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Pattern of injuries in Two-Wheeler riders involved in Road Traffic Occurrence –an Autopsy Study

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Abstract

Background: Road traffic injuries are India's sixth leading cause of death, affecting youth and middle-aged individuals. Rapid motorized traffic growth, particularly two-wheelers (72% of vehicles), has increased accidents. Inadequate and non-uniform helmet regulations worsen the situation. Road injuries strain healthcare, demanding hospitalization, and rehabilitation. Kerala experiences significant two-wheeler accidents, often fatal due to head injuries. Studying injury patterns and causes among riders in fatal accidents is vital.

Methods: A cross-sectional study was conducted at Govt TD Medical College, Vandanam, Kerala, following approval from the Institutional Ethics Committee. The study included all deaths of two-wheeler riders involved in road traffic accidents with clear vehicle information, excluding decomposed or unidentified bodies. A total of 101 cases were analyzed, recording external and internal injuries directly onto the Proforma during autopsy. Data were summarized using frequencies and proportions, while the chi-square test assessed relationships between categorical variables.

Conclusion: The study found that most accidents occurred between 6-9 pm, involving mainly male (91.1%) two-wheeler riders (80.8%). Few wore helmets (5%). Head injuries (97%) were common, often caused by ejection from vehicles (87%). Non-helmet use and ejection related significantly to head injuries, a leading cause of two-wheeler accident fatalities.

Keywords: Two-wheeler injuries, pattern of injuries, helmet safety, contre coup injuries

Introduction

India has experienced rapid growth of motorized traffic in the last few decades, which resulted in an increase in road traffic accidents. Motor vehicle traffic in India is different from that of other developed countries. Two-wheeler accidents form a major component of all road traffic accidents in Kerala1[1]. According to spitz and fishers the motor cyclist is unprotected for all practical purposes.[2]Most of the deaths in two-wheeler accidents are due to head injuries.Helmets can reduce the risk of serious head injury, but do not protect the wearer from all types of possible head injuries. Crash helmet reduces the friction of the head against the ground and make the decelerations less drastic by allowing the protected head to skid across the ground. Helmet reduces the risk of head injuries by 30% and fatalities by 40%. However, in India helmet regularization is not uniform and it is poorly implemented. In India, two wheelers

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constitute 72% of the total vehicles registered[1]. Two wheelers include motor cycles, scooters, mopeds, and pedal cycles. Accidents to two wheelers are commonly caused by turning in front of a vehicle from one side to the other. The vehicle is hit and the person is thrown violently into the ground or some other object. Road traffic injuries also place a huge burden on the health sector in terms of hospitalization, acute care, and rehabilitation.[3] According to national statistics of road traffic accidents in India, half of those dying on the world's roads are 'vulnerable road users' that include Pedestrians, cyclists, and motorcyclists. Sincetwo-wheeler accidents accounts for 78.67% of road traffic accidents in Kerala and 33.1% of the total number of deaths in 2014 due to road traffic accidents, it is important to understand injury patterns, causes of death, and head/neck injuries among two-wheeler riders in fatal road accidents.

Methodology

A cross-sectional study, based on autopsy findings of deaths involving two-wheeler riders, was conducted at Government TD Medical College Hospital, Vandanam, Kerala from January 2014 to May2015.Most of the autopsied cases originated from accidents that occurred in Alappuzha district, with some cases from parts of Ernakulam and Kollam districts. Cases where information about the nature of the vehicle involved was unclear, as well as cases involving unknown identities and decomposed bodies, were excluded from the study. The total sample size comprised of 101 cases. The study was initiated after getting approvals from institutional research and ethics committees.

A Proforma was prepared for data collection. The epidemiological features related to victim like age, sex, type of vehicle involved, time of accident, place of death of victim, nature of treatment given, period of survival of victim after accident and other relevant data were collected from KPF 102 provided by police, clinical case records, details from concerned investing officers, relatives, friends, and others accompanying the body. Details of the injuries were recorded into the Proforma during autopsy examination. These data were entered into Microsoft excel and statistical analysis was done using *SPSS* software version 15.

Results

During the study period, 101 two-wheeler accident deaths were autopsied at Government T D medical college Alappuzha. The most affected age group was 20-29 years 32.3% (n=32), followed by 40-49 years 21.0% (n=21) and 50-59 years 18.0% (n=18). Males constituted 91.1% (n= 92) of cases, while females were 8.9% (n=9). The age range of victims was 15 to 73 years.

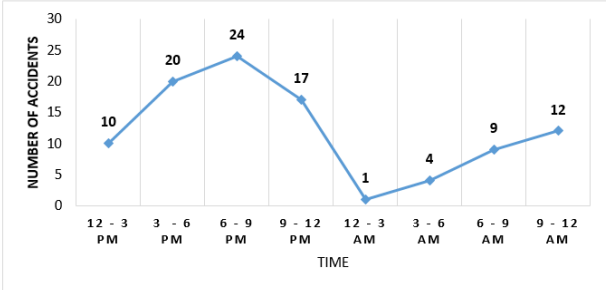

Fig 1: Distribution according to time of accident

Most two-wheeler accidents occurred between 6 pm to 9 pm 23.8% (n=24), with 40% of deaths occurring within 2 hours and none surviving beyond one-month post-accident. (Fig 1)

Table 1: Distribution of factors related to the two-wheeler accidents.

Sl.No	Factors	Categories	Frequency	Percentage
1	Type of road	National highway	64	63.4
		Other roads	35	34.7
		Data not available	2	2
2	Type of two-wheeler	Motor cycle	62	60.4
		Scooter	18	17.8
		Moped	0	0
		Bicycle	21	20.8
3	Type of rider	Rider	81	80.8
		Pillion rider	20	19.2

Continue.....

4	Wearing helmet	yes	5	5
		no	88	87.1
		Data not available	8	7.9
5	Direction of impact	Along the direction	19	18.9
		Opposite to direction	50	49.5
		To stationary object	14	13.9
		skidding	2	2
		Data not available	12	11.9
		Not applicable	4	4
6	Type of Offending vehicle	Two-wheeler	17	16.8
		Three-wheeler	7	7
		Light Motor Vehicle	30	29.7
		Heavy vehicle	24	23.8
		Stationary object	13	12.9
		Not applicable	10	9.9
7	Ejected out	yes	88	87.1
		no	10	9.9
		Data not available	3	3

Majority of two-wheeler accidents occurred on national highways 63.4% (n=64) and other roads 34.7% (n=35). Among the victims, 60.4% (n=62) were motorcycle riders, 20.8% (n=21) were bicyclists, and 17.8% (n=18) were scooter riders. Most victims 80.8% (n=81) were riders, not pillion passengers 19.2% (n=20). Despite helmet mandates in Kerala, 87.1% (n=88) of victims were not wearing helmets. Collisions primarily involved vehicles from opposite directions 49.5% (n=50). Two-wheelers mostly collided with light motor vehicles 29.7% (n=30). Ejection from the two-wheeler occurred in 87.1% (n=88) of cases. (Table 1)

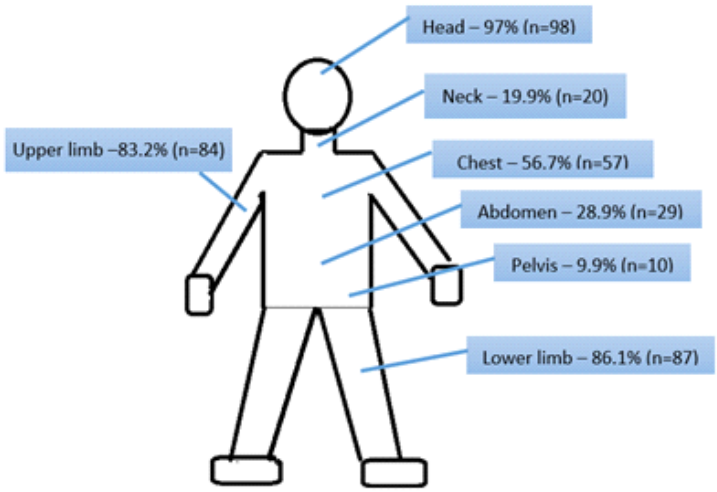

Fig 2 : Showing the injuries in the body of the victims

Head injuries were prevalent in 97% (n=98) of victims, followed by lower limb 86.1% (n=87) and upper limb injuries 83.2% (n=84). while injuries to the chest and abdomen were present in 56.7% (n=57) and 28.9% (n=29) of cases, respectively. Combined injuries to the head, chest, upper limb, and lower limb were noted in 17.8% (n=18) of cases, and head, upper limb, and lower limb injuries in 16.8% (n=17).

Common injuries included abrasions 99% (n=100), contusions 94% (n=95), lacerations 81.1% (n=82), and fractures 88% (n=89), while penetrating injuries were rare 2% (n=2), and amputations were not observed. (Fig 2)

Table 2: Pattern of injuries in the head and neck region

Sl.no	Variables	Pattern of injuries in head and neck region		
		Categories	Frequency (n)	Percentage (%)
1	Region of head	Scalp	92	91.1
		Skull	80	79.2
		Face	47	46.5
		Neck	12	11.9
		Extra Dural Hemorrhage	16	15.84
		Sub Dural Hemorrhage	69	68.3
		Sub-Arachnoid Hemorrhage	74	73.3
		Intracranial bleed	8	7.9
		Brain contusion	46	45.5
		Brain Laceration	23	22.8
		No head injury	3	3
2	Coup and contrecoup injuries of brain	Coup injury	86	85.1
		Contrecoup	65	64.1
		Both	58	57.4
		No injury	8	7.9
3	Region of skull fractures	Vault	68	67.3
		Base	58	57.4
		Face	17	16.8
		No fracture	19	18.8
		Others	1	1
4	Neck injuries	Fracture cervical spine	12	11.9
		Spinal cord injury	4	4
		Hyoid bone fracture	1	1
		Deep Soft tissue injury	1	1
		No injury	87	86.1

In this study, scalp injuries were the most prevalent 91.1% (n=92), followed by skull fractures 79.2% (n=80), subarachnoid hemorrhage 73.3% (n=74), and subdural hemorrhage 68.3% (n=69). Only 3% (n=3) of participants exhibited no head injuries. Brain injuries were significant, with 85.1% (n=86) experiencing coup injuries and 64.4% (n=65) contrecoup injuries, while 57.4% (n=58) demonstrated both. Skull fractures were primarily vault fractures 67.3% (n=68) and base fractures 57.4% (n=58). Combined base and vault fractures occurred in 31.6% (n=32) of cases, with face, base, and vault fractures combined affecting 13.9% (n=14) of participants. Cervical spine fractures were found in 11.9% (n=12) of cases, with all neck spinal cord injuries linked to cervical fractures 4% (n=4). Hyoid bone fracture was rare 1% (n=1), while 86.1% (n=87) had no neck injuries. (Table 2)

Chest injuries primarily comprised of soft tissue injuries to the chest wall, occurring in most cases, followed by rib fractures in 29.7%. Lung and heart injuries were observed in 14.9% and 4% of cases, respectively. Clavicle and sternum fractures were present in 4% and 5.9% of cases. Chest injuries were absent in 38.6% of cases. Soft tissue chest wall injuries were associated with rib fractures in 9.9% of cases. Abdominal injuries included soft tissue injuries in

20% and liver injuries in 13.9% of cases, with the majority (72.3%) having no abdominal injuries. Pelvic bone fractures were observed in 6% of cases, while urinary bladder injuries occurred in 2%, all of which were associated with pelvic bone fractures.

In the upper limb, soft tissue injuries were the most common (84.2%), with a few cases of humerus and radius fractures (3 cases) and isolated instances of elbow dislocation and wrist fracture dislocation (1 case); shoulder dislocation was not observed. In the lower limb, soft tissue injuries were predominant (90.1%), with rare femur fractures (2 cases), more common tibia fractures (18 cases), and 6.9% of cases involving fibula fractures. Knee dislocation was observed in 2 cases, and 8.9% of cases had no lower limb injuries.

Head injuries were the primary cause of death, leading to the demise of 62 individuals. Head injuries combined with other injuries were implicated in 90.1% (n=101) of cases resulting in death. Chest and abdominal injuries, when standalone, caused death in two cases each, but when combined with other injuries, contributed to death in 16.8% (n=17) and 12.9% (n=13) of cases, respectively. Lower limb injuries alone were not fatal, but in combination with other injuries, led to death in 11.9% (n=12) of cases. Upper limb injuries alone were non-fatal, except when coupled with head injuries, resulting in one death. Spine injuries combined with head, chest, and pelvic injuries contributed to death in 5% (n=5) of cases, while pelvic injuries combined with other injuries led to 4% (n= 4) of fatalities. In 2% (n=2) of cases, death was attributed to late complications arising from the injuries.

Discussion

This study on two-wheeler accident victims (n=101) found that most fatalities occurred in the third decade of life, with 31.7% (n=32) aged between 20-29 years. Age groups 40-50 and 50-60 yearsaccounted for20.8% (n=21) and 17.8% (n=18) respectively. Studies from other parts of India also showed that majority of the victims were of the age group 20 to 40 years (56.5%)[4]. The male to female ratio was 10: 1, aligning with similar studies in India and Jamaica, which also reported male predominance due to a higher number of male two-wheeler passengers (5,6). These findings underscore the vulnerability of young adults and males to two-wheeler accidents.

Most two-wheeler accidents took place between 6:00 pm and 9:00 pm (23.8%), with the fewest occurring between 12:00 midnight and 3:00 am (1%). Overall, 60% of accidents happened between 3:00 pm and 12:00 pm. Comparable studies indicate that two-wheeler accidents tend to peak during local rush hours[7].The study revealed that a significant majority of deaths occurred shortly after the accident, with over 42% of victims succumbing within 2 hours, and 11.9% of victims dying at the accident scene, findings consistent with previous research.[8,9].

The study revealed that 63.4% of accidents occurred on national highways, possibly due to their well-maintained conditions favoring higher speeds. Among deceased two-wheeler riders, 60.4% were on motorcycles, followed by bicycle riders (20.8%). This trend may be attributed to the prevalence of motorcycles in Kerala, their compact design, speed, and power compared to other two-wheelers, consistent with previous studies.[10,11]. Most victims were riders (80.8%), with pillion riders accounting for 19.2%. This aligns with similar findings from another study conducted in a South Indian state[12].

Out of 101 individuals in the study, only 5 wore helmets during accidents, while 88 did not, and data for 8 cases were unavailable. This highlights a widespread reluctance among two-wheeler riders to wear helmets, despite mandatory regulations in Kerala, underscoring the need for improved driver education on the benefits of protective gear. Most of the two wheelers collided with light motor vehicles (29.7%), followed by heavy vehicles (23.8%), and in 17 cases with other two wheelers. However, studies in different locations have reported varying proportions of offending vehicles [10]. Notably, in 87% of cases, occupants were ejected from two-wheelers during accidents due to the absence of mechanisms like seat belts. Sudden braking led to occupants continuing their motion due to momentum, emphasizing the need for safety measures in two-wheelers.

In this study, head injuries predominated (97%), with substantial rates of lower limb (86.1%) and upper limb injuries (83.2%). Chest and abdomen injuries were also notable at 56.7% and 28.9%,

respectively. Combined injuries to the head, chest, upper limb, and lower limb occurred in 17.8% of cases, and head, upper limb, and lower limb injuries in 16.8%. These findings align with previous Indian studies[4]where head injuries were prevalent in two-wheeler accidents. However, studies from outside India reported that majority of the injuries were on the extremities, suggesting a regional variation possibly linked to Indian riders' reluctance to wear helmets.

Abrasions were the most prevalent injury type (99%), followed by contusions (94%), consistent with existing literature. Lacerations and fractures were present in 81% and 88% of cases, respectively. Head injuries predominantly involved scalp injuries (91.1%) and skull fractures (79.2%). Subarachnoid hemorrhage (73.3%), subdural hemorrhage (68.3%), and epidural hematoma (15.8%) were common findings. Brain contusion and laceration affected 45.5% and 22.8% of victims, respectively, with only 3% free from head injuries. Skull fractures involved vault fractures (67.3%) and base fractures (57.4%), notably hinge fractures in the middle cranial fossa. Combined base and vault fractures occurred in 31.7% of cases. Coup injuries were observed in 85.1% of victims, contrecoup injuries in 64.4%, and both in 57.4%. Even though wearing of helmet can protect the head from injuries, it cannot protect the head from all type of injuries, especially contrecoup injuries which are seen in 64.4 % of cases.

Cervical spine fracture was present in 11.9% of victims. All case of spinal cord injuries of neck were associated with cervical spine fracture (4%). The most common chest injury was soft tissue damage (84.2%), followed by rib fractures (29.7%), resulting in death in only 2 cases.Abdominal wall soft tissue injuries occurred in 20% of victims, with 13.9% experiencing liver injuries, leading to death in 2 cases.Pelvic bone fractures were observed in 6% of cases, along with urinary bladder injuries in 2%, exclusively associated with pelvic fractures.

Upper limb injuries mainly consisted of soft tissue injuries (84.2%), with rare cases of humerus and radius fractures (3 each), along with elbow dislocation and wrist fracture-dislocation (1 each). Shoulder dislocations were absent, and upper limb injuries were fatal in only 1% of cases. Lower limb injuries primarily involved soft tissues (90.1%), with 2 femur fractures and 18 tibia fractures. Lower limb injuries contributed to 12 fatalities.

Head injuries were identified as the leading cause of death in two-wheeler accidents, responsible for 62 fatalities. Notably, 90.1% of deaths resulted from head injuries combined with other injuries. A study in Calicut supported these findings, showing head injuries as the primary cause of death among drivers (70.2%) and pillion riders (66.6%) (10). Chest and abdominal injuries independently led to two fatalities each, while combined chest injuries contributed to 16.8% of deaths and abdominal injuries to 12.9%. Although lower limb injuries were non-lethal alone, they contributed to 11.9% of fatalities when combined with other injuries. Upper limb injuries were fatal only when accompanied by head injuries, resulting in one fatality. Spinal injuries or pelvic injuries combined with other injuriesor late complications from injuries led to death only in a small proportion of cases. These findings emphasize the critical role of head injuries in two-wheeler accident fatalities and the impact of combined injuries on outcomes.

Statistical analyses using chi-square tests revealed significant associations in three comparisons: between individuals ejected from two-wheelers and those with head injuries ($p=0.004$), between head injury as a cause of death and not wearing a helmet ($p=0.043$), and between head injury and non-helmet use at the time of the accident ($p<0.001$).

Conclusion

The study highlights several critical findings regarding two-wheeler accidents. It reveals a striking gender disparity, with males comprising most victims. Most accidents occur during the afternoon and evening hours, and victims are predominantly in their third decade of life. Highways are the primary accident location, with motorcycles being the most common vehicle involved. Alarmingly, helmet usage is extremely low, and head injuries are the leading cause of death in these accidents, both in isolation and when combined with other injuries. Ejection from vehicles is a significant risk factor for head injuries. These findings underscore the urgent need for mandatory helmet laws for both riders and pillion riders, with strict enforcement, to mitigate the high

incidence of head injuries and fatalities. Furthermore, exploring preventive measures like seat belts to reduce ejection from two-wheelers should be a priority in improving road safety for this vulnerable demographic.

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Conflict of interest: Nil

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Paraphilia Induced Suicide: A Case Report

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Abstract

Paraphilia is a term used to describe different sexual deviations involving unconventional methods of sexual gratification. Paraphili as indulged in abnormal and orthodox sex play by using objects as parts of the body or fantasies in which complete satisfaction is sought and obtained without sexual intercourse. Perversions are acts that are socially prohibited or unacceptable, or biologically undesirable. In sexual paraphilia, usually, person psychopaths suffer from mental aberrations and conflicts, socio-sexual maladjustments, psychosexual imbalance, and abnormalities. Paraphilia-induced suicide is a type of anomic suicide, and anomic suicide is due to a lack of social regulation that occurs during high levels of stress and frustration. Paraphilia may induce suicide even though paraphilia is not punishable. It is just due to fear of social defamation and social taboo.

