (39.4%) wore helmet correctly, whereas, less than three-fifth (58.7%) did not. Almost equal percentage of male (58.6%) and female (58.9%) did not wear helmet at all. As compared to drivers, two-wheeler passengers were observed lower in using helmet correctly (11.6%). Even though correct helmet use during the crash reduces the severity of head and neck injury, observed helmet use in Rajasthan was low⁷. In a study conducted by Jayadevan Sreedharan and et. al., regarding wearing of helmets 36 (11.7%) respondents

claimed ignorance about the need for a safety helmet. Ninety-seven (31.4%) riders however claimed they used a safety helmet while riding a motorcycle, but only 48 (49.5%) identified themselves as regular safety helmet wearers⁸. The present study was taken with the objectives to analyze the injuries caused in bike accidents and cause of death.

MATERIALS AND METHODS:

Present study was carried out in Mahadevappa Rampure Medical College, Kalaburagi. Cases autopsied between January 2011 to December 2016 with history of bike accidents were included in the study. (6-year retrospective study). Total 100 cases were autopsied with the history of bike accidents. In each case details of injuries were studied and cause of death was noted from the PM report. History of each case was noted from inquest report. In each case age, sex, types of injuries and cause of death is noted. Injuries were classified as Intracranial hemorrhages, injuries over head and neck region, thoracic region, abdominal region and over limbs. In cause of death it is noted whether person died due to head injury or other than head injury. Then percentage of data collected is calculated.

RESULTS

Table no 1 shows out of 100 cases studied 82 were males and remaining 18 were females. Maximum deaths due bike accidents were seen in the age group between 21 years to 40 years, 45 deaths occurred and next in age group 41 -60 years 44 deaths occurred. In age group between 11-20 years 7 deaths occurred and least seen in the age 1-10 years and above 60 years i.e. 2 cases each.

Table no. 2 shows injuries seen over different part of the body, in 68 cases

Table 1: Sex and Age wise distribution of RTA (Bike Accidents)

Sex		Age in years				
Male	Female	1-10	11-20	21-40	41-60	60+
82	18	2	7	45	44	2
82%	18%	2%	7%	45%	44%	2%

Table 2: Regional wise injuries seen in RTA (Bike Accidents)

ICH	Head & Neck	Thoracic	Abdomen	Upper Limb	Lower Limb
68	36	48	40	21	35
68%	36%	48%	40%	21%	35%

Table 3: Cause of Death in RTA (Bike Accidents)

Head Injury	Others
65	35
65%	35%

intracranial hemorrhage is seen, in 48 cases injuries were seen over thoracic region, in 40 cases injuries were seen over abdomen region, in 36 cases injuries were seen over head and neck region, in 35 cases over lower limb and in 21 cases injuries were seen over lower limb. In 34 cases except head injuries no other injuries were seen over the body.

Table no. 3 shows cause of death, in 65 cases death was head injuries and remaining 35 cases cause of death were other than head injury like hemorrhagic shock, septicemia, multi organ failure and others.

DISCUSSION

Motorcycles crashes are considerable causes of injury related fatality and disability⁹. Common cause of death in bike accident is head injury. Many previous studies show significant relationship between head injuries and death^{10,11}. In the present study maximum deaths occurred between age group 21-60 years 89% of deaths occurred, males were 82% and females were 18%. In 65 cases cause of death was head injury, whereas in remaining 35 cases it was others like injuries to thoracic region, abdominal regions and others. When we study mechanism of head injury, it is because when a motorcycle or bicycle is involved in a collision, the rider is often thrown from the cycle. If the rider's head hits an object, such as the ground, the head's forward motion is stopped, but the brain, having its own mass, continues to move forward until it strikes the inside of the skull. It then rebounds, striking the opposite side of the skull. This type of injury can result in anything from a minor

head injury, such as concussion, to a fatal head injury. A helmet aims to reduce the risk of serious head and brain injuries by reducing the impact of a force or collision to the head. A helmet works in three ways, one by reducing the deceleration of the skull, by spreading the forces of the impact over a greater surface area and by preventing direct contact between the skull and the impacting object¹². In the present study, in 65 cases cause of death is head injury, if proper protective helmet was worn these deaths can be prevented. Whereas in 35 cases except head injuries no other injuries were seen on body in these cases if proper helmet was worn both morbidity and mortality can be prevented. In a study of fatally injured riders, Sarkar et al. (1995) noted that 36% of deaths among helmeted riders were due to the trunk, as compared to 19% among the non-helmeted. Similar findings were noted in a California study of fatalities before and after a mandatory helmet law (Kraus et al., 1994). Thus, among helmeted motorcyclists, a substantial proportion of fatalities that occur will involve serious chest and abdominal trauma¹³.