Case presentation: A 59-year-old male committed suicide on the railway track, and thenthe body was sent to the mortuary room for an autopsy examination. History was taken from the police and relatives. He was a widower for the last 15 years.

Conclusions: Paraphilia is the form of the insertion of foreign bodies in the rectum, and when a person cannot remove foreign bodies himself, attending a hospital is very humiliating. To prevent the social integrity or self-esteem, the person committed suicide. Where this type of paraphilia is not listed as a crime in India, for sexual gratification, a person may use it by any means, which may be natural or unnatural form. Many unnatural forms of paraphilia are used by many people, which is not punishable. Sexual gratification is done by most of normal people and a few abnormal psychiatric people by any sexual perversion. All paraphilia that is not punishable by the law should not be considered a social taboo.

Keywords: Paraphilia, Anomic suicide, Sexual gratification

Background

Paraphilia is a term used to describe different sexual deviations involving unconventional methods of sexual gratification. Paraphilias indulged in abnormal and orthodox sex play by using objects as parts of the body or fantasies in which complete satisfaction is sought and obtained without sexual intercourse. Perversions are acts that are socially prohibited or unacceptable, or biologically undesirable.[1] Paraphilia, which may be any form of action uranism, active algolagnia, necrophilia, necrophagic, passive algolagnia, fetichism, voyeurism, frotteurism, etc. [2] In sexual paraphilia, usually, person psychopaths suffer from mental aberrations and conflicts, socio-sexual maladjustments, psychosexual imbalance,

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and abnormalities. Durkheim identifies four different types of suicide which are egoistic suicide, altruistic suicide, anomic suicide, and fatalistic suicide. [3]Paraphilia-induced suicide is a type of anomic suicide, and anomic suicide is due to a lack of social regulation that occurs during high levels of stress and frustration. A help fulcategorization of rectal foreign bodies is that it classifies them into two categories: voluntary and involuntary, sexual and nonsexual.

Case presentation

A 59-year-old male committed suicide over a railway track collision by train, after a preliminary investigation by the investigating agency, the deceased was sent to the mortuary room for an autopsy examination. History was taken from the police and relatives. He was a widower for the last 15 years.

Autopsy examination findings:

Injuries:

1. Multiple abraded contusions over the anterior part of the Neck, face, chest, shoulder, and head region.
2. Multiple lacerations over the head region.
3. Various Skull bones were fractured at places.
4. Brain and meninges crushed in places.
5. Contusion over the right anterior part of the chest region.

Anal and rectum examination:

Except for a small tear of length 1.5cm at 08 o clock position, over the rest anal opening, no evident external injury was appreciated, and the sphincter was found to have normal texture and tone.

After opening the abdomen, we feel some hard structure in the rectum. Then after making an incision over the rectum and examining the rectal cavity, we found a bottle gourd inside the lumen of the rectum. Measurement of foreign body bottle Gourd taken as length 24 cm in length and circumference was 08 cm. The bottlegourd was found intact, and no injury or contusion was appreciated inside the lumen of the rectum white mucoid material stuck at places over the gourd.

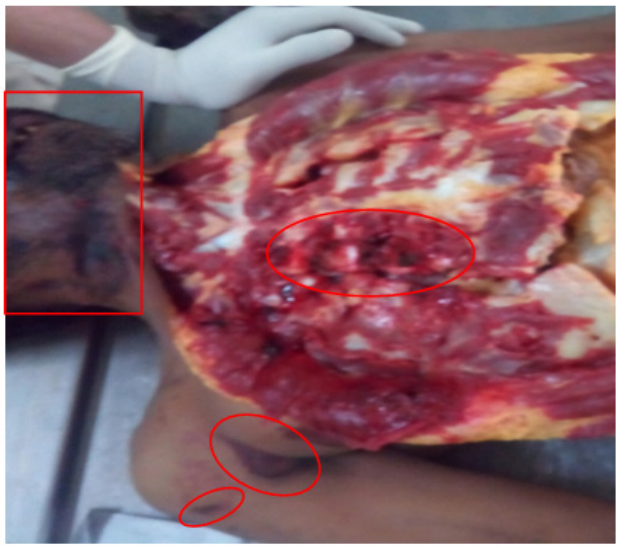

Figure 1: Injuries in form of abrasion and contusion seen in the red encircled area.

Figure 2: A green bottle gourd is in a circle in the rectum in red.

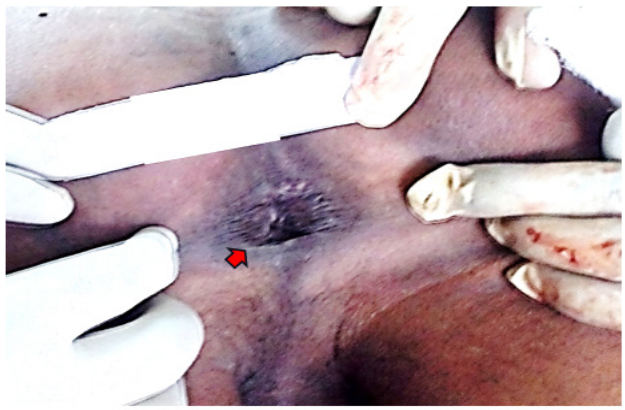

Figure 3: Annal opening observation one tear saw at 08 o'clock position indicated by the red arrow.

Figure 4: Recovered bottle gourd from the rectum.

Discussion

This case report is autopsy and history-based presentation. Sadism is an abnormal sexual behaviour where the person derives sexual excitement from inflicting psychological or physical pain on his sexual partner.[4] Sexual gratification obtained or increased from acts of physical cruelty or infliction of pain upon one's partner. Insertion of a foreign body into the own rectum through the anus is cruelty to the self-body for sexual gratification. We can nomenclate it as Narcissistic Sadism.

In most cases, rectal foreign bodies are inserted for the erotic activity to get sexual gratification. The foreign bodies are commonly described as plastic or glass bottles, cucumbers, light bulbs, tube lights, axe handles, broomsticks, carrots, and wooden or rubber instruments.[5–7]

Other objects include dildoes or vibrators, light bulbs, candles, soda, or beer bottles.[8] Some rectal foreign bodies, such as toothpicks, popcorn, bones etc. It may initiallys wallow, transit through the gastrointestinal tract, and be stuck in the rectum.[9] Rectal foreign body cases are rarely reported and often related to sexual gratification, sexual assault or the result of ingestion and are rarely accidental.[10] Insertion of foreign bodies in the rectum for sexual pleasure, primarily seen in males of the 3rd and 4th decades.[11] Such patients are ashamed and hesitant to visit the hospital.([12] In India, it is a significant social taboo to fear losing social integrity if the patient has no courage to visit the hospital. The same fear happened in this case, and the patient committed suicide. The most common reason for a foreign body in the rectum was found to be purposefully inserted foreign body for sexual gratification in unnatural sexual behaviour.[10,13]

Psychiatric patients also may insert foreign bodies in the rectum; Posttraumatic stress disorder patients insert foreign bodies in the rectum.[14]

Conclusions

Paraphilia is the form of the insertion of foreign bodies in the rectum, and when a person is unable to remove foreign bodies and attending hospital very humiliating for the person. To prevent the social integrity or self-esteem of the person who committed suicide. Where this type of paraphilia is not listed in crime in India. Sexual gratification person may be done by any means, which may be natural, ormany unnatural forms of paraphilia are used by many people which is not punishable.

Sexual gratification is done by most the normal people and few the abnormal psychiatric people. Paraphilia that is not punishable by the law should not be considered a social taboo.

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Original Research Article

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Study of Medico-legal cases in a Tertiary Care Teaching Hospital

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Abstract

Medico-legal cases are pivotal in the pursuit of justice for victims and the accused. It is essential for medical professionals to be well-versed in the intricacies of medico-legal cases to ensure that they follow the procedures of the law of the land diligently. Understanding the patterns of medico-legal cases in a specific region can assist government authorities in devising strategies to prevent such incidents. This study was conducted at a rural tertiary care teaching hospital over a span of seven months, from January to July 2023, and examined 139 medico-legal cases. The age group of 21 to 40 years, predominantly comprising males, emerged as the most affected demographic in our study. Road traffic accidents were the predominant cause of medico-legal cases, with head injuries being the most frequently observed. Understanding the demographics and injury patterns of medico-legal cases in this rural area serves as a foundation for tailoring medical care and legal interventions to the specific needs of the community. By continuing to investigate and analyze medico-legal cases, healthcare providers and law enforcement agencies can work collaboratively to not only address the immediate medical needs of victims but also to develop proactive strategies to minimize the occurrence of such cases and improve overall community well-being.

Key words: Medico-legal cases, Injuries, Road traffic accidents (RTA's).

Introduction

Any unnatural event resulting in bodily damage seeking intervention and legal answer is called medico legal case[(1)]. Medico-legal cases, which involve medical issues with legal implications, require both medical examination by a doctor and investigation by law enforcement authorities. These cases encompass a wide range of scenarios, including road traffic accidents, sexual assaults, poisonings, falls, burns, asphyxia deaths, industrial accidents, assaults, and more [(1)].

The primary responsibility when a medico-legal case arrives at the Emergency Medicine department is to assess and provide medical care to stabilize the victim or accused. Subsequently, the circumstances and history surrounding the incident must be documented for legal investigation along with thorough examination. The welfare of the patient

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takes precedence over procedural requirements, and doctors are obligated by oath to prioritize their patient's well-being [2]. After stabilizing the patient, it is crucial to inform the relevant law enforcement authorities about the medico-legal case.

In every medico-legal case, a comprehensive medico-legal report must be prepared. This report should include essential information[1] such as the patient's name, age, sex, address, date and time of reporting, the person who brought them to the hospital, P.C. number and Police Station, time of the incident, conducted investigations, and the patient's discharge status. Additionally, two identification marks and fingerprints of the patient should be obtained, and the date and time of the examination should be documented. If the patient is in serious condition, a dying declaration should be recorded [2].

Before conducting any examination, informed consent from the patient and or requisition from courts or the police is essential depending on circumstances of case. The doctor must clearly explain to the patient the medico-legal nature of the examination and the legal implications if the findings and history do not align. Following a thorough examination, an opinion should be provided, which holds significance in subsequent legal procedures.

Additionally, Emergency Medicine department is the backbone of every hospital as all medical and surgical first report here. Knowledge of trends of medico legal cases brought to Emergency Medicine department is essential to make corresponding arrangements in terms of man power, drugs, equipment's, and instruments to deal with them, as the initial few hours are Golden Hours[3] which can save the life of a victim/patient. These trends are also necessary for law enforcement agencies too, by which they can take preventive and corrective measures[3].

The prevalence and nature of medico-legal cases reported in a hospital are influenced by factors such as road quality, socio-economic conditions, and cultural diversity in the area. In some rural areas, cases like Organophosphorus poisonings and snakebites are more common, necessitating the presence of anti-snake venom sera and antidotes of poisoning in rural primary health centers and Emergency Medicineunits. Conversely, metropolitan areas may see higher instances of road traffic accidents and industrial accidents, highlighting the need for trauma care centers and blood banks.

Misinterpretation of medico-legal cases can occur, emphasizing the importance of conducting examinations with care and transparency. Doctors should familiarize themselves with medico-legal guidelines set by their respective state and central governments. In cases of Medico Legal Casedeath, the body must be handed over to the police and subjected to a postmortem examination before being released to the patient's relatives[4]. Hospitals should ensure that their medical practitioners receive adequate training to handle medico-legal cases effectively.

Medico-legal cases are typically categorized as accidental, suicidal, or homicidal. The examination of the crime scene by a doctor along with law enforcement authorities can provide vital evidence and help determine the manner of death in some cases.

The primary objective of this study is to investigate the prevalence and patterns of medico-legal cases in a rural tertiary care teaching hospital. This research aims to provide insights into the types and frequency of medico-legal cases encountered in the hospital setting which can create standard health care practices and allot resources for other similar rural setups.

Materials and Methods

Study Design: This retrospective cohort study aimed to analyze medico legal cases (MLC) registered in the Emergency Medicine department of Great Eastern Medical School and Hospital during the period from January 2023 to July 2023.

Data Collection: Sample Size: A total of 139 MLC cases were included in this study.

Data Sources: Data was collected from two primary sources: Medical records maintained in medical record department &Emergency medicine records.

Data Parameters Collected: Age, Sex, Type of occurrence (e.g., road traffic accidents, burns, hanging, drowning, poisoning, assault, fall), Manner of occurrence (e.g.; suicidal, homicidal, and

accidental); Time of arrival at the hospital, Time of day and month of occurrence, Time gap between the incidence and admission, Duration of the hospital stay, Number of deaths /discharges.

Inclusion Criteria: All cases that were officially recorded as medico-legal cases (MLC) during the specified period were included in the study. Exclusion Criteria: Cases that did not meet the criteria/not relevant to the study's objectives were excluded.

Data Analysis: The collected data was analyzed, grouped, and tabulated based on the relevant parameters mentioned above. The results were expressed in terms of frequency and percentage to provide a clear understanding of the prevalence and characteristics of MLC cases in the hospital during the study period.

Advantages: Easy, inexpensive, require less time, Risk factors can be known

Limitations: Retrospective studies have limitations related to accuracy & completeness of data, recall bias. The study's findings may be specific to the hospital and region under investigation &may not be generalizable some times.

Results and Discussion

The analysis of medico-legal cases reveals several key findings and trends:

Road traffic accidents (RTAs)[4,5,6] were the most prevalent type of medico-legal cases, accounting for over half (51.07%) of the cases. Falls (19.42%) and Poisonings (15.82%) were the next most common, followed by Assaults (5.75%), Burns (4.31%), Industrial accidents (2.15%), Drowning (0.71%), and Hanging (0.71%). The high incidence of Road Traffic Accidents in the area could be attributed to greater motorization in this region. The prevalence of falls suggests the possible influence of factors like alcohol consumption (n=3) or underlying health issues like vertigo, Hypertension, Diabetes, Syncopal attacks etc.

The study revealed that, most affected age group was 21 to 40 years [1] (48.2%), likely due to this age group's higher engagement in outdoor activities such as work, recreation, education, and miscellaneous pursuits. Males were significantly more affected[5,6], constituting 76.25% of the cases, which can be attributed to their higher involvement in outdoor activities.

Males suffered from RTA's (n=59) followed by fall (n=25), Poisoning (n=12) and Assaults (n=5). Females, majority suffered from RTA's (n=12), followed by Poisoning (n=10) and Burns (n=4). More females suffering from Poisonings and Burns suggest they stay alone at home leading to suicidal thoughts and succumbing to poisons and burns.

Most Medico-legal cases occurred between 6 AM - 6 PM (64.74%) and from 6 PM to 11 PM (22.3%). This can be explained by increased human activity during daytime and up to 11 PM. Fewer cases were observed on Tuesday (n=13) may be due to less movement, with Thursdays and Fridays recording the highest (n=26), possibly due to increased movement on these days. Similarly, taking into consideration Month of incidence, July recorded the highest Medico-legal cases (34.5%) followed by June (24.4%), while March recorded the lowest (4.31%).

Most cases (58.27%) showed a time gap of 1-8 hours between incident and arrival at hospital. This delay could be attributed to factors such as delayed ambulance response, unavailability of vehicles at the incident site, patients' negligence in seeking medical attention and non-availability of patient attenders etc.

Patients with medico-legal cases arrived at the hospital more frequently during the time of 6 PM to 6 AM [7] (38.84%), followed by 12 PM to 6 PM (33.09%), in contrast to most of the Medico-legal cases occurring between 6AM and 6PM, imposing the requirement of trained staff in Emergency Medicine department during night time.

Taking into consideration the duration of stay in the hospital, 84 cases (60.4%) were discharged within 6 days while 55 cases (39.5%) exceeded 6 days. The high number of discharges within 6 days can be attributed to the less severity of the disease.

In RTAs, Head injuries (n=19) were the most common. In Head injuries, Scalp lacerations were the most common (n=19) followed by Facial injuries (n=16), Intracranial injuries (n=10) and Skull fractures (n=9). Lower limb soft tissue injuries and fractures (n=18) and Upper limb soft tissue injuries and fractures (n=10) were also prevalent. Thoracic

injuries included Rib fractures (n=4) while there were a few cases of Pelvic, Abdominal, and Neck injuries.

Among the types of RTA's majority were Self Accidents (53.52%) maybe due to skidding, bad roads, over speeding, sudden obstruction, followed by Pedestrian accidents (22.53%), Bike x Four-Wheeler (11.26%), Two-Wheeler x Two-Wheeler (9.89%).

Falls from heights resulted in Head injuries (n=20) particularly facial (n=8) and scalp injuries (n=5), as well as Intracranial injuries (n=3) and Skull fractures (n=2). Chest injuries (n=5) were the next most common, including rib and claviclefractures (n=2), followed by long bone injuries such as Femur (n=2) Fibula (n=1) and Radius fractures (n=1) along with Spine injuries (n=2).

Poisoning cases predominantly involved Snake bites (18.18%) and Paraquat poisonings (18.18%) followed by other types of poisonings. Suicidal cases (77.27%) were more common than accidental cases (22.72%) in this category. Incidence of Snake bites is high due to rural areas, while Paraquat poisonings are high probably due to usage of pesticides in agriculture.

In Burns cases, females (66.67%) were more affected while Industrial accidents (100%) predominantly affected males. Accidental causes were dominant in both types of medico-legal cases.

In Assaults, majority of the cases involved usage of Blunt objects (87.5%) as compared to Sharp objects (12.5%). Males were predominantly involved (62.5%) as compared to Females (37.5%)

Looking at the manner of Medico-Legal cases, 81.29% of the cases were Accidental, 12.94% Suicidal and 5.7% Homicidal. [8]

This Study's outcomes indicate that most cases (85.61%) were discharged, while 6.47% resulted in fatalities. 11 cases were referred to higher centers. Among the deaths, (5.03%) occurred within the first day of admission, likely due to the severity of Disease/Injuries.

TABLE 1: TYPES OF MLCs (n=139)

MLC Type	MALE	FEMALE
RTA (51.07%)	59	12
FALL (19.42%)	25	2
POISON (15.82%)	12	10
ASSAULT (5.75%)	5	3
BURN (4.31%)	2	4
INDUSTRIAL ACCIDENTS (2.15%)	3	0
HANGING (0.71%)	0	1
DROWNING (0.71%)	0	1

TABLE 2: AGE OF PERSON

Age in years	Male (n=106)	Female (n=33)
0-10	1	2
11-20	12	3
21-30	31	3
31-40	25	8
41-50	17	9
51-60	13	6
61-70	2	1
71-80	5	0
81-90	0	1

TABLE 3: TIME OF INCIDENT

TIME OF Incident	MALE	FEMALE	TOTAL	%
6AM-6PM	66	24	90	64.74%
6PM-11PM	29	2	31	22.3%
11PM-6AM	11	7	18	12.94%

TABLE 4: ARRIVAL TIME AT HOSPITAL

Arrival at hospital	Total	Percentage
6AM-9AM	14	10.07%
9AM-12PM	25	17.98%
12PM-6PM	46	33.09%
6PM- 6AM	54	38.84%

Table 5: TIME GAP BETWEEN INCIDENT & ADMISSION

Time gap between incident & admission	Total	Percentage
<1hour	24	17.26%
1 -8 hours	81	58.27%
8-16 hours	13	9.35%
16-24 hours	10	7.19%
>24 hours	11	7.91%

Table 6: DURATION OF HOSPITAL STAY

Duration of hospital stay	Total	Percentage
<24 hours	19	13.66%
1-3 days	44	31.65%
4-6 days	21	15.10%
>6 days	55	39.56%

TABLE 7: INJURIES IN RTA's

HEAD INJURIES	NECK INJURIES	THORAX INJURIES	ABDOMINAL INJURIES	PELVIC INJURIES	UPPER LIMB INJURIES	LOWER LIMB INJURIES
1.Scalp lacerations-19 2. Facial injuries – 16 3. Intra Cranial Injuries – 10 4. Skull Fractures - 9	Soft tissue injury - 1	1) Rib fractures: 4 2) Soft tissue injuries - 2	Soft tissue injury - 1	Soft tissue injuries - 3	1) Bone fractures – 3 2) Soft tissue injuries - 10	1) Bone fractures – 9 2) Soft tissue injuries – 18

Conclusions

Majority of Medico-Legal cases include Road Traffic Accidents, fall from heights and Poisonings.