CONCLUSION

From the present study we can conclude that maximum deaths can be prevented by wearing proper protective helmet, because in the present study in 65% of cause of death is head injury. Whereas in 35% cases except head injury no other injuries were seen on the body. Though wearing helmet is compulsory by law, but people are unaware of its genuine benefits. So multiple awareness programmes have to be organized according to local language and culture.

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An Autopsy based Study of Profile of Organ Donors and type of Organs Retrieved in Cases Attended by Faculties of Department of Forensic Medicine and Toxicology, Sabvmcri, Bengaluru- A Cross-Sectional Study.

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ABSTRACT

Organ donation is remarkable achievement in modern medicine which helps those suffering from chronic incurable end organ diseases. However, the process of organ donation and transplantation is not devoid of ground level difficulties like timely diagnosis of brain death, harvesting of organs during the supravital period, transporting the retrieved organ to a facility where transplantation is to be conducted and in Medicolegal cases the Forensic Pathologist has to examine the patient and allow/disallow the retrieval of organ based on their necessity in determining cause of death. The Forensic Pathologists can do their bit in expediting the above mentioned process by conducting the autopsy in operation theatre where organs were retrieved. This practice is being followed in Telangana, Tamil Nadu and now in Karnataka. This paper aims to study the profile of organ donors, analyze the types of organs retrieved and to highlight the role of Forensic Pathologists in expediting the process of organ donation and transplantation.

Keywords: Organ donation, Forensic Pathologist, Medicolegal case, operation theatre.

INTRODUCTION

Organ donation and transplantation is a life saving procedure. Organ donation rate in India is only 0.65 per Million population and is far behind the leading countries like Spain and USA¹. Governments both at central

and state level have taken many steps in this direction like legal framework under Transplantation Of Human Organs and Tissues Act (TOHOTA) 1994, National organ transplant programme 2014, National Organ Donation Day on November 27 of every year to

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spread awareness, National Organ and Tissue Transplantation Registry (NOTTO), State Organ and Tissue Transplantation Registry (SOTTO) etc². This study was conducted to analyze the profile of organ donors, types of organs retrieved in Medicolegal cases, where the autopsy was carried out by faculties of Department of Forensic Medicine and Toxicology, SABVMCRI, Bengaluru and to highlight the role of Forensic Pathologists in expediting the process of organ donation and transplantation.

AIMS AND OBJECTIVES

1. To analyze the profile of organ donors.
2. To analyze the types of organs retrieved in the Medicolegal cases, where the autopsy was carried out by the faculties of Department of Forensic Medicine and Toxicology, SABVMCRI, Bengaluru.

MATERIAL AND METHODS

Study Type: Cross-sectional study.

Duration of Study: 1st January 2022 to 31st December 2022.

Inclusion Criteria: Medicolegal cases in which organs were retrieved and attended by faculties of Department of Forensic Medicine and Toxicology, SABVMCRI, Bengaluru.

Exclusion Criteria: None.

The details were collected from Medicolegal cases (MLC) Register of Mortuary, Department of Forensic Medicine and Toxicology, Bengaluru.

RESULTS

A total of 37 cases were studied in the duration of 1 year (2022) and following observations were made.

As far as the profile of donors is concerned, majority of the donors were males (Fig. 1).

The peak activity of organ donation was shown in deceased aged 26years and 38years. (Fig. 2)