Males in the age group of 21-40/50 years are the most vulnerable.

Medico-Legal cases predominantly occurred between 6AM-6PM, while arrival to the hospital was more between 6PM-6AM.

Incidence of Medico-Legal cases was lower on Tuesdays in a week.

Most of the patients required a hospital stay of less than 6 days.

In Road Traffic Accidents, self-accidents were common followed by pedestrian accidents.

Among the manner of MLC's, accidental manner was the commonest; in contrast to the poisonings where suicidal manner was the commonest.

Conflict of interest: None

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Original Research Article

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Profile of Autopsy Cases at Government Medical College Kanpur: A Retrospective Study

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Abstract

Background: The profiling of medico-legal cases is imperative in order to avert preventable casualties in the future and to analyze the authentic crime rate within a specific region. Presently, road traffic accidents are the primary cause of casualties, resulting in numerous fatalities. ***Objective:*** The objective is to establish a comprehensive profile of deaths caused by either natural or unnatural factors, thereby enabling us to channel rigorous efforts towards mitigating their occurrence.

Materials and Methods: A retrospective analysis was conducted on the mortality cases subjected to medico-legal postmortem examination at the Mortuary, Government Medical College, Kanpur, U.P., India, during the year 2022. Throughout this duration, a total of 2326 autopsy cases were conducted.

Results: October had the highest number of autopsy cases. Males accounted for 63.23% of cases, with most falling in the 21-30 age group. Injury-related deaths were the largest proportion (47.36%), followed by natural deaths (19.93%), violent asphyxial deaths (10.48%), thermal injuries (9.89%), and poisoning (9.04%).

Conclusion: The analysis reveals that road traffic accidents are the most common cause of death, potentially due to the increased frequency of transportation. Specifically, vehicular accidents resulting in head injuries were the leading cause of death.

Key Words: Autopsy, Unnatural Deaths, Injury, Burns, Violent Asphyxial Death, Poisoning

Introduction

The profiling of medico-legal cases emerges as a crucial undertaking in the realms of forensic science and public health, extending beyond documenting past incidents to actively preventing future casualties. Its significance lies in providing a comprehensive understanding of morbidity and mortality dynamics, benefiting stakeholders such as policymakers, healthcare professionals, law enforcement, and researchers[1].

Road traffic accidents (RTAs) represent a harrowing issue, causing preventable casualties with far-reaching consequences—loss of life, physical injuries, emotional trauma, and economic burdens. Understanding the contributing factors to RTAs becomes imperative for effective interventions, making comprehensive profiling an essential tool for crafting strategies to mitigate these incidents. The primary objective of this research is to establish a comprehensive profile of deaths from natural and unnatural causes. This holistic approach aims to channel collective efforts toward curtailing tragic events, delving into the intricacies of human existence and societal dynamics beyond statistical data[2].

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India, particularly the city of Kanpur, grapples with challenges stemming from rapid industrialization and urbanization. Challenges include unemployment, income disparities, substance abuse, traffic density, inadequate infrastructure, and various morbidities, leading to a notable increase in medicolegal cases. The study's significance lies in its intersection of health, justice, and social issues, offering insights into the etiology and nature of underlying causes. The research in Kanpur seeks to unravel the intricate tapestry of medicolegal cases, understanding the stories behind each case, societal contexts, and systemic issues perpetuating them. It goes beyond statistical analysis, providing a foundation for evidence-based policymaking to address root causes and tailor interventions[3].

The profiling of medicolegal cases transcends disciplines, intersecting with public health, criminal justice, and social welfare. Its value lies in its potential to save lives, alleviate suffering, and improve overall well-being. Through comprehensive research and analysis, it aims to pave the way for a safer, more equitable, and healthier future for the people of Kanpur and beyond[4].

Materials and Methods

This retrospective study encompasses all instances of mortalities presented for postmortem examination at the mortuary of Government Medical College, Kanpur, Uttar Pradesh, India, spanning from the commencement of January 1st, 2022, until the culmination of December 31st, 2022. The primary objective of this investigation pertains to ascertaining the overall count of deceased cases, discerning the gender distribution of the individuals, and comprehending the distribution pattern across different months. The comprehensive analysis of the variables related to the cause of death entails the consideration of age, gender, day and month of incidence, causative agent, and the cause of death determined through autopsy. The meticulous collection and systematic tabulation of data were executed to determine the frequency and proportion of these fatalities, with outcomes subsequently expressed in the form of percentages.

Result

Table 1: Age and gender wise distribution of cases

Age Group	Male	Female	Total	Percentage
0-10	110	124	234	10.060
11-20	164	161	325	13.972
21-30	508	198	706	30.353
31-40	311	194	505	21.711
41-50	186	80	266	11.436
51-60	98	65	163	7.008
61-70	76	23	99	4.256
>71	20	8	28	1.204
Total	1473 (63.33%)	853 (36.67)	2326	100

Table 2: Distribution of cases according to cause of death

	Cause of death	Percentage
1	Injury	47.36
2	Natural	19.93
3	Asphyxia deaths	10.48
4	Burns	9.89
5	Poisoning	9.04
6	Electrocution	2.03
7	Unknown	1.27
	Total	100

Table 3: Distribution of cases according to various types of injury

	Type of mechanical injury	Percentage
1	Head injury	67.38
2	Multiple injury	28.94
3	Spinal cord injury	2.45
4	Stab injury	0.79
5	Cut throat	0.24
6	Firearm injury	0.2
	Total	100

Table 4: Distribution of cases according to natural cause of deaths

	Natural deaths by disease	Percentage
1	Respiratory system	42.34
2	Cardiovascular system	28.86
3	Septicemia(multiorgan failure)	21.10
4	GIT system	4.87
5	Blood system	2.04
6	Cerebral	0.46
7	Nonviable	0.32
8	Stillborn	0.1
	Total	100

Table 5: Distribution of cases according to violent asphyxial deaths

	Violent asphyxial death	Percentage
1	Hanging	50.72
2	Drowning	24.54
3	Strangulation	8.89
4	Choking	15.85
	Total	100

Table 6: Types of unnatural death irrespective of the manner of death

	Unnatural death	Percentage
1	Head injury	41.75
2	Multiple injury	21.86
3	Asphyxial	17.32
4	Burns	8.21
5	Poisoning	6.39
6	Electrocution	2.06
7	Spinal cord injury	1.24
8	Unknown	0.62
9	Stab injury	0.38
10	Cut throat	0.14
11	Firearm injury	0.03
	Total	100

During a span of one year, a comprehensive examination of 2326 deceased individuals was conducted. It was observed that the months of October and September exhibited the highest frequency of cases, while the months of March and February corresponded to the lowest number of occurrences. The study revealed that male individuals accounted for 63.33% of the subjects. The investigation further noted that the highest proportion (30.35%) of autopsy cases, spanning both genders, fell within the age range of 21-30 years. This was followed by the age group of 31-40 years, while the lowest proportion of cases (1.2%) was observed in individuals aged over 70 years.

Table 2 presents the data indicating that the largest number of cases recorded pertained to deaths caused by mechanical injuries, specifically those resulting from road traffic accidents (RTA). This was followed by deaths from natural causes, violent asphyxiation, burns, and poisoning incidents. In the specific month of October, there were a total of 91 cases attributed to deaths caused by mechanical injuries, with natural deaths, violent asphyxiation, and burn-related deaths following closely behind. The highest number of cases in the mechanical injury category can be attributed to blunt trauma resulting from road traffic accidents. Furthermore, it is worth noting that a small percentage of cases, 1.27% to be precise, are currently under investigation, and the exact cause of death for these cases is yet to be determined.

Table 3 displays the various types of mechanical injury that were discovered and analyzed in this particular study. Among the assortment of injuries, it was observed that head injury and multiple bodily injuries were the most prevalent, with spinal cord injury, stab injury, cut throat injury, and firearm injury following suit. In terms of the nature of death, a natural demise occurred in 19.93% of the cases. Within this subset, it was noted that the maximum number of cases were attributed to respiratory system-related deaths, with cardiovascular causes, septicemia, gastrointestinal tract (GIT) causes, and other factors ranking subsequently. This is further elucidated in **Table 4.**

During the course of the entire year, the autopsies conducted amounted to a total of 2,326 cases, and it was found that a percentage of 10.48% of these cases were attributed to violent asphyxial deaths. Upon examining Table 5, it becomes apparent that within the category of violent asphyxial deaths, the highest number of occurrences was reported in cases of hanging, accounting for approximately 50.72% of the total. Following closely behind were incidents of drowning, which constituted approximately 24.54% of the cases. Lastly, there were instances of ligature

strangulation, throttling, and choking, which were documented in **Table 5.**

Discussion

Among the total number of autopsy cases, which amounted to 2326 in total, it was found that the male cases accounted for 1473, constituting approximately 63.33% of the total, while the female cases accounted for 853, making up around 36.67% of the total. This finding aligns with the results obtained from various studies conducted by Radhakrishna *et al.,* Sharma *et al.,* Wasnik, Shrivastava *et al.,* Zine *et al.,*Qasim *et al.,* and Afandi. These researchers all arrived at a similar conclusion, further strengthening the validity of this result. The higher prevalence of male cases can potentially be attributed to the fact that male individuals tend to have greater exposure to the external environment. This can be attributed to the socioeconomic structure of our community, wherein men often serve as the sole breadwinners and have more freedom to venture outdoors, while women typically stay indoors[5].

The age group that was most commonly involved in all types of cases was found to be individuals between the ages of 21 and 30, encompassing both males and females. This discovery aligns with the findings of various studies conducted by Radhakrishna *et al.,* Wasnik, Zine *et al.,* Qasim *et al.,* and Afandi. In the research conducted by Sharma et al., it was observed that the age group predominantly affected was individuals between the ages of 21 and 25, followed closely by those between the ages of 26 and 30. An interesting observation that can be made is that the majority of victims were young adults, highlighting the vulnerability of this particular age group. This information sheds light on the significance of focusing on this demographic in order to develop effective interventions and preventative measures. Overall, these findings emphasize the need for targeted efforts aimed at protecting and supporting young adults, as they are particularly susceptible to various types of cases. The majority of cases consisted of deaths resulting from injuries, with the highest frequency observed in this category. Subsequently, deaths caused by natural causes ranked second in terms of prevalence. Furthermore, deaths resulting from violent asphyxiation, such as strangulation or suffocation, were also present among the reported cases. Additionally, deaths caused by burns, either accidental or intentional, were identified as another significant category. Moreover, cases of deaths caused by poisoning, whether accidental or intentional, were also reported. Finally, deaths resulting from electrocution and those with an undetermined cause were among the identified categories of mortality[6].

Among the instances of fatalities resulting from injuries, it is noteworthy to mention that the primary cause of demise was head injury, accounting for a substantial 67.38% of cases, followed by multiple body injuries at a rate of 28.94%. Additionally, spinal cord injuries contributed to 2.45% of the total, while stab injuries accounted for a relatively lower percentage of 0.79%. Furthermore, the occurrence of cut throat injuries represented a mere 0.24% of cases, with firearm injuries constituting a minute 0.2%. A study conducted by Vij established that head injury cases encompassed a staggering 69.5% of all fatal road traffic accident (RTA) cases. This dominance can be attributed to the head being the primary target of injury in the majority of physical assaults. These findings aligned closely with the results obtained by various other researchers, with the exception of Afandi's study, wherein it was observed that the leading cause of death stemmed from blunt and sharp forces, rather than RTAs. This discrepancy can be attributed to the fact that in Afandi's country, medicolegal autopsies are not required for cases involving RTAs[7].

In this particular investigation, a notable percentage of the cases, specifically 19.93%, were determined to be the result of natural causes leading to death. Within our comprehensive examination, it was observed that deaths associated with the respiratory system, accounting for a significant proportion of 42.34%, surpassed those linked to the cardiovascular system, which amounted to 28.86%. This finding closely aligned with the research conducted by Shrivastava et al. Furthermore, it is crucial to note that Radhakrishna et al. study yielded contrasting results, as they identified a higher number of deaths attributable to the cardiovascular system compared to those related to the respiratory system. Interestingly, the two aforementioned causes of death were succeeded by multiorgan failure, accounting for

21.10% of the cases, followed by deaths associated with the gastrointestinal tract system, amounting to 4.87%, and hematological diseases, which constituted 2.04% of the total cases. It is noteworthy to mention that within this study, nonviable and stillborn fetuses were classified as a natural type of death[8].

Violent asphyxial deaths, which encompassed 10.48% of the total cases, exhibited a distinct composition. Of these occurrences, hanging cases dominated, accounting for 50.72% of the total, while drowning cases comprised 24.54%, strangulation cases accounted for 8.85%, and choking cases made up 15.85%. These observed figures align closely with the findings of previous studies conducted by Wasnik and Shrivastava *et al.,* highlighting a consistency in the prevalence of these types of deaths. Among the unnatural deaths, regardless of the specific manner in which they occurred, a significant majority consisted of injury-related deaths. These cases were primarily attributed to road traffic accidents (RTAs) and rail accidents, wherein a substantial number of fatalities ensued from head injuries and multiple injuries. Following this category, deaths resulting from asphyxial causes represented 10.48% of the total cases, while burns accounted for 9.89%, poisoning for 9.04%, and electrocution for 2.03%, as depicted in **Table 6.** This distribution mirrors the patterns observed in previous studies conducted by Radhakrishna *et al.,* Sharma *et al.,*Wasnik, Shrivastava *et al.,* and Zine *et al.,* thereby supporting the consistency of these findings across various investigations. The reasons underlying this distribution can be attributed to several factors. Firstly, the presence of faster modes of transportation has contributed to an increase in traffic accidents, as individuals are able to travel more frequently and cover longer distances. Consequently, this heightened exposure to vehicular hazards has resulted in a notable rise in injury-related deaths. Moreover, the prevalence of industrial and occupational hazards has further contributed to the occurrence of fatalities related to asphyxial causes, burns, poisoning, and electrocution. The combination of these factors underscores the need for increased awareness and preventive measures in order to mitigate the risks associated with violent asphyxial deaths and other forms of unnatural deaths[9].

Among 2326 autopsy cases, 6.39% were attributed to poisoning, prompting further investigation. Notably, 0.62% involved unidentified poisons, posing a challenge for forensic experts. Acid ingestion was the most prevalent, followed by organophosphate (OP) and aluminium phosphide (ALP) poisonings, snake bites, and other factors. This aligns with previous studies, suggesting a consistent pattern. The prevalence is linked to the rural population's reliance on agriculture, increasing agrochemical poisoning incidence. This underscores the need for dedicated attention and intervention in addressing poisoning cases, particularly in agricultural settings, to ensure community well-being[10].

During the analysis of thermal injuries, burns constituted 9.89% of cases, and electrocution accounted for 2.03%, emphasizing the significance of burns in the studied population. In this investigation, burns ranked fourth in frequency of deaths, following injury-related deaths, natural deaths, and violent asphyxial deaths, indicating their substantial role in mortality outcomes. Notably, a study by Zine et al. identified burns as the second leading cause of death, consistent with this research. Findings from studies by Wasnik and Qasim et al. add credibility and consistency to the recognition of burns as a significant contributor to mortality. The specific investigation period revealed only one firearm-related injury, differing from Qasim et al., study attributing higher numbers to firearms as a choice in homicides. This underscores the impact of weapon selection on injury patterns, urging comprehensive research. Analysis of thermal injuries, specifically burns and electrocution, offers valuable insights into their prevalence and impact on mortality, with consistent findings across studies. Emphasizing the importance of addressing these injuries, preventive measures are crucial. Further research is imperative to understand contributing factors and develop effective strategies for prevention and management in this field[11].

Road Traffic Accidents (RTA) are a tragic and preventable cause of high mortality. Advocacy for early education on traffic rules and awareness is crucial, coupled with stringent law enforcement. Natural deaths, often due to coronary insufficiency, rank as the next leading cause. Violent asphyxial deaths and burn cases follow closely. Poisoning, notably organophosphorus (OP) poisoning, is prevalent, exacerbated by the agricultural reliance

of the majority. Prevention strategies include personalized counseling and the introduction of online services for poison treatment. These measures aim to reduce the impact of RTAs and other leading causes, emphasizing education, enforcement, and accessible support services[12].

Conclusion

This research on medicolegal autopsy cases at a government hospital contributes vital insights for policymakers, law custodians, and the community. It emphasizes the need for health awareness on stress management, traffic regulations, and motor vehicle laws to reduce casualties. Recommendations include improving road infrastructure, enforcing safety regulations, establishing emergency services, and trauma care centers. Addressing the population's exponential growth is crucial to mitigate the escalating number of accidents, highlighting the importance of comprehensive measures for community well-being.

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Original Article

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Spectrum, Pattern and Outcome of Trauma patients admitted to Tertiary care hospital in North India

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Abstract

Introduction: Trauma is foremost reason behind the mortality and morbidity worldwide among all age groups. Trauma remains the vital public health issues worldwide and is independent of socioeconomic condition of a country. Incidence of trauma is still increasing with increase in incidence of violence, road traffic accident, assault and violence. Trauma will still remain if all medical and surgical diseases are overcome.

Aims and Objectives: The aims and objective of our study was to evaluate the spectrum, pattern, mechanism and outcome of trauma patient presenting at tertiary care hospital.

Results: Trauma patient visited to tertiary care hospital were 1926 (with 73% male and 27% female). Most common age group was 21-30 years. Most common mechanism of trauma was RTA which include 60% patient followed by fall. Most common site of injury was extremities followed by head and neck injuries. 28% of trauma patient were hospitalized. 66% of hospitalized patients were managed conservatively while 34% of the were managed surgically. 92% of the trauma patients were survived while mortality was only 8%.

Conclusions: RTA is most common form of trauma affecting most commonly young male in their third decade of life. Health education and behaviour change among the youngster about trauma may reduce the trauma injuries.

Keyword: Trauma; Injury; Tertiary care hospital; Road traffic accident; Hospitalization

Introduction

Any physical injury caused by violence or any other force is known as trauma. Trauma shifts the patient into potential risk of death or disability.

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Trauma is foremost reason behind the mortality and morbidity worldwide among all age groups[1]. WHO reported that trauma is responsible for more than 5 million of annual death which is even more than the combined death caused by tuberculosis, malaria and HIV. Trauma remains the vital public health issues worldwide and is independent of socioeconomic blossoming[2]. On the basis of cultural, developmental and geographical characteristic of a country, there is difference in pattern of trauma that reached to the treating hospitals. Hence epidemiology of trauma patients in India will differ from south to north India and from urban to rural areas[3]. Despite of immense significance, trauma is still considering as one of the neglected diseases of modern society. Incidence of trauma is still increasing since the incidence of violence, road traffic accident, assault and violence are increasing. Trauma will still remain if all medical and surgical diseases are overcome[4].

Keeping all these in view, the aim and objective of our study was to evaluate the spectrum, pattern, mechanism and outcome of trauma patient presenting to the tertiary care hospital in Hind Institute of Medical Sciences, Barabanki.

Material and Methods

Present study was a 3 years retrospective study based on medical records of the trauma patients who came in the emergency department at tertiary care hospital of Hind Institute of Medical Sciences, Barabanki from August 2020 to May 2023. Various demographic data such as sex, age group, mechanism of trauma, distribution of injuries on body part, hospitalization of trauma patient and their management, average time of stay in hospital, time period between trauma and arrival at hospital and outcome of trauma patient. Medical records having insufficient data (such as patient absconded, referred or LAMA) were excluded from the study. Data entered in excel sheet and were quantified and analysed statistically using SPSS (Statistical Package for the Social Sciences).

Results

In the present study total number of trauma patient visited to tertiary care hospital with mentioned exclusion criteria were 1926 with 73% male (total number 14114) and 27% female (total number 512) (Figure no.1). Most common age group of trauma patient in this study was 21-30 years (44%) (Table no. 1, Figure no.2). Most common mechanism of trauma in the present study was RTA (Road Traffic Accident) which include 60% (total number of patients 1155 out of 1926) of trauma patient followed by fall (Table no. 2). Among various types of falls, fall from height was most common with 270 patients followed by fall on ground (Figure no. 3). In the present study most common site of injury in the body was lower limb followed by upper limb followed by head and neck injuries (Figure no. 4).Out of 1926 trauma patients who came to the hospital only 28% of trauma patient were hospitalized (Figure no.5). Among the hospitalized patients 66% of patients were managed conservatively while 34% of the trauma patients were managed surgically (Figure 6). Among the hospitalized patients 25% of trauma patients stay for more than 3 days in the hospital while 75% of trauma patients stay for less than 3 days in the hospital (Figure no. 7). 27.4% of patient hospitalized to the tertiary care hospital within 30 minutes of trauma incidence while 72.6% of patients hospitalized after 30 minutes of trauma incidence (Figure no. 8). In the present study 92% of the trauma patients were survived while mortality was 8% (Figure no. 9)

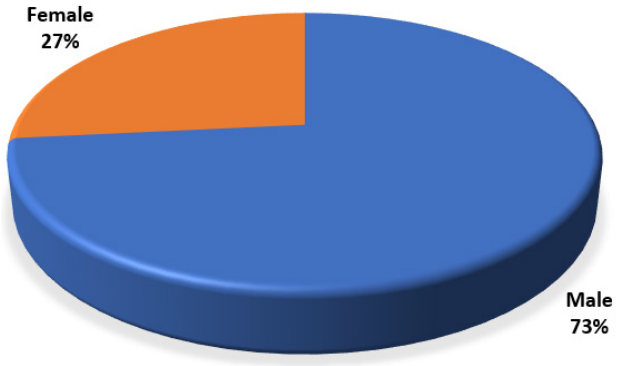

Figure 1. Distribution of sex of trauma patient

Table 1. Age group distribution of trauma patient

Age group (Years)	Number of trauma patient	Percentage
<10	83	4.3
11-20	462	24
21-30	848	44
31-40	250	13
41-50	158	8.2
51-60	73	3.8
>60	52	2.7

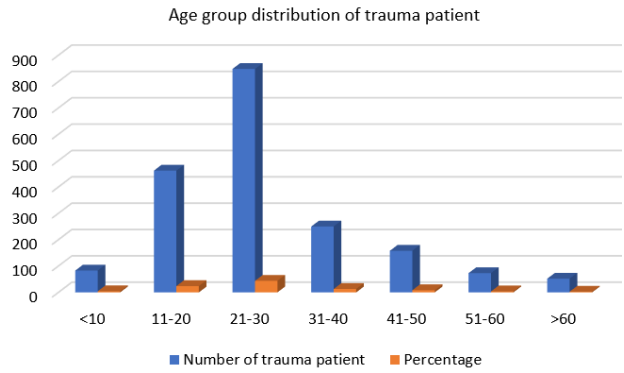

Figure 2. Age group distribution of trauma patient

Table 2. Various mechanism of Trauma

Mechanism of trauma	Number of patients	Percentage
Fall	525	27.2
Trauma due to animal	108	5.6
RTA	1155	60
Machine injuries	54	2.8
Violence/Assault	38	2
Other	46	2.4

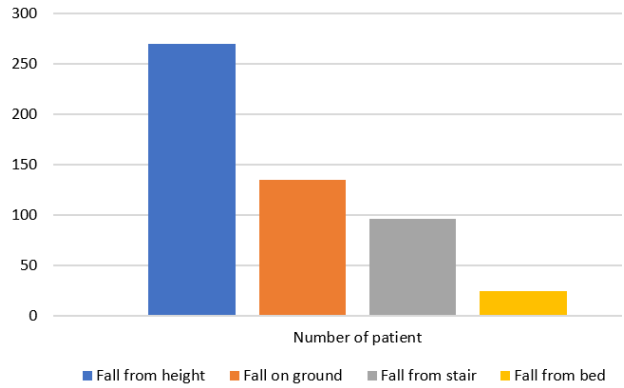

Figure 3. Various types of falls of trauma patient

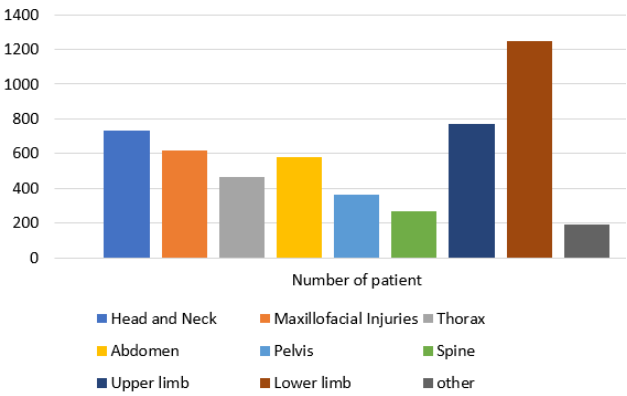

Figure 4. Distribution of injuries on various body parts

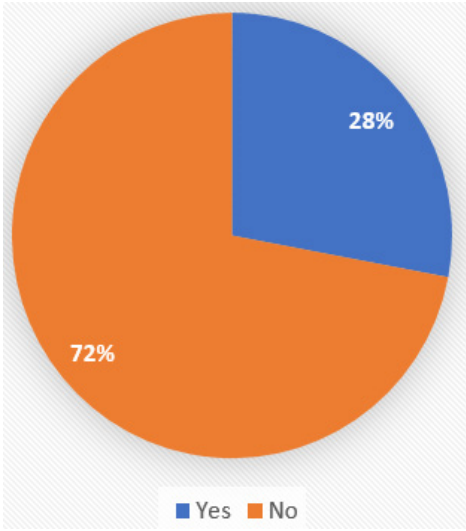

Figure 5. Hospitalization of trauma patient

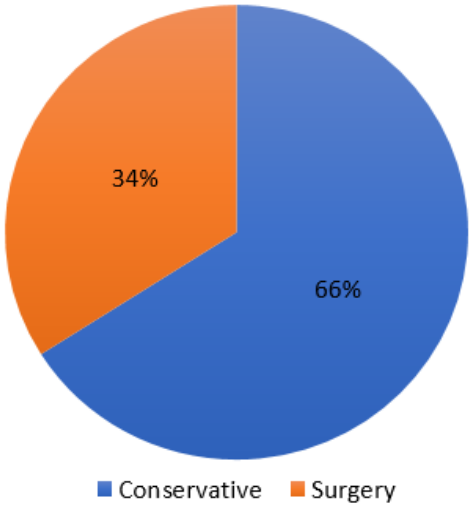

Figure 6. Trauma Management of hospitalized patient

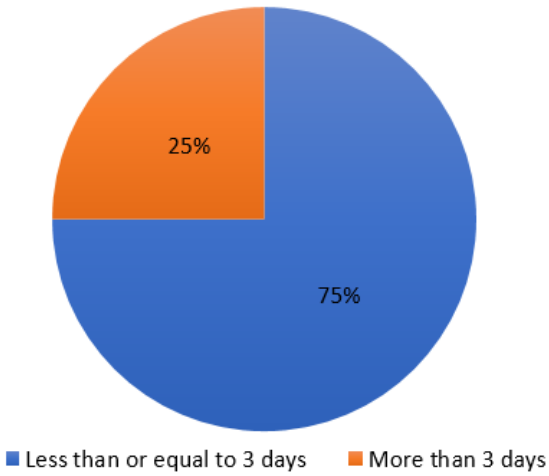

Figure 7. Average time of stay of trauma patient in the hospital

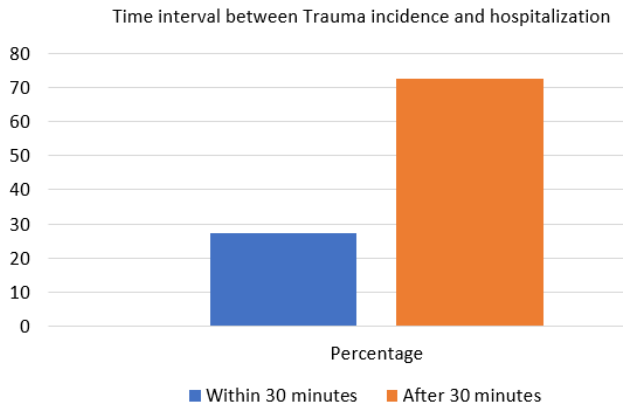

Figure 8. Time interval between Trauma incidence and hospitalization

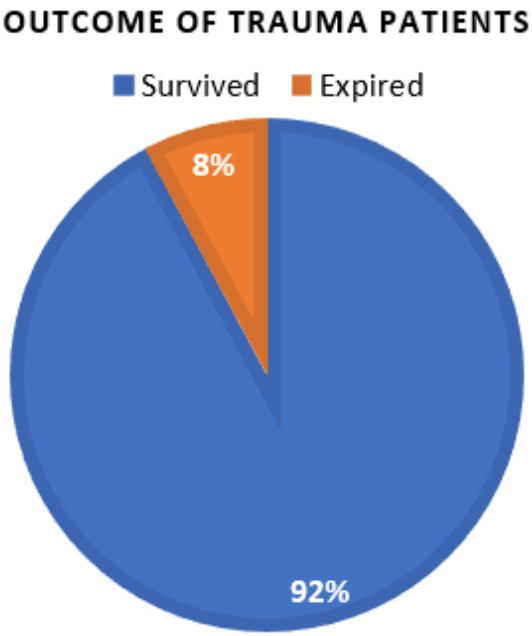

Figure 9. Outcome of trauma patients coming to tertiary care hospital

Discussion

Present study revealed that male (73%) were predominant victim of trauma which was similar with the study done by Singh et al in rural setting of central Uttar Pradesh[5], Jain et al in eastern Uttar Pradesh[3], Kanwar et al in Himanchal Pradesh[4] and many other studies[6,7,8,9].In the present study most common age group for trauma was 21-30 years which account for 44% of total trauma patients and was similar with the study of Bayissa et al[2], Jain et al[3], Kanwar et al[4] Singh et al[5] and study of Ndubuisi O onyemaechi in Nigeria[9]. Reasons for male dominance and more trauma for this age group is as a greater number of vehicles run by male and more outdoor work along with involvement of risky activities by male. Male are often exposed to agricultural and occupational hazards since they are earning members of their family.

Most common mechanism of trauma in the present study was RTA followed by fall which was similar with the study of Jain et al[3], Kanwar et al[4], Singh et al[5] and Roshanaei et al in their study at regional trauma centre in Midwest of Iran[10] whereas Dosuza et al[11], Sharma et al[12], Ghimire et al[13] and Klaiselvan et al[14]in their study reported most common mechanism of injury was fall followed by RTA. Reason behind such dissimilarities may be due to difference in geographical location. Most common mode of fall in our study was due to fall from height and it may be because of easy method of self-injuries. Most of the trauma patient in the present study sustained multiple injuries. In this study lower limb was most common site of injuries followed by upper limb followed by injuries to head and neck region.So, extremities is most common site of injury followed by head and neck region. Similar finding was reported by Bolandparvaz et al[15] in South Iran region and Silver et al[16]whereas Kanwar et al[4], Eftekhar et al[17] and Moini et al[18] in their study found most common site of trauma was Head and neck injury followed by extremities. In the present study only 28% of trauma patients were hospitalized. 66% of hospitalized patient were managed conservatively whereas 34% were managed surgically. 75 % of hospitalized patient stay in hospital for less than 3 days whereas 25% of trauma patients stay in hospital for more than 3 days. Similar finding of hospitalized patients was observed by Roshanai et al[10]. In the present study 27.4% of trauma patients brought to the tertiary care hospital within 30 minutes of the incidence of trauma whereas 72.6% of trauma patients brought to hospital after 30 minutes of the incidence of trauma which was similar with the finding of Hokkam et al[1]. Reasons for early arrival of trauma patients to our tertiary care centre was due to location of Hind Institute of Medical Sciences at adjacent to national Highway (NH 27). About outcome, 92% of patients survived while only 8% of trauma victim expired in the present study. Reason for high survival and low mortality for trauma patients in our study was due to early arrival of trauma patient since the tertiary care centre located

adjacent to national highway and hence management of trauma started early.

Conclusions

Trauma become global health hazard due to increase in the process of modernization and economic expansion. RTA is most common form of trauma and the dominant victims are young male in their third decade of life. Tertiary care centres must have well trained personnel. There should be a national injury surveillance unit which can help in injury prevention action such as to improve the existing strategies or to develop new strategies or policies. Health education and behaviour change among the youngster about trauma may reduce the trauma injuries.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearence: Has been taken from the Institutional Ethics Committee.

Abbreviations: WHO: World Health Organization, HIV: Human Immunodeficiency Virus, LAMA: Leave against medical advice, RTA: Road traffic accident.

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Original Research Article - Retrospective study

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A Study on Pattern of Medico-Legal Cases at ESIC Medical College, Kalaburagi

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Abstract

In casualty, Casualty Medical Officers come across a maximum number of Medico-legal cases. Any case where the doctor feels that it should be investigated by the Police or a Magistrate is considered as Medico legal case. As it is a Medico legal case, there will be an inquiry by the investigating officer and if needed an Investigating officer may require a report of that case to produce to the court. The doctor who has issued report can be called to the court to give the evidence regarding that case. Identifying the pattern of injuries, types of cases, age-wise distribution, and sex distribution of Medico-legal cases reported to the casualty department of the hospital will help administrators, social workers, NGO's, and policymakers to successfully manage and prevent such cases by devising necessary policies. A retrospective study was conducted at Employee State Insurance Corporation Medical College, Kalaburagi, Karnataka, India. All the reported cases to casualty between April 2022 and March 2023 at ESIC Medical College, Kalaburagi were analyzed. Total of 452 Medico-legal cases were analyzed which were attended in casualty in span of one year out of total 11288 Casualty cases. In that 344 were male and 108 female patients. In the present study, the maximum MLCs were Road Traffic Accidents, followed by assault, poisoning and others.

Keywords: Medico-legal cases, Road traffic accidents, Injury, Assault, Poisoning, and Casualty.

Introduction

In casualty, Casualty Medical Officers come across a maximum number of Medico-legal cases. Any case where the doctor feels that it should be investigated by the Police or a Magistrate is a Medico legal case. Which includes, injury as a result of assault, accident, suicide, self-inflicted, firearm, animal bite and bomb explosion, poisoning, and any unnatural case. It also includes a legal case when

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brought by the police for examination, requiring medical expertise since a doctor's knowledge may be necessary for the administration of law. It is an examination of the living person carried out under the law of the state for the protection of society and to help the administration of justice[1]. Medico-legal cases are an essential component of medical practice and comprise the most important constituent of emergencies[2]. In such cases, treatment of the patient along with proper documentation is very important. As it is a Medico legal case, there will be an inquiry by the investigating officer and if needed an Investigating officer may require a report of that case to produce to the court. The doctor who has issued report can be called to the court to give the evidence regarding that case.

Medico-legal cases cause extra burden to the hospital. Along with the treatment of the patient, detailed documentation, evidence collection, and intimation of police should be done. If necessary treated doctor may be asked to attend the court at his own expense. So it is both a human resource and financial burden on the hospital. In such cases, police intimation should be sent at the earliest. The idea is to initiate legal proceedings at the earliest so that maximum evidence can be collected to study the crime pattern in the area[3]. Among the medico-legal cases Road Traffic Accidents cases are more. Road traffic injuries are the leading cause of death globally and the principal cause of death in the age group of 15 to 49 years. Every year the lives of approximately 1.3 million people are cut short globally as a result of a road traffic crash. Unfortunately, more than 90 percent of road traffic deaths occur in low- and middle-income countries, even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in road traffic crashes. India, ranks at the top with highest number of fatalities with about 11% share in the world. As per the 'Road Accidents in India 2021', there were 4,12,432 unfortunate incidences of road accidents during 2021 which claimed 1,53,972 lives and caused injuries to 3,84,448 persons[4]. As per the National Crime Record Bureau latest report on Road Accidents in India-2021, in Karnataka state, a total 40754 injured and 10,038 people died in road mishaps[5].

Identifying the pattern of injuries, types of cases, age-wise distribution, and sex distribution of Medico legal cases reported to the casualty department of the hospital will help administrators, social workers, NGO's and policymakers to successfully manage and prevent such cases by devising necessary policies.

Total of 452 Medico-legal cases were analyzed which were attended to casualty in span of one year out of total 11288 Casualty cases. In that 344 were male and 108 female MLCs.

The present study is carried out with the objective of knowing different types of MLC, the pattern of injuries in Medico-legal cases and age – sex-wise distribution of cases, that were documented at the casualty of ESIC Medical College, Kalaburagi.

Materials and Methods

A retrospective study was conducted at Employee State Insurance Corporation Medical College, Kalaburagi, Karnataka, India. All the reported cases to casualty between April 2022 and March 2023 at ESIC Medical College, Kalaburagi were analyzed. Non Medico legal cases and cases with incomplete records were discarded. A total of 11288 cases were reported to casualty, in which 452 cases were Medico legal cases. Data related to the date of reporting the casualty, age, gender, and cause of being MLC were collected from the records. For sorting and analyzing data SPSS16 was used.

Results

Results are shown in the form of chart, graphs and tables. Total of 452 Medico-legal cases were analyzed which were attended to casualty in span of one year out of total 11288 Casualty cases. Of that, 344 were male and 108 female patients, which is shown in Figure - 1. Figure - 2 shows types of Medico-legal cases. Out of a total of 452MLC, 236 are male RTA cases and 34 are female RTA cases, 34 male assault cases and 12 female assault cases, 12 male poisoning cases and 24 female poisoning cases, 30 self-fall cases (26 Male and 4 female), Animal bite 18 cases (12 male and 6 female), burns total 12 cases(male 10 female 2), hit by bull 8 male and 2 female cases, workplace injuries 10 male cases and others 10 male cases. Figure - 3 shows the region-wise distribution

of injuries. Head and Neck injuries were seen in 192 cases (160 males and 32 females), thoracic injuries in 20 cases (male 16 and female 4), abdominal injuries in 10 cases (8 males and 2 females), upper-limb injuries in 150 cases(120 males and 30 females) and lower limb injuries seen in 126 cases(110 males and 16 females). Column chart 2 shows age and sex-wise distribution of Medico-legal cases. Table number 1 shows types of injuries in various Medico-legal cases. Figure - 4 shows types of RTA cases. Figure – 5 shows cases of animal/reptile bites.