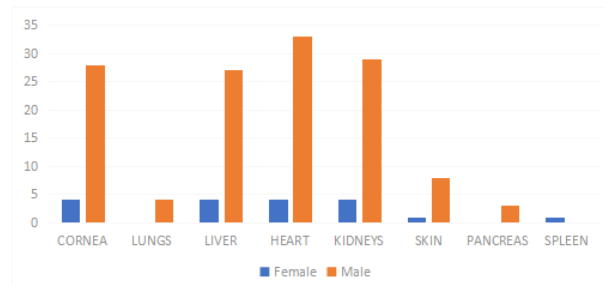


Fig. 1: Graph showing organ donation by Gender

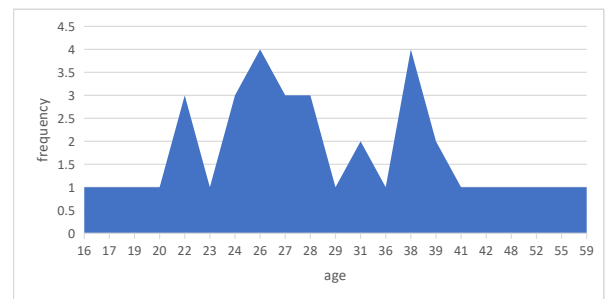


Fig. 2: Graph showing Frequency of organ donation by age.

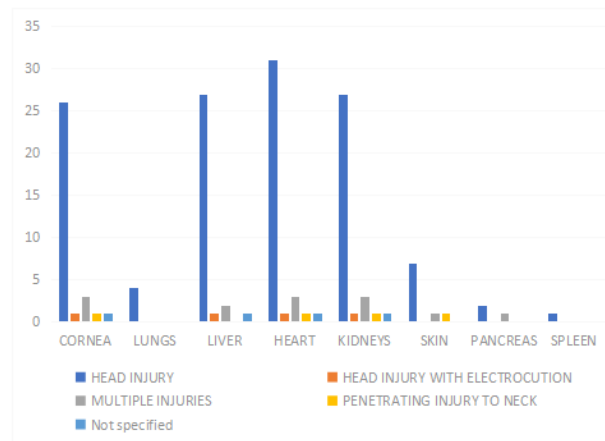


Fig. 3: Graph showing cause of death among organ donors.

On analyzing the cause of death in organ donors, majority of them had sustained Head injury. Most commonly retrieved organs are Heart, Liver, Kidneys, Cornea and Skin in that order. Spleen was retrieved only in one case; it is placed in recipients to reduce the chance of graft versus host disease⁴ (Fig. 3).

Manner of death among most of the cases was Accidental in nature, where the majority of deceased met with Road Traffic Accidents. One case had Homicidal injury (Fig. 4).

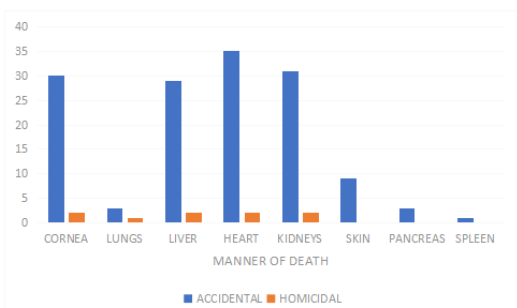


Fig. 4: Graph showing manner of death among organ donors.

DISCUSSION

The demand for organs is 2.5 Lakh Kidneys, 80,000 for Liver, 50,000 for Heart and 1 Lakh for Cornea². Moreover, the organ retrieval should be done precisely in the narrow time period as following 4-6hrs for Heart, 4-8hrs for Lungs, 24-48hrs for Kidneys and 12-15hrs for Liver². The main reasons for delay in organ donation are time consuming confirmatory tests of brain death which need to be repeated after an interval of 6hrs, once the consent is taken the process of co-ordination for organ retrieval takes time and in Medicolegal cases the police conduct inquest and the Forensic Pathologist has to examine the patient to allow/ disallow particular organ to be retrieved based on its requirement for further investigation into cause of death. To prevent such delay the faculties of Department of Forensic Medicine and Toxicology, SABVMCRI attend the hospital where Brain death is declared and conduct postmortem examination⁵. This practice is being followed in Telangana and Tamil Nadu even before its commencement in Karnataka⁶. This Protocol for PM examination is notified by union Health Ministry in order dated 21 November 2021⁷.

CONCLUSION

By doing Postmortem examination in Operation Theatre where Organ retrieval is done, the process of organ donation and other Medicolegal procedures to be done

in Medicolegal cases is hastened. As it is highlighted in this paper that the availability of organs is still less than demand. Therefore, in more and more states legal framework should be brought into force by consulting all the stakeholders to ensure that such practice is followed and the delay in availability of organs for transplantation is reduced.

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Conflict of Interest: None declared.

Ethical Clearance: Taken from the institutional ethics committee.

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