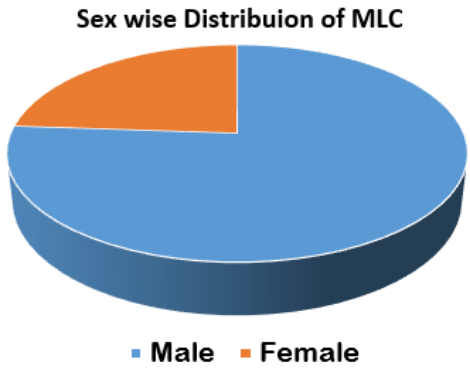

Figure - 1

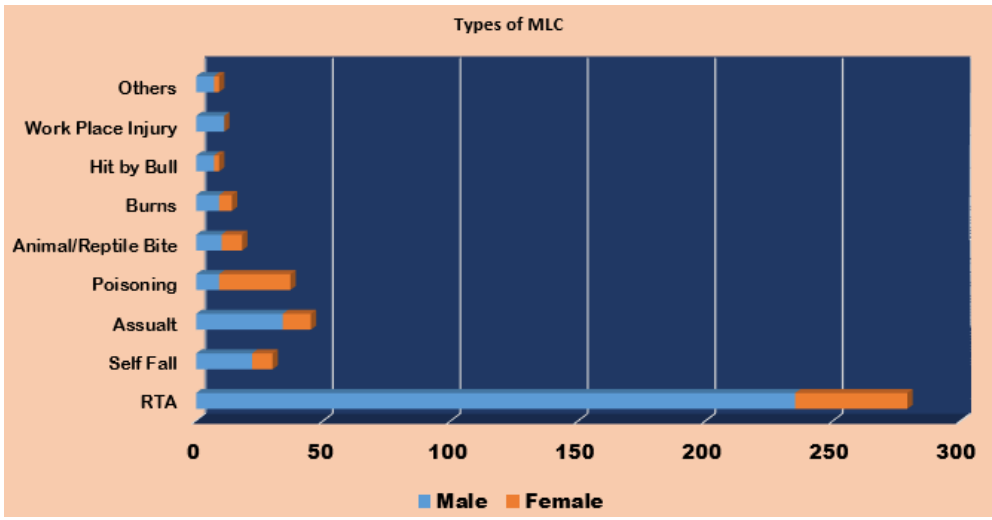

Figure - 2

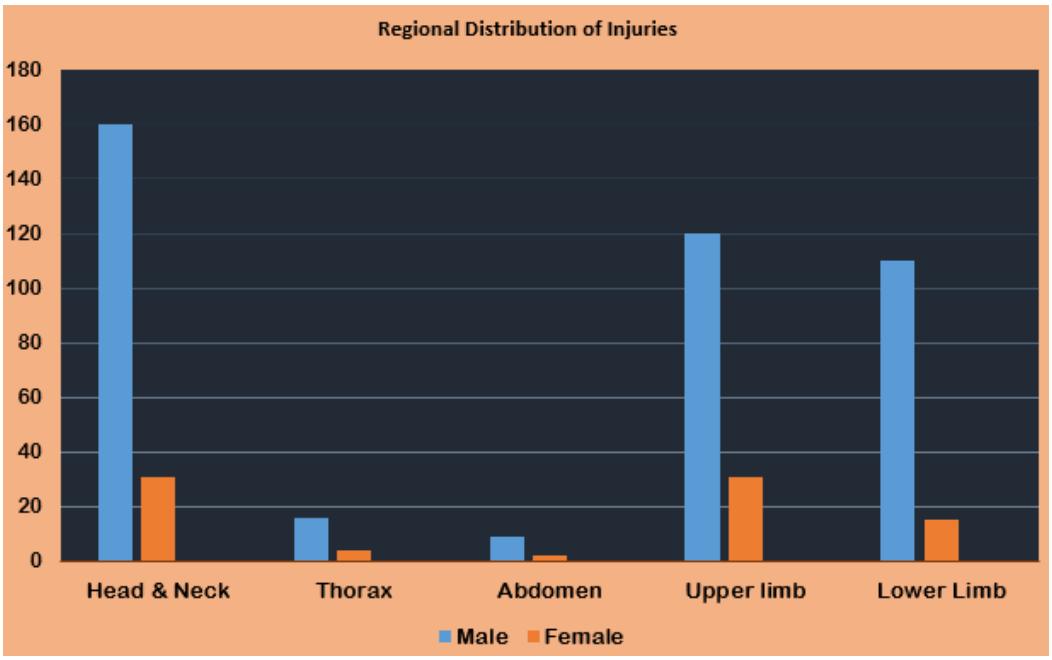

Figure -3

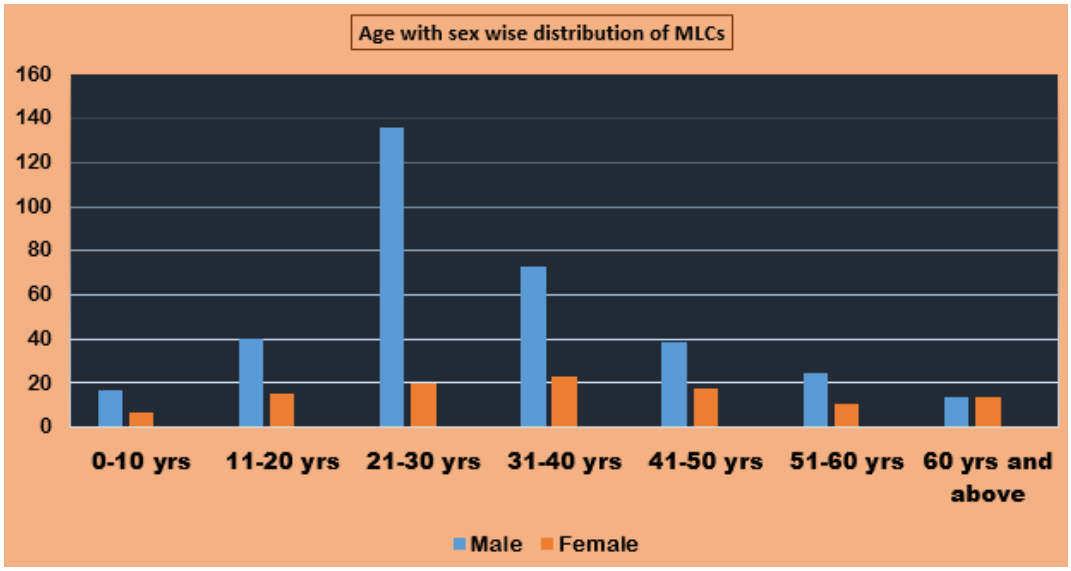

Figure - 4

Table No. 1: Shows types of injuries in various Medico-legal cases.

	Laceration	Abrasion	Contusion	Incision	Fractures
RTA (Under influence of Alcohol)	19	36	7	0	5
RTA (Not under influence of Alcohol	31	82	3	0	4
RTA (Self Fall)	83	148	5	3	10
RTA (Collision with other Vehicle)	24	38	4	0	1
Assault	16	16	7	0	3
Self-Fall	9	10	3	0	0
Total	182	330	29	3	23

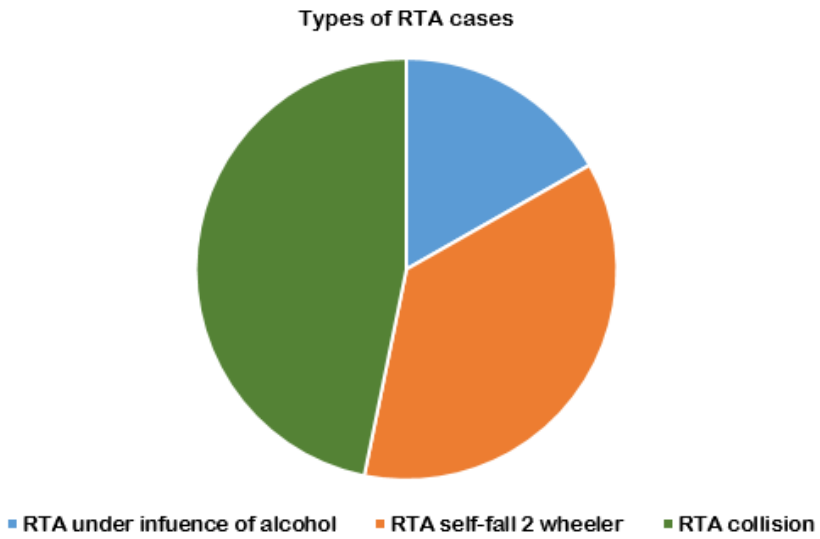

Figure - 5

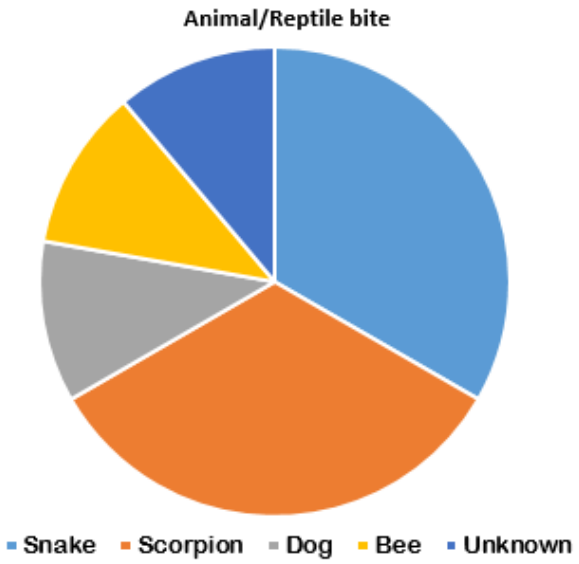

Figure - 6

Discussion

When it comes to casualty, Medico-legal cases are more common. Casualty Medical officers are more worried about handling Medico-legal cases. The social, demographic, and epidemiological transition due to rapidurbanization, mechanization, and industrialization has augmented the frequency of such cases[6]. The present study shows that male MLCs (76.1%) are more common when compared with female MLCs (23.9%). Females are less helpless against relational interpersonal violence-based injury because of vengeance-free behavior and a traditionalist way of life. As males are more exposed to the outside world and events can happen at workplaces, on the roads, and other places of exposure.[7,8] This is consistent with the study conducted by Dileep Kumar R, Siddaramanna TC, Shailesh V Parate, et. al.[9], Dr. Manju. L, Dr. Nazeema Beevi. P[10], Malik R, Atif I, Rashid F, et. al.[11], Timsinha S., Manjari S. K., Baral M. P.,[12] and Brahmankar, T. R., Sharma S. K.[13] The present study reveals that maximum cases are RTA 279(235 male and 44 female cases), followed by assault 45(34 males and 11 female cases), poisoning 38(M/F – 9/28), self-fall 30(M/F – 22/8), animal bite 18(M/F – 10/8), burns 14(M/F – 9/5), workplace injuries 11(all male) hit by bull 9 case and 9 others. The present study results that is RTA cases being the maximum cases among MLCs is consistent with studies of Trangadia MM et al[14], Yatoo GH et al[15]and Siddappa S. C., Datta A. The commonest injuries are abrasion followed by lacerations, contusions, fractures, and incise wounds. Most common age group is 21 to 30 years (156 cases/ 34.51%) followed by 31 to 40 years (95 cases/ 21.01%), which is consistent with a study conducted by Zaheen U.[16] Age group 21 – 30 years, has a great socio-economic impact as any kind of trauma leading to temporary and permanent disability and that will affect the individual as well as its family and as a whole society. According to the Karnataka Honorable High Court Order in Criminal Petition no: 370 of 2023 Dated 17-A2-2023, it has been noted that Wound Certificates are not being recorded correctly and written legibly and has hence directed Commissionerate Health & Family Welfare Services,5th Floor Arogya Soudha, Magadi Road, Bengaluru -560 023 to issue directions on the legible and correct recording of Wound Certificate by concerned. In case of grievous injury expert/specialist opinion is to be taken when required. Legally all MLC cases are to be intimated to the police in writing as per the Police Information Register and a written copy of it is to be maintained. Communication with the police, orally (or) through the phone is not acceptable. It is observed that in some of the medico-legal cases the patient was not given an OP slip and is referred to Taluk Hospital or Higher Centre with minimal documentation, then the Taluk Hospital or Higher Centre shall issue the wound certificate and provide treatment.

Conclusion

In the present study, the maximum MLCs are Road Traffic Accidents, seen more in males in the young age group (21-30 years), which has a great socio-economic impact. In this 17% of the cases were under the influence of alcohol, 47% collision, and the remaining self-fall from bike (36%). Not following traffic rules, drink and drive increases the incidence of Road Traffic accidents. Strict implementation of traffic rules, avoiding drink and drive, use of helmets/seat belts, avoiding use of mobiles while driving, and avoiding overspeeding, can reduce road traffic accidents. Next common is assualt, followed by poisoning and others. To handle such cases emergency department should be well-equipped with antidotes and other drugs necessary for treating such cases. Doctors in casualty are not only involved

in treating patients but also in handling MLC. So they should be aware of the proper handling of Medico-legal cases. It will be good if MLCs are handled by specialists or by doctors trained by the specialist. This can definitely reduce cases of medical negligence and help in delivering the proper justice.

Conflict of Interest: There is no conflict of interest in our study as we have not gained any financial benefits from any organization.

Funding source: None.

Ethical clearance: NA

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Case Report

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Aortic Rupture Due to Blunt Force Trauma: A Case Report

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Abstract

Background: Aortic rupture is one of the most important life-threatening conditions. Aortic rupture can occur by several causes, including trauma and spontaneous rupture.

Case Details: A 62-year-old man was brought for an autopsy examination in a mortuary with a history of road traffic accidents. As per history revealed by the police and relatives, the deceased was a retired army officer and was driving a car.

Autopsy Finding: The deceased was an elderly male. On external examination, the deceased sustained multiple reddish abraded contusions over the chest and both sides of the chest. On opening the thorax, the following injuries were present. Fracture of sternum was present at junction of body and manubrium associated with extravasations of blood in surrounding area. Multiple fracture of bilateral ribs associated with extravasations of blood in surrounding area.

Discussion: All aortic segments are prone to rupture following sudden blunt trauma. In various studies it is found that 92% of aortic rupture occur at isthmus followed by arch of aorta (4%) followed by ascending aorta (3%).

Keyword: Road traffic accidents, thoracic aorta, traumatic aorta rupture, rib fracture.

Introduction

Aortic rupture is one of the most important life-threatening conditions. Aortic rupture can occur by several causes, including trauma and spontaneous rupture. Trauma can result from blunt force impact, which cause by sudden and rapid deceleration, and/or penetrating injuries. Aortic rupture usually has a fatal outcome, since the aorta is a large vessel that contains blood with very high pressure, any trauma resulting in fast evacuation of blood from the vessels, resulting in rapid haemorrhagic shock. Complete transaction of aorta leading to exsanguination and immediate death. Traumatic aortic rupture is the second leading cause of death amongst victims of blunt chest trauma in motor vehicle accidents. 15% of fatalities involving motor vehicles are caused by traumatic aortic damage, and 85% of these deaths happen on the spot.All three aortic layers are typically affected by aortic disruptions, which typically occur transversely at the isthmus.[1, 2]

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Case Details

A 62-year-old man was brought for an autopsy examination in a mortuary with a history of road traffic accident. As per history revealed by the police and relatives, the deceased was a retired army officer and was driving a car. While driving, his car collided with a lorry coming from the opposite direction, and he was seriously injured and was brought to the Emergency Department of H.N.B base hospital Srikot, Srinagar U.K, a Tertiary care Centre where he was declared brought dead.

Autopsy Finding

- The deceased was elderly male. On external examination, the deceased sustained multiple reddish abraded contusions over the chest and both sides of the chest. On opening the thorax, following injuries were present:
    1. Sternum fracture was present at the junction of body & manubrium associated with extravasations of blood in surrounding area.
    2. Multiple fracture of bilateral ribs associated with extravasation of blood in surrounding area.
    3. Multiple contusions and lacerations of varying sizes were present over the both lungs.
    4. Complete transection of aorta at isthmus region was present.
    5. Pericardium was ruptured.
    6. Approximately 500ml of frank blood was present in thoracic cavity.
- In abdominal cavity multiple lacerations were present over the liver and peritoneal cavity was filled with approximately 1000 ml of liquid and clotted blood. Organs were pale in appearance.
- The cause of death in this case was opined as haemorrhage and shock, secondary to blunt force trauma to the chest and abdomen.

Discussion

All aortic segments are prone to rupture following sudden blunt trauma. In various studies it is found that 92% of aortic rupture occur at isthmus followed by arch of aorta (4%) followed by ascending aorta (3%). Descending aorta rupture was seen in 1% cases. Usually, all layers of aorta are involved in aortic transections, which happen transversely with the edges found several centimetres apart.[1, 2,3,4,5]

The ligamentum arteriosum, the left main stem bronchus and the paired intercostal arteries limit movement of the proximal descending aorta. However, experiments have shown that displacement of the aorta in either the cranial or caudal direction can result in traction tears at the isthmus. [1, 2,3,4,5]

According to a different idea, the aorta bursts, and tears at its weakest spot when hydrostatic pressure suddenly increases at impact due to deceleration force.[1, 2,3,4,5]

One of the recently done a study in USA and Canada was shows that 7000-8000 victims die every year in automobile related trauma and leading cause was blunt traumatic aortic rupture[6].

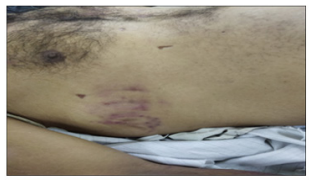

Figure 1

Figure 2

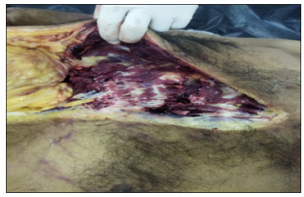

Figure 3

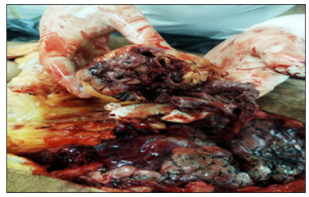

Figure 4

Conclusion

One of the most serious and life-threatening conditions is aortic injury. It is the second largest cause of death worldwide, after head injuries. The most common cause is blunt trauma, but penetrating injuries may also be responsible. Significant mechanisms for aortic trauma damage included rapid acceleration and deceleration. Significant deceleration occurs in head-on collisions or lateral impact. The greatest risk involves frontal or side impacts.

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Conflicts of interest: There are no conflicts of interest

Informed consent: Not applicable as it is medicolegal autopsy based case where subject confidentiality was maintained.

Ethical clearance: taken from institutional ethical committee

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Original Research Article

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A Cross-Sectional Study on Pattern of Thoraco-abdominal Injuries in Victims of Fatal Road Traffic Accidents

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Abstract

Background: Road traffic accidents are preventable public health issues and are becoming more common. These accidents can be linked to a number of factors, including an increase in the number of vehicles on the roads, changes in daily life, a nasty habit of breaking traffic laws, anarchic traffic systems, and risky driving practices. Thoraco-abdominal injury in different forms is one of the major causes of mortality in the victims of fatal road traffic accidents. The aim of this study was to know the pattern of thoraco-abdominal injuries in victims of fatal road traffic accident cases.

Material & Method: The present study was conducted at the tertiary healthcare centre in southern Haryana. Total of 75 cases of fatal road traffic accident cases were enrolled during one year of study period. The basic information about the deceased like age, gender, mode of travel of the victim was obtained from investigating officer narration and inquest papers. During autopsy, detailed examination of injuries was carried out and the autopsy findings were recorded and analyzed.

Results: It was observed that out of 75 cases male outnumbered females in ratio 5.25:1. Majority of the victims belonged to the age group 21-30 years. The commonest injury of the thoracic region was rib fracture (41.3%). It was also observed that 17.3% of victims had pelvic fracture.

Conclusion: Human error is a major contributing factor to fatal RTAs, which can be avoided in many cases. A more stringent licensing policy, particularly for four-wheelers, increased knowledge of traffic laws, the reduction of drug abuse and an appropriate road network that is in line with traffic volume can help to reduce the number of fatal road traffic accidents.

Keywords: Road traffic accidents; thoraco-abdominal injuries; rib fracture

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Introduction

Accident is an episode, occurring out of the blue, unexpectedly and unintentionally under unforeseen situations. Amongst all transportation accidents, road traffic accidents tend to be the most severe problem worldwide; a counter product of modernization and fast life.[1] Accidents occur not only due to ignorance but also due to carelessness, thoughtlessness and over confidence. Human, vehicular and environmental factors play a role before, during and after road traffic accidents.[2]

Injuries and fatalities occur in all forms of transportation but numerically road traffic accidents account for the great majority worldwide, causing more than a million deaths annually and injuring about 20–50 million. If the current trends continue, road traffic injuries are likely to rise to the fifth leading cause of death by 2030. The pattern of injury, fatal and otherwise, varies significantly depending upon whether the victim is a vehicle occupant, a motorcyclist, a pedal cyclist or a pedestrian.[3]

Road traffic injuries are the eighth leading cause of death for all age groups. More people now die as a result of road traffic injuries than from HIV/AIDS, tuberculosis or diarrhoeal diseases. Road traffic injuries are currently the leading cause of death for children and young adults aged 5–29 years, signalling a need for a shift in the current child and adolescent health agenda.[4]

Since the thoraco-abdominal cavity contains the vital organs such as heart, lungs, liver, spleen, stomach, kidney, major blood vessels, and ribs, trauma to this region challenges the integrity and even the viability of the individual. It is a leading cause of death in approximately 25% of trauma patients and, when associated with other injuries, it causes death in additional 50% of multiple trauma patients.[5] The present study is an attempt to analyze the pattern of thoraco-abdominal injuries in autopsy cases with an alleged history of fatal road traffic accidents with regards to age, gender, mode of travel of victim, external and internal injuries sustained.

Material & Methods

The present study was a prospective, cross-sectional study. The study was conducted in the Department of Forensic Medicine of a tertiary care center of southern Haryana. Total of 75 cases of fatal road traffic accident cases were included during one year of study period. Bodies that were decomposed, unidentified and those with no specific history were excluded from the study. A Proforma was designed specifically for the study purpose. Basic information of the deceased such as age, gender, address, travel mode of the victim was obtained from the reporting of investigating officer and inquest papers. Each injury was recorded as per the involvement of body region viz. thorax, abdomen and pelvis. During autopsy, detailed examination of injuries was carried out and the autopsy findings were recorded on standard autopsy proforma and the information thus collected, was statistically analyzed.

Observations & Results

In our study, it was observed that out of 75 cases, 63 were male (84%) and 12 were female (16%), the males outnumbered females in ratio 5.25:1.

It was observed that individuals belonging to the age group 21-30 years were most affected in road traffic accidents (26.7%), followed by 31-40 years (20.0%). The age wise distribution of victims is depicted in Figure 1.

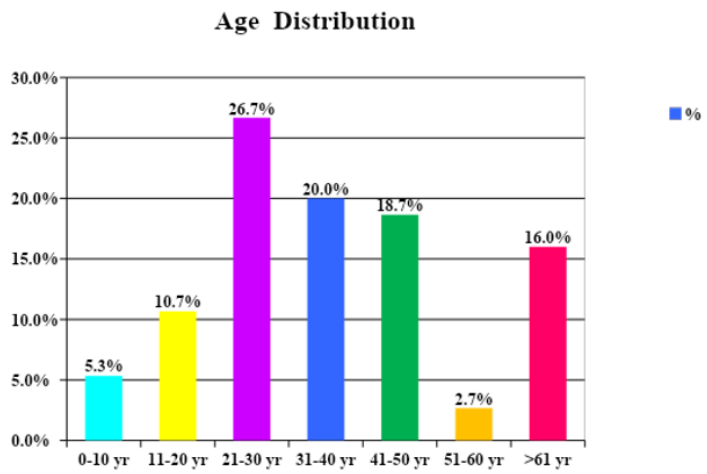

Figure 1: Bar diagram demonstrating the age distribution (%) of individuals involved in fatal road traffic accidents (n=75).

It was observed that motorcyclist / scooter occupants were most affected by RTAs comprising 65.3% cases followed by pedestrians (20%), light motor vehicle occupants (13.3.%) and least affected were heavy motor vehicle occupants (1.3%). (Figure 2)

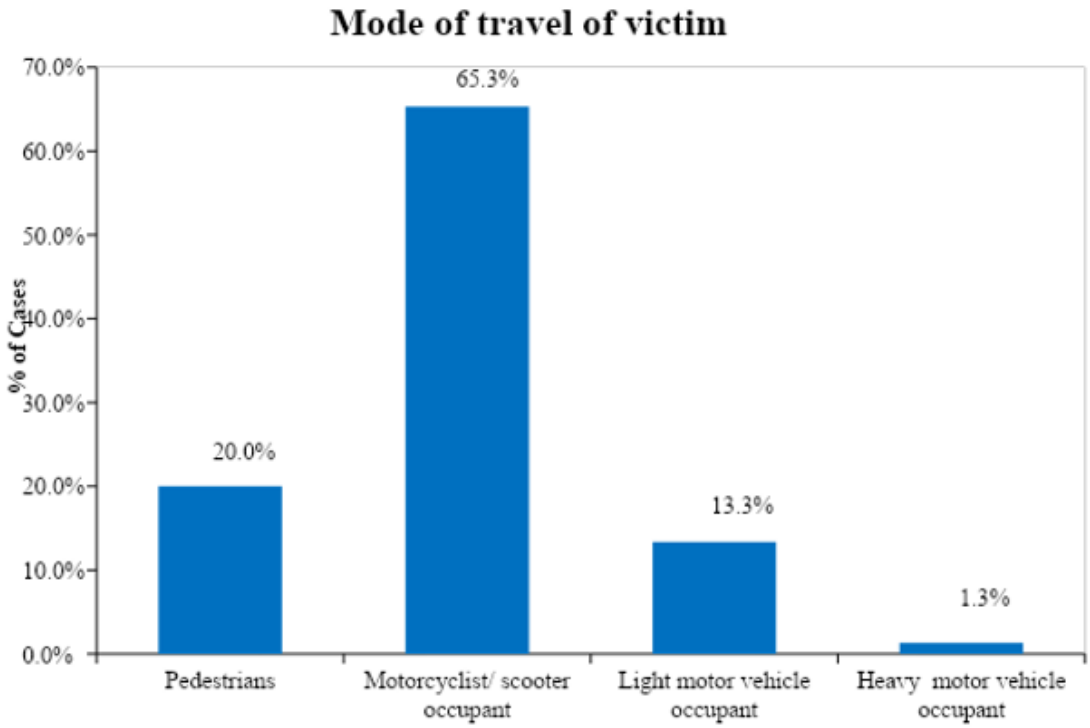

Figure 2: Bar diagram demonstrating the mode of travel (%) of the victims involved in fatal road traffic accidents (n=75).

It was observed that the maximum number of road traffic accidents occurred in the morning between 06:00-11:59 hours followed by accidents occurring between 12:00-17:59 hours and the least number of RTAs occurred at night between 00:00-05:59 Hrs. (Figure 3)

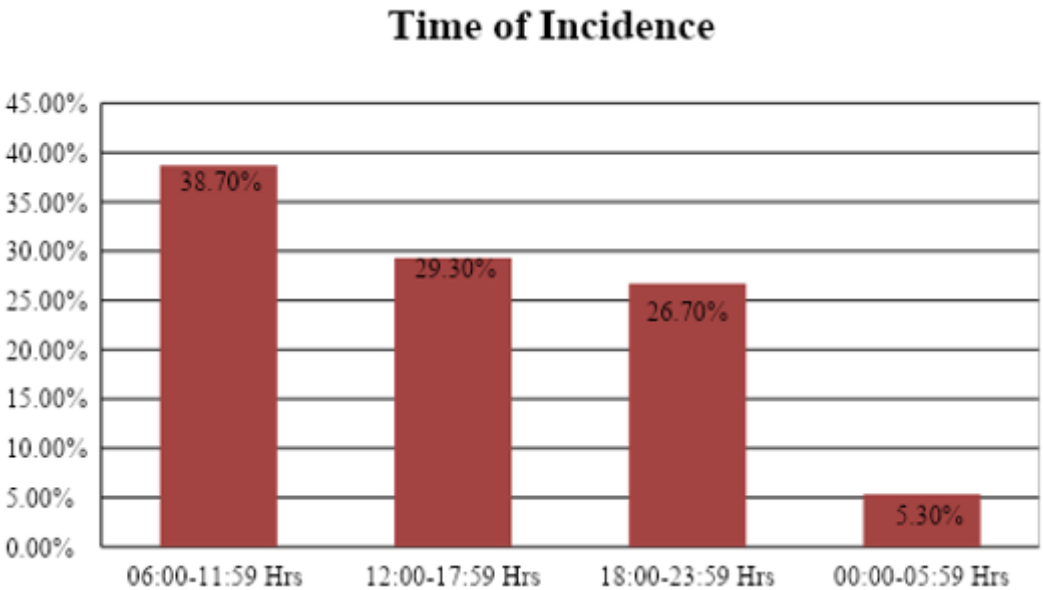

Figure 3: Bar diagram demonstrating the time of incidence (%) of fatal road traffic accidents (n=75).

It was observed that 70.7% of victims succumbed within 1-6 hours after a fatal road traffic accident, followed by 17.3% within $^{1}/_{2}$-1 hour and only 2.7% of the victims survived for more than 3 days. (Figure 4)

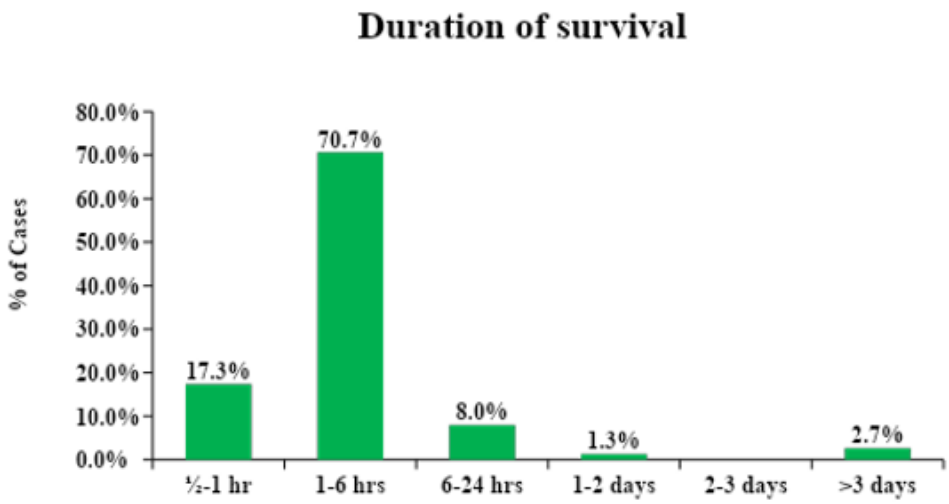

Figure 4: Bar diagram demonstrating the duration of survival (%) in the victims involved in fatal road traffic accidents (n=75).

Injuries over thorax were mainly abrasions (32.0%) and contusions (30.7%). However, the majority of abdominal injuries were abrasions (17.3%). Those who had injuries over pelvic region majority had contusions (9.3%), followed by abrasions (4.0%).

It was also observed that the commonest injury of the thoracic region was fracture of ribs (41.3%) followed by lung injuries (4.0%). Among the abdominal injuries commonest injury was injury to mesentery followed by liver injury (4.0%), injury to intestine (2.7%) and least injured was spleen. It was observed that 17.3% of victims of fatal road traffic accidents had pelvis fractures. (Figure 5)

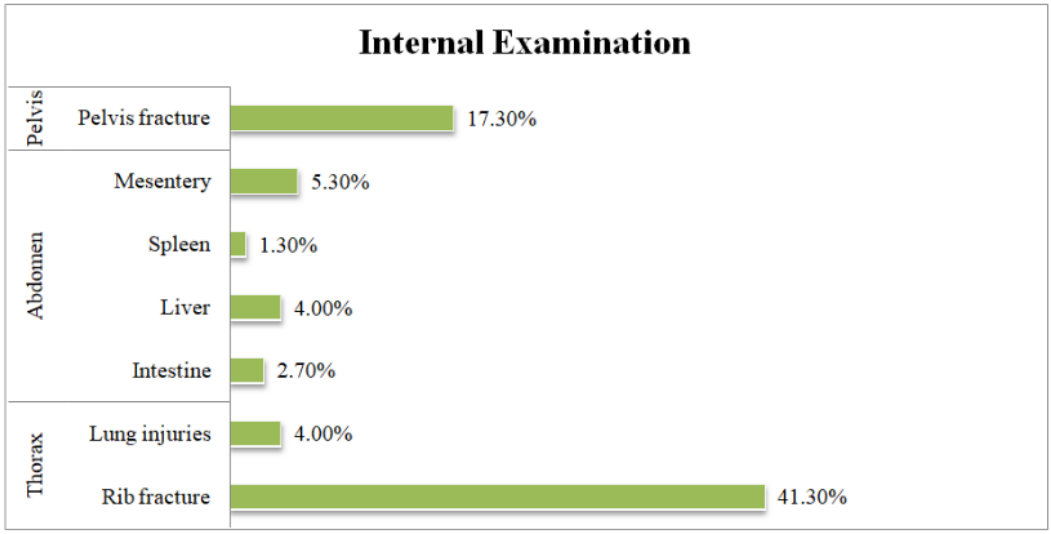

Figure 5: Bar diagram demonstrating the region of body involved and type of internal injury sustained (%) for the victims involved in fatal road traffic accidents (n=75).

Discussion

The number of deaths on the world's roads remains unacceptably high, with an estimated 1.35 million people dying each year. Road traffic injuries are now the leading cause of death for children and young adults aged 5–29 years. More than half of all road traffic deaths are among vulnerable road users; pedestrians, cyclists and motorcyclists.[4]

In our study a total of 75 cases that satisfied the inclusion and exclusion criteria were included and it was observed that out of 75 cases 63 were males (84%) and 12 were females (16%) and males outnumbered females in ratio 5.25:1. These findings are in general agreement with the studies conducted by Singh & Dhattarwal,[6] Rao & Mukerjee,[7] Verma et al.[1]

In road traffic accidents, people between the age group of 21-30 years were most affected (26.7%), followed by those between the age group of 31-40 years (20.0%) and 41-50 years (18.7%). People between the age group of 51-60 years (2.7%) were least affected. Additionally, it was observed that victims of RTAs in this area were often older people over 61 years. Their ignorance of traffic safety precautions may be the cause of the rise in fatalities. Since the age group of 21–30 years is the most socially and physically active, it outnumbers other age groups on the road. It was also observed that the majority of the cases (65.4%) lie within the economically productive age group of 21-50 years. These findings are in general agreement with the studies conducted by Singh & Dhattarwal,[6] Kiran et al.,[8] Dhillon et al.[9]

It was observed that, in 65.3% of cases, riders of motorcycles and scooters were the most affected by road traffic accidents, followed by pedestrians (20%), drivers of light motor vehicles (13.3%), and drivers of heavy motor vehicles (1.3%). The majority of victims in this study were riders of motorcycles or scooters, which makes sense given that most Indian family, prefer to travel by motorcycle or scooter. Since this is a rural area, most people who use the roads are either pedestrians or two wheeler riders. The findings of the present study are in general agreement with the study conducted by Dagar et al.,[10] Chourasia et al.[11] However, the findings are contrary to the study done by Khan et al.[12] as they observed that pedestrians were most commonly affected by fatal road traffic accidents.

It was observed that the maximum number of road traffic accidents occurred in the morning between 06:00-11:59 hours followed by accidents occurring between 12:00-17:59 hours and the least number of RTAs occurred at night between 00:00-05:59 hours. The reason for higher incidence in morning hours may be due to traffic rush as majority of the people travel for work, offices, school, etc These findings are in general agreement with the studies conducted by Murkey et al.,[13] Shruthi et al.[14] However, the findings of this study are contrary to the study done by Madhuvardhana et al.[15] as they found maximum number of road traffic accidents in evening hours.

In the present study, it was observed that 70.7% of victim succumbed within 1-6 hours after fatal road traffic accident, followed by 17.3% within $^{1}/_{2}$-1 hours, 8% within 6-24 hours, 1.3% within 24-48 hours and only 2.7% of the victim survived for more than 3 days. The higher incidence of early deaths may be due to inadequacy of early transport and management of trauma patients. These findings also reflect the severity of the injury where the majority of the victims succumbed in early hours. The findings of this study are in general agreement with the study conducted by Verma et al.[1] However, the findings of this study are contrary to the study done by Shruthi et al.[14] as they observed that the majority of victims survived for > 24 hours.

It was observed that the majority of the victims had multiple external injuries in the form of abrasions, lacerations, contusions and incised wounds over thoraco-abdominal region. Among the external injuries, abrasion was the most common injury, followed by contusions, lacerations and the least observed was an incised wound. The findings of this study are in general agreement with the study conducted by Abymon et al.[16] It was observed that the commonest injury of the thoracic region was fracture of ribs (41.3%) followed by lung injuries (4.0%). Among the abdominal injuries commonest injury was injury to mesentery followed by liver injury (4.0%), injury to intestine (2.7%) and least injured was spleen. It was also observed that 17.3% of victims had pelvis fracture. The findings of this study are in general agreement with the study conducted by Numan et al[17], However, the findings of this

study are contrary to the study done by Gushinge et al.[5] as they observed that among abdominal injuries the majority of victims had liver injuries followed by splenic injuries.

Conclusion

From the present study it was concluded that road traffic accidents were predominantly more common in males of age group 21-30 years; two wheelers' occupants followed by pedestrians were most vulnerable to road traffic accidents. In this study, thoracic injuries outnumbered the abdominal injuries in fatality. The study also showed that most road traffic accidents deaths, brought to a tertiary care rural hospital, took place within 6 hrs of injury which is indeed very alarming. Human error is a major contributing factor to fatal RTAs, which can be avoided in many cases. A more stringent licensing policy, particularly for four-wheelers, increased knowledge of traffic laws, the reduction of drug abuse and an appropriate road network that is in line with traffic volume can all help to reduce the number of fatal road traffic accidents.

Conflict of interest: None

Ethical approval: The study was approved by the Institutional Ethics Committee

Source of Funding: None

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Case Report

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A Rare Case of Left Ventricle Free Wall Rupture at two sites Secondary to Myocardial Infarction: An Autopsy Case

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Abstract

Background: About 40–50% of occurrences of sudden death are due to cardiovascular reasons, with acute myocardial infarction (AMI) being the most common cause.

Case Details: The subject was 57 years male having alleged history of sudden fell down at his house and was unresponsive since then. He was brought to the Emergency Department of H.N.B Base hospital Srinagar, Garhwal, Uttarakhand.

Autopsy Findings: On opening pericardium, 190 grams of clotted blood was present in the pericardial cavity. Grossly enlarged heart. Weight of heart: 560 grams. Epicardial fat covers approx. 2/3rd of the heart's surface. It is present over the right ventricle especially along the right border, anterior surface and at the apex and along the distribution of coronary arteries.

Discussion: A myocardial rupture is the rupturing of one or more heart valves, the papillary muscles or chordae tendineae, the interatrial or interventricular septum, or the ventricles or atria of the heart.

Keywords: Sudden natural death, Left ventricular wall rupture, Cardiac tamponade.

Introduction

About 40–50% of occurrences of sudden death are due to cardiovascular reasons, with acute myocardial infarction (AMI) being the most common cause[1]. Harvey originally documented free wall rupture of the heart following an acute myocardial infarct in 1647.[2] Duaine also concluded that a cardiac rupture never happened spontaneously after publishing the first significant series of individuals with the condition in 1871[3,5]. It has been reported that following an acute myocardial infarction, the incidence of cardiac rupture varies between 1% and 3%. In patients with acute myocardial infarction, myocardial rupture is the second most frequent cause of hospital death. Ventricular rupture, a rare but deadly consequence of acute myocardial infarction (AMI), accounts for up to 15% of all AMI-related early fatalities in patients[4]. With the development of pharmacological therapy and immediate primary coronary intervention,

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the frequency of cardiac rupture following acute myocardial infarction has declined throughout the previous 20 years. A myocardial infarct or blunt chest trauma are linked to the majority of cardiac rupture cases in which the pericardium is unharmed. An uncommon discovery like the reason of death can only be found by meticulous dissection and observation during the autopsy.

Case Details

The subject was 57 years male having alleged history of sudden fell down at his house and was unresponsive since then. He was brought to the Emergency Department of H.N.B Base hospital Srinagar, Garhwal, Uttarakhand, where he was declared brought dead. Police made an inquest as it was a case of sudden death and referred for medico-legal autopsy to the mortuary wing of Department of Forensic Medicine and Toxicology, VCSG Govt. Medical Science & Research Institute Srikot, Srinagar (PauriGarhwal) Uttarakhand.

Autopsy Findings

i. **External Examination:** The dead body of the subject was moderately built and well nourished, measured 179 cm and weighed 91.4 kg. On examination rigor mortis was present all over the body, hypostasis was present over the back except over pressure areas and fixed, pupils were bilaterally dilated and fixed. No external ante-mortem injury was present over the body after careful examination.

ii. **Internal Examination**

- On opening pericardium, 190 grams of clotted blood was present in the pericardial cavity.
- Grossly enlarged heart. Weight of heart: 560 grams. Epicardial fat covers approx. 2/3rd of the heart's surface. It is present over the right ventricle especially along the right border, anterior surface and at the apex and along the distribution of coronary arteries.
- Left ventricle was hypertrophied. Thickness of the left ventricle wall was 2.9 cm and right ventricle was 1.1 cm.
- Two lesions were present on gross examination. (a) Rupture of anterio-lateral free wall of left ventricle, measuring 03cm x 0.5cm x cavity deep, associated with extravasation of blood in surrounding area was present, over the middle 1/3rd portion of left surface of the heart, situated 04cm above the apex. (b) Rupture of anterio-lateral free wall of left ventricle, measuring 1.2cm x 0.5cm x cavity deep, associated with surrounding dark mottled area was present over the middle 1/3rd portion of left surface of heart, situated 1.2cm lateral from previous rupture.
- Coronaries were gritty on cut section. Left anterior descending coronary artery was almost completely occluded, in its proximal epicardial course & 50-60% occlusion of Left circumflex artery and right coronary artery was patent.

iii. The cause of death in this case was opined as complications of myocardial infarction.

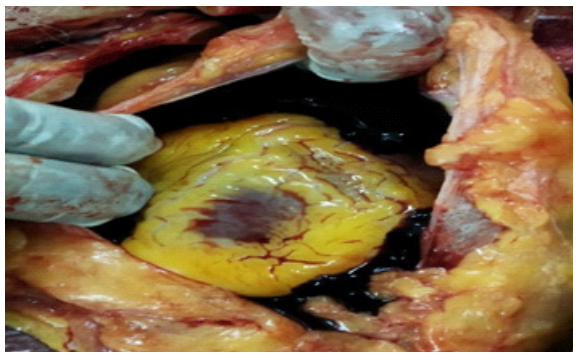

Figure 1: Clotted blood in the pericardial sac

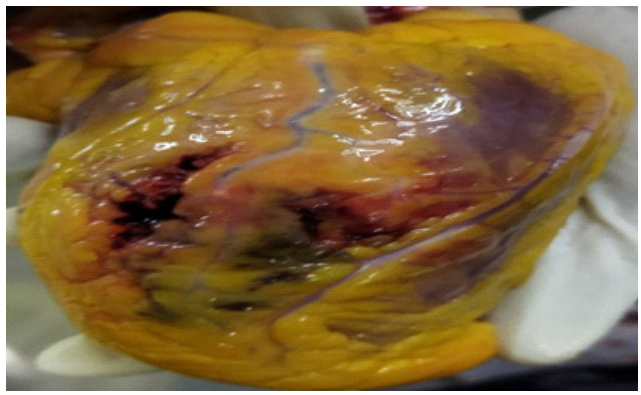

Figure 2: Ruptured left ventricle wall

Figure 3: occluded LAD

Discussion

A myocardial rupture is the rupturing of one or more heart valves, the papillary muscles or chordae tendineae, the interatrial or interventricular septum, or the ventricles or atria of the heart. The myocardium becomes necrotic and subsequently inflamed, which leads to the cardiac rupture syndromes. Myocardial ruptures are categorized as follows: Type I: a slit-like tear that happens 24 hours after an acute myocardial infarction. b) Type II: This kind of myocardial erosion usually happens 24 hours after the myocardial infarction and is indicative of a slow tear of the dead myocardium. c) Type III ruptures are distinguished by the early development of an aneurysm and the aneurysm's subsequent rupture.The area of the heart that has ruptured determines the anatomic classification of myocardial rupture.

Depending on which part of the heart has ruptured, myocardial rupture is classified anatomically. The most frequent type is rupture of the ventricular free wall, which can result in hemopericardium and cardiac tamponade. 2) Ventricular septal rupture (less common), which results in acute ventricle-to-right shunting and an acute VSD. 3) Rupture of the parietal muscle (less frequent), which causes an abrupt onset of severe mitral regurgitation. When coagulative necrosis, neutrophil infiltration, and myocardial connective tissue lysis have weakened the infarcted myocardium, free-wall rupture is most common 3 to 7 days after myocardial infarction (mean, 4 to 5 days; range, 1 to 10 days). The most typical location for post-infarction free-wall rupture, as in our case, is the anterolateral wall at the mid-ventricular level[4].

Conclusion

In cases of unexpected, suspicious, or unnatural deaths, a medico-legal autopsy is performed. Ventricular free wall rupture at two sites as a complication of AMI is a rare cause of sudden death, even though AMI is the most common cause. Finding such a rare finding could direct and assist in the implementation of preventative measures to preserve the lives of those with any history of AMI, even if the condition is clinically ignored. To determine the cause of death, a thorough autopsy examination and careful dissection are therefore necessary.

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Conflicts of interest: There are no conflicts of interest

Informed consent: Not applicable as it is medicolegal autopsy based case where subject confidentiality was maintained.

Ethical clearance: taken from institutional ethical committee

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Review Paper

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Morphological and Chemical Analysis of Farzi (Fake) Indian Currency

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Abstract

In Forensic Science, Morphological and chemical analysis of farzi currencies plays a very important role in identifying the counterfeit currency. The term "counterfeit" refers to fake or forgery which is an exact replica of the original. As there is a rapid advancement in technology there is a drastic increase in crime rate with respect to technology as well where culprits are using advanced and modern technologies for committing crime, here counterfeit currency falls one among them, where culprits are using wellversed technologies in manufacturing fake notes and coins which cannot be easily recognized by the public. In India though RBI is taking a lot of precautions to overcome counterfeiting by implementing high security features in Indian currency such that it cannot be duplicated easily, some or the other way these fake currencies are circulating in the society and people are lacking knowledge in identifying these fake notes and coins.

Some of the security features for identifying these fake currencies is revealed to public by the RBI in its guidelines. Though criminals disguise the original by circulating fake currencies, it is impossible to implement the authenticated security features in it. The composition and its ratio of the original varies from the duplicate which is a loophole, and this can be easily analysed by forensic scientists by keen observations and conducting certain physical and chemical tests. We tried to differentiate between fake and original currencies of India by using RBI guidelines and by performing certain chemical tests through which counterfeit currencies can be analysed.

Key words: Counterfeit currency, Farzi (fake), RBI and its guidelines, Morphological and chemical Analysis, Advanced technologies, Security features.

Introduction

In forensic science, Identification of fake and original currency plays a very crucial rolin preventing certain crimes related to smuggling, crime against nation, white collar crimes and helps in finding the new technologies through which criminals are disguising the original currencies.

Though the criminals disguise the original currency, they can only produce a replica which visually looks alike but they cannot produce the exact copy because original currency is manufactured with a lot of security features in it and some security features are hidden and they cannot be easily visible.

We considered Indian coins and notes for identifying the counterfeit currency and our Indian currency has a lot of security features embedded in it.

Some of the security features of Indian currency are mentioned below:

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1. **For Notes:**

According to RBI guidelines notes can be identified by the following aspects:

a) Morphological analysis:

- We can observe the changes in Gandhi's picture on the note i.e., Gandhi's picture will have identical changes in its appearance because one cannot make the exact replica of it.
- Notes have the magnetic strips embedded on it in which Bharat (Hindi), RBI wordings are written on it in an alternative manner throughout the length of the strip. This strip can be identified only by scanning in government provided apps.
- Micro designs on the notes with different pattern of art on it - This cannot be easily replicated because there will be minute spacing in between the design and only RBI has original design with it which is designed by the team of expert artists. If anyone tried to disguise it, it won't be the same because of the minutia characters.
- Watermarks of Gandhi's picture along with the denomination of currency in numbers is without distorted lines for the original note and will be in distorted lines in the fake notes.
- Micro lettering of the words 'Bharat' & 'India' are seen at Gandhi's collar in his picture on the note which cannot be matched even in high resolution scanners. There will belines on Gandhi's picture, these lines are in such away that they are superimposed in a different pattern called "MOIRE'S EFFECT".
- RBI microlettering is seen on the Gandhi's spectacle's frame.
- Ink used for manufacturing these notes is "optically variable ink (OVI)'' also called as "colour shifting ink'' which is fluorescent in nature and is an anti- counterfeiting measure taken by RBI.
- Original notes will be having a clear edge finishing and has a standard measurements and dimensions for each note of varying cost. Notes have a peculiar serial number where these serial numbers are in their increasing order.
- Notes are printed using special type of paper having the composition of cotton fabric along with Lenin and gelatine. These papers are not easily available, the complete details and the purpose of use are recorded, and permission is required to use these papers.
- Standard thickness of notes as per new rule is about 90 GSM (grams per sq. Meter) for 10 - 1000 rupees and having a calliper thickness 110 microns for 10- 1000 rupees.
- Margin and corner designs of notes will be having micro lettering of RBI imprinted on it.

b) Chemicalanalysis:

- Magneticstrips when observed under UV light gives fluorescence.
- Solubility test can be performed (since it is a destructive method this test is notrecommended).
- Burntest can be performed (since it is adestructive method this test is not recommend).

2. **For coins:**

Indian coins are generally made up of metals such as stainless steel, nickel and brass and have a standard composition percentage.

a) Morphologic alanalysis:

- The metals used for coin manufacturing varies from one coin to other having different costs.
- The pattern in which the letters and designs imprinted on a coinisd one by "EMBOSSING'' methods.
- Fonts and letters imprinted on coin will be different for counterfeit coins.
- Spacing between letters and alignment of the letters will be uneven in counterfeit coins.
- Standard Logo of Indian coins has a particular size, shape and embossing pattern which cannot be replicated by others, and we can easily differentiate these things in counterfeit coins.
- There is a standard measurement and thickness for every coin which is given by RBI, this can be identified for counterfeit coins.
- Coin edges will be having lands and grooves

with an equal spacing between them and this cannot be replicated.

- Margin designs are designed in apeculiar way which I simpossible to replicate.

b) Chemicalanalysis:

- Verniercallipers can be used to measure the thickness of the coins.
- Acid-base tests can be performed because the composition and quality of original coins are very high and quite resistant to acid and bases and counterfeit coins will not sustain acid base tests.
- Electric conductivity and resistivity can be checked.

Fig. 1 Showing original 1000 rupees note.
Fig. 2 showing counter feit 1000 rupee note.

Examining a variety of Indian notes and coins helps in identifying the counterfeit currency and helps in understanding the methods used by the culprits to manufacture counterfeit currency to provide much more security and develop much more strong features to secure our currency.

Experimental section

- A total of 5 samples of counterfeit coins were collected and a sample of counterfeit note is collected along with it 7 original notes were collected of rupees 10,20, 50,100,200,500,2000.
- The experiment was carried out, under the following conditions:

  a) A sample of counter feit note of 1000 rupees was compared with the original.

  b) 5 samples of counter feit coins were subjected to acid test.

  c) 7 samples of original notes were subjected to morphological analysis for exploring the security features on them.

1) Comparison of 1000 rupees note: (*from fig. 1 and fig.* 2)

- The analysis was done in naked eyes using magnifier.
- The comparison revealed changes in designs of the margin, the counterfeit note had a completely different design at the margin.
- The Gandhi's picture watermark of the counterfeit note was completely different.
- The counter feit note when touched it felt like aplasticcoatingonitandhada great thickness difference when compared to the original.
- The magnetic strip was embedded in the original note whereas a sticker resembling magnetic strip was pasted on the counterfeit note.
- There were no characteristic features like RBI, India was not visible on the collar of Gandhi in fake note.
- Moire's effect of super imposed line designs was missing in fake note and were present in original.

2) Acid test for counter feit coins:

- The coins were subjected to acid test using conc. HCl.
- The coins which were original did not showed any changes and blackening was less when treated with conc. HCl.
- The coins which were counterfeited were showing black precipitate along with fumes on it with change in colour that is the coin turned black. It may be caused due to change in composition of an individual coin as well.

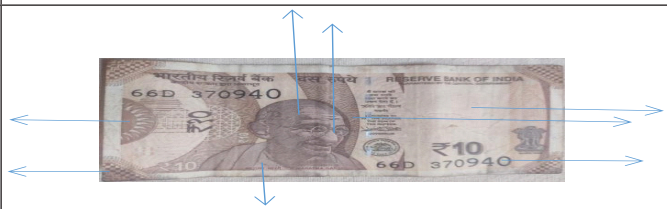
Fig. 3 showing reaction of original and fake coins with conc. HCl.

Result and Discussion

Morphological analysis of original notes for exploring security features:

- The samples of 7 notes were collected and analysed.
- The security features like increasing serial number size in order, water mark of Gandhi, "RBI and Bharat " wording on Gandhi's collar and spectacles were observed.
- The RBI wording was seen in the designs of margin of notes.
- The Moiré's effect was seen.
- There was agradual increase in size of serial number.
- Magnetic strips were seen embedded inside thenote on which RBI was written.

Table: 1 Showing chart of note specimens analysed for key identification security features:

Sample Number	Specimen sample	Keyidentifying security features
S1		1. Moire's effect 2. RBI wording on spectacles 3. Magnetic strip 4. Serial.noinincreasing size 5.RBI, India wording on Gandhi's collar 6,7,8-wording of RBI on the margins.
S2		1. Increasing insize of serial.no 2. Moire's effect 3. Watermark of Gandhi 4. Magneticstrip 5. RBI on spectals 6,7 RBI words on collar and on margins.
S3		1. Moire's effect 2. RBI Wording on Gandhi's spectacles. 3. Watermark of Gandhi 4. Magneticstrip 5. Serial. Noin increasing order. 6,7,8 are the RBI wording on collar of Gandhi's and at the borders.

Like the above samples weeven performed analysis for 20rs, 200rs, 500rs and 2000rs.

By the above experiment we were able to differentiate between original and counterfeit currency and managed to identify maximum differences between original and fake notes and explored the security features given by RBI for Indian currency.

In coins we were able to clearly differentiate between original and counterfeit by acid test (conc. HCl) where, original coins did not react much and persisted their own colour and form but, counterfeit coins turned black along with the evolution of blackish fumes and bubbles were formed on the surface of the coins which is due to the metal reaction with the acid.

The possibility that this reaction may be due to the change in metal composition of fake and original coins.

Conclusion

By this we can conclude that people cannot easily distinguish between real and counterfeit currency which may lead to circulation of fake currency in the society. And as a forensic analyst we can differentiate counterfeit currency through scientific techniques as well as by using certain instruments also, by which we can help law enforcement agencies in preventing crimes related to fake currency smuggling, illegal selling fake currencies for higher prizes, damaging Indian economy that is crime against nation and much other aspects.

As a forensic expert, by following certain ethics and rules, we can prevent such kind of crimes and be a responsible citizen of the nation.

Limitations

- Sample collection of counter feit currency was difficult because of least availability.
- Sample collection was limited because it is illegal to possess counter feit currency.
- For fake note analysis certain tests like solubility test and burning tests are there. but it is not prescribed because it is a destructive method.
- Byacid test we can just identify the reaction occurring, but we cannot confirm the type of metal and composition of the metal can't be analysed.
- There are many more security features in Indian currency, but RBI made it confidential and doesn't reveal to the public in order to secure the country.

Scope for further enhancement

This study opens the scope for further research in understanding the techniques and methods used by the culprits to develop counterfeit currency in order to avoid crime as well as to enhance much more high security features to Indian currency so that no one can easily pyrite our currency.

It is self funding.

Conflict of interest: Nil

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Original Research Article

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An Analytical Study on Medicolegal Cases at a Tertiary Care Hospital

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Abstract

Introduction: Medico-legal audits are an integral part of hospital/clinical audits and involve examination of the hospital records. The clinical audits aim towards improvement of quality of care and hence are limited to the scrutiny of patient's clinical records. On the other hand, a medico-legal audit aims at the prevention of foreseeable litigations on the hospital and includes the perusal of all the hospital records.

Aim: To perform a Medicolegal records audit at a tertiary care hospital

Results: Road traffic accidents are the major Medicolegal cases(65%) arriving to the emergency department. Males are more involved in the Medicolegal incidents than females.

Conclusion: The medico-legal auditing helps in the necessary changes to be put forth for the better functioning of the hospital

Key words: Audit, Documentation, Medicolegal records

Introduction

A physician has a dual responsibility, the first being a duty of care towards the patient and secondly, a duty to serve the interest of justice[1]. These two roles should be executed in a balanced way when came across a medico-legal case. Documentation of medical records is regarded as an essential element in the legal system of country[2]. Auditing includes an examination of records, whether financial or nonfinancial, maintained by the institute and to express an opinion based on these records, whether they are within specific law and regulations applicable to that entity or institute[3].Medico-legal audits are an integral part of hospital/clinical audits and involve examination of the hospital records. Clinical audit is a process that has been defined as a quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and the implementation of change[4].These clinical audits aim towards improvement of quality of care and hence are limited to the scrutiny of patient's clinical records. On the other hand, a medico-legal audit aims at the prevention of foreseeable litigations on the hospital and includes the perusal of all the hospital records[5]. The importance of these medico-legal audits arises

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mainly in cases where the hospital has to deal with the legal system of that land. In order to prevent the litigations arising, every hospital shall incorporate and make the medico-legal audits mandatory.

Aim

To study the available records and conduct an audit at a tertiary care hospital.

Methodology

This is a document based retrospective study which was conducted in a tertiary care hospital during the period January 2022 to December 2022. A total number of 653 medicolegal cases documented during this period were studied. All the Medicolegal cases that arrived to the emergency room of the hospital were properly recorded in the Medicolegal register. These records were studied and analysed by using a master chart after obtaining permission from the Institutional Ethics Committee and head of Emergency Medicine Dept.

Results

Age and Sex

The age and sex of the individual is recorded accurately for all the cases. In this study, most no. of cases (496) were in the age group of 21-40 years when compared to other age groups and males outnumbered the females(males=477, females=176) (Table -1) of the total cases. This clearly depicts that the middle age group males were the victims in these Medicolegal cases.

Type of Medicolegal case

The type of case whether it is RTA, poisoning, burns, hanging, drowning, fall from height, brought dead cases etc were 100%recorded in the MLC register. As per the study, the majority of the Medicolegal cases arrived to the emergency department were road traffic accidents (422) followed by poisoning cases (97) (Fig-1) (Table-1). This shows that accidents are the most common MLCs which can be reduced by stringent laws, proper laying of roads and proper usage of helmets etc.

Time of incidence

The incidence time for few cases was not mentioned in some records. As per the available data, the study shows that more no. of incidents (340) occurred from 6AM – 6PM (daytime) when compared to cases (290) during 6PM – 6AM (nighttime). This shows that many cases can be prevented from occurring as most of them were during daytime.

Admission in hospital

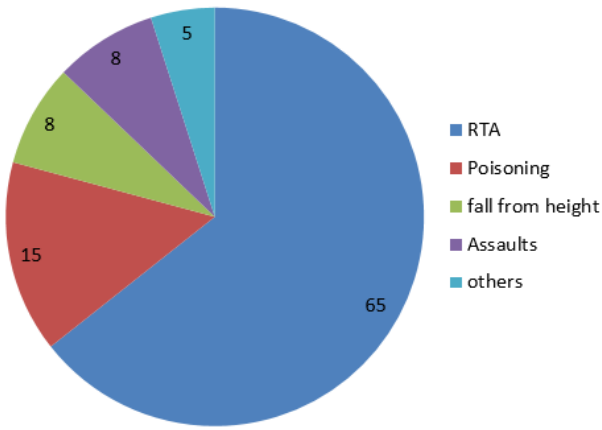
The details regarding admission are missing in 1% of the records. As per the data, almost equal no. of cases were admitted in the hospital (268) and got treated in the out-patient basis (286). Some cases were LAMA (62) and very few brought dead cases (3).

Clinical details

In most no. of documents, the recording of the pulse (44%) and the Blood pressure (69%) of the patient was not entered. The presenting complaints were not recorded in 2% cases and alleged history was not written in 3% of the cases.

Intimation to Police

For every case the police intimation was sent. For those jurisdictions which are at a long-distance communication was sent by telephone.



Figure

Table No.1: Type of Medicolegal case

Type of Medicolegal Case	Male	Female	Total no. of Cases
RTA	318	104	422
Poisoning	58	39	97
Fall from height	41	12	53
Assault	42	09	51
Burns	17	09	26
Asphyxia cases	01	03	4

Discussion

In the present study it was found that in some cases the relevant information was not documented properly. As medicolegal documentation is vital in the court of law it is essential for the hospital authorities to ensure proper training by forensic experts so that the litigations does not arise.

The study shows majority of cases (about 65%) arrived to emergency department were road traffic accidents and males were involved more. The emergency medicine should be equipped with well trained staff for the immediate resuscitative measures and then after the Medicolegal documentation.

The younger age group was the most suffered victims in our study. Hence the govt. shall impose stringent laws and safety awareness campaigns to reduce road traffic accidents.

In most of the records time of incidence was recorded, a key to know the time taken to approach for treatment so that an aggressive management can be started immediately in delayed cases.

Sangeeta Regge et al in a study concluded that due to ambiguity in the understanding the MLC, more and more health care professionals are looking at MLC as a burden. Their study suggested that there was a need of standard operating procedures in the context of doctors, nurses and police and their respective medicolegal roles[6].

For proper training in medico-legal documentation, the casualty must be attached to and supervised by the Forensic Medicine department and interns and postgraduates in Forensic Medicine should be posted[7].

While conducting the auditing, the auditor shall not only study the cases but ensure to look on the maintenance of registers, their proper storage for the time period as per the laws of that land, provide information to the authorities for necessary changes and their implementation for better functioning of organization. Another major concern is maintaining confidentiality of the patient records as the patient can hold the doctor and the hospital negligent for breaking confidentiality of his records[8].

Conclusion

The suggestions that can be provided by well performed audit are

a. Designing SOPs for healthcare workers with respect to medico-legal work

b. Continuous monitoring of health records documentation in addition to medicolegal cases

c. Improvement in the healthcare services and maintenance of documents based on the review of audit and patient feedback

Ethical Clearance: Obtained from institutional ethics committee (I.E.C, NRIIMS;

Ref. code: S.No – 52, Dt 06/03/2023)

Source of Funding: Self

Conflict of Interest: Nil

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Original Research Article

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A Pattern of Unnatural Mortalities at Tertiary Care at Sarguja Region of Chhattisgarh: A One-Year Retrospective Study

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Abstract

The pattern of unnatural mortalities reflects the prevailing social set-up and mental health status of the region. To understand the magnitude and pattern of unnatural deaths in the Sarguja region of Chhattisgarh, a one-year retrospective study was carried out in the Department of Forensic Medicine, RSDKS Government Medical College, Ambikapur, Sarguja. The study revealed a male predominance-affected age group of 21–30 years, followed by 31–40 years, mostly in summer. We found that head injury and polytrauma are major causes of unnatural death; they contribute mainly to traffic accidents.

Key word: Unnatural Death, Manner of Death.

Introduction

According to the Bhagavad Gita, Lord Krishna said: - "One who has taken his birth is sure to die, and after death one is sure to take birth again" (Chapter 2 verse 27).

Death is inevitable. It has been lamented for centuries. Thanatology (Greek thanatos = death, logus = science) is a branch of medical science that deals with the study of death[1]. Death is the extinction of life, indicated by a complete and prolonged cessation of respiration and circulation combined with a complete cessation of brain function[2].

Section 46 IPC defines death denotes death of a human being unless the contrary appears from the context[3].

An unnatural death was defined as any death caused by external causes, which could be intentional or unintentional[4]. The manner of death refers to the way in which the cause of death occurred. If the death is due to an illness, the manner of death is 'natural', and if it is due to an injury, the manner of death is 'violent'/unnatural.

Violence can result in an accident, suicide, or homicide, depending on the circumstances. The manner of death here in India is determined by the court after examining all aspects of the case, including the doctor's statements and his interpretation of the findings.

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In the United States and some other countries where there is a 'Medical Examiner System,' the manner of death is also expected from the doctor after he has examined the scene/incident and the victim[5].

Factors leading to unnatural deaths include traffic accidents, poisoning, falls, drowning, fires, burns, smoke, firearm discharge and electrocution[6]. Other factors include deaths from space programming, death in sports, industrial accidents, collapsed buildings and unsafe sleeping places[7].

In our study conducted at RSDKS Government Medical College, Ambikapur, SargujaTo understand the magnitude and patterns of unnatural deaths, the study included those who were brought for postmortem during the period from January 1, 2022 to December 31, 2022.

Aims of the study

In this study, we will find out how the pattern of unnatural death affects the frequency, age, sex, seasonal variation, and type of death, and find remedies to reduce the frequency.

Material and Methods

The present study is conducted in the Department of Forensic Medicine, RSDKS Government Medical College, Ambikapur, Sarguja. The department receives cases for autopsy from district of Sarguja region. Only the cases whose cause of death was unnatural i.e., homicide, suicide and accident and doubtful cases grouped as undetermined were selected.

The data is analysed retrospectively for the period of one year from January 1 to December 31, 2022. All data were collected from the records in the department. From the first of January to the end of December 2022, a total of 799 autopsies were performed in the morgue of the Department of Forensic Medicine. Of these, 3 intrauterine foetuses and 1 skeletonized remains were excluded from the study.

Observation and Results

1. **Gender-specific distribution of cases:**

S.No.	Gender	No. of cases	Percentage
1	Male	581	73.08%
2	Female	214	26.92%
Total		795	100

Table 01: - Gender wise distribution of unnatural deaths shows that most of the cases were males (73.08%) while females constituted 26.92%.

2. **Age and Sex wise distribution of the cases:**

S.No.	Age in year	Male	Female	No. of cases	Percentage
1	< 1	03	07	10	1.26%
2	1-10	14	12	26	3.27%
3	11-20	68	38	106	13.33%
4	21-30	174	53	227	28.55%
5	31-40	122	38	160	20.13%
6	41-50	90	31	121	15.22%
7	51-60	55	12	67	8.43%
8	61-70	40	16	56	7.04%
9	>70	15	07	22	2.77%
Total		581	214	795	100

Table 02: The age and sex wise distribution of unnatural deaths shows that the age group of 21 to 30 years was the most affected (28.55%), followed by the age group of 31 to 40 years (20.13%) and the age group of less than one year was the least affected.

3. Seasonal variation in the distribution of cases:

S.No.	Seasonal distribution (Month)	No. of cases	Percentage
1	Summer (March -June) Jan	299	37.61%
2	Rainy (July – October) Feb	268	33.71%
3	Winter (Nov.-February) March	228	28.68%
Total		795	100

Table 03: The study shows that the seasonal distribution of unnatural deaths, most cases in the summer season 37.61%, followed by the rainy season 33.71% and in the winter season 28.68%.

4. Cause of death according to distribution of cases:

S. No.	Cause of death	No. of Cases	Percentage
1	Head Injury	179	22.52%
2	Polytrauma	124	15.61%
3	Hanging	91	11.45%
4	Poisoning	85	10.69%
5	Pending (For chemical analysis)	69	8.68%
6	Natural	60	7.55%
7	Snake Bite	51	6.42%
8	Drowning	37	4.65%
9	Burn	30	3.77%
10	Abdominal Injury	13	1.63%
11	Electrocution	11	1.38%
12	Thoracic Injury	09	1.13%
13	Animal (Elephant, Bull, Tiger and Dog) Assault	09	1.13%
14	Aspiration	06	0.75%
15	Bee Sting	06	0.75%
16	Undetermined	05	0.63%
17	Limb Injury	04	0.50%
18	Lightning	03	0.38%
19	Strangulation	03	0.38%
Total		795	100%

Table 04: The distribution of unnatural causes of death shows that the main causes are head injuries and polytrauma, which occur most frequently in traffic accidents, followed by falls from a height, hanging and poisoning.

5. Manner of death - distribution of cases:

S. No.	Manner of death	Male	Female	No. of Cases	Percentage
1	Natural	42	18	60	7.55%
2	Suicidal	130	64	194	24.40%
3	Accidental	351	106	457	57.48%
4	Homicidal	14	11	25	3.15%
5	Undetermined	04	01	05	0.63%
6	Pending report till Chemical analysis.	34	20	54	6.79%
Total		575	220	795	100

Table 05: Distribution of unnatural deaths by manner of death Accident 57.48%, including RTA, fall from height, burns, drowning, snakebite, electrocution, animal attack and lightning strike, suicide 24.40%, homicide 3.15% and natural causes of death 7.55% each.

Discussion

Unnatural death is one of the indicators of social and mental health. Crime has never left human society since its appearance on this earth. Unnatural deaths include deaths caused by a person's negligent acts, criminal intentions, or planned omissions, as well as deaths where there is no illegal intent but death is caused by an accident or mishap.

In our study, unnatural deaths were higher in men than in women. The study is similar to the studies of M. Deepak et al.[9], Dr. Awdhesh Kumar et al.[10], Zahid Hussain Khalil et al.[11], AB Zarami et al.[12], and Anjanamma T et al.[13]. Men are mostly involved in socio-political disputes and crimes due to their work culture, and they take many risks leading to unnatural deaths.

The age distribution of unnatural deaths is predominantly in the age group 21–30 years, followed by 31–40 years. The study is similar to those of M. Deepak et al.[9], Dr. Awdhesh Kumar et al.[10], and AB Zarami et al.[12] and differs from those of Anjanamma T et al.[13] This preponderance of the younger age group could be due to the stress factors one is exposed to at this age. This is the age when individuals are approaching the crucial moments of their lives, such as employment, marriage, and family responsibilities, which makes them vulnerable to various hazards of life. The difference from the study of Anjanamma T et al.[13] could be due to the fact that after 30, life becomes calmer and brings less stress than in the 31–40 age group in our region.

Our study shows that most unnatural deaths occur in the summer region, followed by the rainy season, similar to the studies of M. Deepak et al.[9] and Dr. Awdhesh Kumar et al.[10] In our region, most family members are free from work and go on holiday or to a wedding party.

In our study, the most common cause of unnatural death was head injury, followed by polytrauma. Both injuries mostly contribute to traffic accidents. The study is similar to the studies of Deepak M. et al.[9], Dr. Awdhesh Kumar et al.[10], and differs from the studies of Zahid Hussain Khalil et al.[11], AB Zarami et al.[12] This difference is mainly due to the fact that the study was conducted outside of India, and law and order prevail in their own country. In India, the studies are similar due to the general problem of traffic congestion.

In our study of the nature of death, most unnatural deaths fall under accidental death, followed by suicide. Studies of M. Deepak et al[9], Anjanamma T et al[13] differs from a Study of Zahid Hussain Khalil et al[11] due to the law-and-order situation in the country. A similar study of fatalities is attributed to poor enforcement of traffic rules and regulations, drunk driving, risk-taking behavior by teenagers and other poor road conditions.

Conclusion

The law-and-order situation in a particular jurisdiction is the main reason for planning such studies for situational analysis of unnatural deaths in the study region to compare with the national and global statistics and to find possible remedial measures to minimize the incidence of unnatural deaths. The predominant sex, predominant age group, causes and manner of unnatural deaths in our study are more or less similar to the pattern found in most of the national studies.

It can be concluded from the study that most victims of unnatural deaths are men who have died in traffic accidents.

These are mostly younger people who are losing their economic power due tothe loss of the productive population.

These deaths can be prevented through strict enforcement of traffic rules and national health programs.

Suicide poisoning needs to be addressed early through government policies. Education and encouragement of the leaders of the society will reduce unnatural deaths.

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Original Research Article

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Epidemiotoxicological Profile of Fatal Poisoning Cases Autopsied at a Tertiary Care Hospital

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Abstract

Poisoning is a major public health problem worldwide with thousands of death occurring every year and most of the cases are being reported from developing countries. The present study includes all the cases of poisoning or suspected poisoning subjected for autopsy at the Department of Forensic Medicine and Toxicology, Basaveshwara medical college and hospital, chitradurga, Karnataka during the period 1stjanuary 2022 to june 2023 in which it was seen that poisoning accounted for 19.9% of autopsies. 24 Males (66.6%) and 12 females (12%) in the age group 21-30 years were commonly affected. Many victims were married males. Majority of cases were suicidal in manner (94.4%) and were from middle class social status (41.1%). The commonest poisoning was organophosphorus compound.

Key words: Poisoning, ingestion; victims

Introduction

Toxicology is a science which deals with the toxicity of substances. The substance inflicting a toxic effect may be a drug, an insecticide, a pesticide or any chemical substance in the environment. In fact every substance is theoretically capable of producing toxicity and every drug is potentially a poison for routine purposes[1]. Poisoning is one of the most common cause of medical emergency visits and leading cause of disease and death in India and global public health concern. It is one of the most common method of committing suicide among both males and females in India. It is estimated that more than 50,000 people die every year from toxic exposure in India.[2,3]. It is one of the preventable cause of death.

Aims and Objectives:

To know the distribution of poisoning cases among different age, sex, frequently used poisonous substance, incidence among literate and illiterate individuals, different socioeconomic status.

Materials and Methods

It is a retrospective study of all the cases autopsy done in the department of Forensic Medicine and Toxicology, Basaveshwara medical college and

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hospital, chitradurga, Karnataka during the period 1stjanuary 2022 to june 2023 with the history of posisoning. Also includes all fatal cases which were admitted at Basaveshwara medical college and hospital, and died later. Information was collected through hospital records, police records, chemical analysis reports, by direct interaction with victim or relatives and finding of autopsy which are presenters like age, sex, marital status, literacy status type of poison, mode of poisoning, manner of poisoning post mortem findings and chemical analysis results. In all cases where samples gave negative results categorized poison as unknown. The data of certain variables were collected and analysed in latest SPSS regarding age, sex, socioeconomic status, maritalstatus, commonly abused poison. The statistical analysis of data from this study was carried out using relevant tables as well as descriptive statistics such as percentage.

Observations and Results

A total of 36 cases of fatal poisoning cases were subjected to autopsy examination. The incidence of poisoning and various cases are shown in table no.1.36 cases of recorded death were due to poisoning during the study period and following observations were made. Total male affected were 24(66.6%) and female were 12(33.3%) (Table 2). The study revealed that more number of persons affected were in the age group of 21-30 years followed by 31-40,followed by 41-50 and least affected age group was 0-20 years(table no.3).

It is evident that 22 victims (41.6%) were of medium socioeconomic status (table no.4).The study revealed that more number of victims were from rural area 66.6% (table no.5).

The study revealed that more number of victims were literate 55.6% (table no.6).

The study revealed that more number of victims were unmarried 63.6% (table no.7).

The study revealed organophosphorus compounds is the most prevalent poison involved in the study population 66.6% (table no.8).

The study revealed that most of the cases were of suicidal in nature 99.4. (table no.9).

Table 1: Showing various types of cases

Types of cases	N=	%
Natural	5	2.7
Hanging	22	11.9
Poisoning	36	19.5
RTA	61	33.1
Drowning	8	4.3
Snake bite	6	3.2
Electrocution	5	2.7

Table 2: Showing sex distribution of fatal poisoning cases

Sex	N=	%
male	24	66.6
female	12	33.3

Table 3: Showing age distribution of fatal poisoning cases

age	frequency	percentage
0-20	2	5.5
21-30	13	36
31-40	10	27.7
41-50	5	13.8
>50	6	16.6

Table 4: Showing socioeconomic status of fatal poisoning cases

status	N=	%
Low	9	36
Medium	15	41.6
high	12	33

Table 5: Showing domicile distribution of fatal poisoning cases

domicile	N=	%
rural	24	66.6
urban	12	33.3

Table 6: Showing literacy status of fatal poisoning cases

literacy	N=	%
literate	20	55.5
illiterate	16	44.4

Table 7: Showing marital status of fatal poisoning cases

Marital status	N=	%
married	13	36.1
urban	23	63.8

Table 8: Showing commonly abused poison by victims

Poison abused	N=	%
Organophosphorus	20	55.5
Carbamates	3	8.3
Pyrethroid	2	5.5
Paraquat	3	8.3
Corrosives	3	8.3
Rat poison	3	8.3
unknown	4	11.1
total	36	

Table 9: Showing manner of poisoning cases

manner	N=	%
Accidental	34	94.4
Suicidal	2	5.5
homicidal	0	0

Discussion

Out of total of 184 autopsies, poisoning accounted for 19.5% of cases. Grag V and Verma S[4] in their study on trend of poisoning in rural area of South West Punjab found 12.15% of total admitted MLC cases were of poisoning, Findings were similar to those obtained by Naik S B Alva M, Shetty D[5] in Karnataka. Gupta B D et al[6] in their study on profile of fatal poisoning in and around Jamnagar observed incidence medico legal autopsies ion poisoning cases to be 15.98% and Gargi J, Tejpal H R et al[7] in their retrospective autopsy study of poisoning cases in Northern region of Punjab observed 11.60% incidence.

In the current study most of the victims were males 66.6% and females accounted for 33.3% Which is true in case of several studies also. Job C[8], Mohanty A C et al[9], Harish D et al[10], Behra A et al[11], Aggarwal N K et al[12] observed higher incidence of poisoning in males then females. This observation may be attributed to stress, unemployment greater number of various responsibilities and stress due to bad health of earning member of the family and inability to cope up with them triggers suicides.

Higher incidence of poisoning was observed in age group of 21 to 30years in 36% cases followed by 31 to 40 years in 27.24% of fatal poisoning cases in the present study. Similar observations were made by shetty A K et al[13] , Zariwala R et al[14], Behra A et al[11], Job C[8,] Gupta B D et al [6], Gargi J, Tejpa H R et al[7], and Dhanya S P et al[15]. Kohli A & Banerjee KK[16], from Delhi observed higher incidence of poisoning in the age group 13-24 years (53.50%) and 25-36 years (22.40%). Ramesh K N observed that more than 60% of victims were between the age of 12 and 20 years while 20 to 29 years age group accounted for 30.2% of incidence of poisoning. Sunanda N et al[5] found that highest incidence of poisoning 58% was seen in the age group 12 to 25 years followed by in 26 to 45 years age group that is 28%. Higher incidence of poisoning cases have been observed in unmarried individuals may be because of loneliness and health issues.

Marriage of any person is a new transitory phase in any one's life which adds to responsibilities and psychological pressure on any person. Stressful situations like disharmony existing between family members, dowry, financial problems, depression, and ongoing physical and psychological changes, responsibility of running the family etc these factors trigger suicidal attempt.

Petrovic B et al [17], in their study on the influence of marital status on epidemiological characteristics suicides in the South East party of Serbia found married women committing more suicides by poisoning than those who are unmarried. Sunanda N et al[5] found that highest incidence of poisoning that is 66% was seen in unmarried females followed by married males. In the present study it was observed that as per police Report suicidal poisoning was reported in 94.4% fatal poisoning cases followed by accidental in 5.5% cases .Similar observation were made by Zariwala R et al[14]observed major chunk were of suicidal cases 62% cases. Gupta B D et al[6], Kohli A &BAnerjee K K 16, Murty O P et al [18], Shetty A K et al[13], Harish D et al[10] and Haparin J H et al [19]observedthat suicide make a major part of the study

that suicidal cases varies from 40% to 70% followed by accidental and homicidal cases. Accidental exposure can result from improper use of chemicals at work or play, product mislabeling, label misreading, mistaken identification of unlabeled chemicals, uniformed self medication and dosing error by nurses, parents, pharmacists, physicians and elderly.

Conclusion

Following are the most conclusion from the study

Most of the victims were males which is 24 number (66.6%) and most of the persons affected were in the age group of 21-30 years It is evident that most of the victims (41.6%) were of medium socioeconomic status. The study revealed that more number of victims were from rural area. The study revealed that more number of victims were literate 55.6%. The study revealed that more number of victims were unmarried 63.6%. The study revealed organophosphorus compounds is the most prevalent poison involved in the study population 66.6%. The study revealed that most of the cases were of suicidal in nature (99.4%).

As organophosphorus compounds are easily available to public these should be curtailed by stringent implantation of laws for sellers and buyers. Public awareness regarding the different poisons which are likely cause of accidental poisoning is necessary. There must be availability of poison information centers.

Conflict of interest: nil

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Ethical clearance: obtained

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