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Original Article

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Post Mortem Study of Brain Injuries in Fatal Road Traffic Accidentsin A Teaching Hospital

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ABSTRACT

Background: Traumatic brain injury (TBI) is a significant global health and socioeconomic issue [1]. Head Injury is a general term used to describe any trauma to the head but most especially with involvement of the brain. It is estimated that nearly 1.5 to 2 million persons are injured and 1 million succumb to death every year in India. Despite the high mortality rate following traffic accidents, the factors that contribute to this rate have received little research attention, and data regarding cause of death, pattern of injuries and epidemiological aspects of road accidents are still scarce [2].
Objectives: It aimed to study the socio-demographic profile and the pattern of brain injuries. Data will be collected from the information furnished from post-mortem examination reports, autopsy requisitions and inquest reports, medical records available.
Materials & Methods: A cross-sectional study was conducted involving 90autopsies conducted at the Mortuary in a teaching hospital during 2019 to 2021.Data were extracted from the information furnished from post-mortem examination reports, autopsy requisitions and inquest reports, medical records available. It aimed to study the socio-demographic profile and the pattern of brain injuries. Universal sampling method was used to recruit the cases.
Results: This study involved 90 autopsy cases with Traumatic brain injuries. TBI was highly prevalent among 31-40 years age group. 84 % of them were married, 73% of the victims were males and the rest were females. 53.3% of the cases were due to hit on pedestrian. The next common was vehicle-to -vehicle collision and followed by others. The commonest injury pattern were multiple abrasions, followed by contusions, crush injury of head and internal injuries. Linear fracture of skull was the most common type of fracture found and the least common was depressed fracture. There was no fracture in 8.8 % of the cases. Fractures were most commonly located in temporal bone and least in parietal bone. Subdural haemorrhage was the most common intracranial haemorrhage (35.5%) found, followed by subarachnoid and extradural amounting to 24%. 10% of the cases showed the evidence of meningeal tears. 43.3% of the victims were rider or driver, 30% were pedestrians, 18.8% were passengers and the remaining were pillion rider.74.4 % were spot dead and the rest were admitted in the hospital and then later succumbed. 83.3% of the victims were under the influence of alcohol during the accident.
Conclusion: Nearly half of the of TBI was found among 31 – 40 years age group. 48 % of the cases have resulted due to hit on pedestrians. Almost one-fourth of the cases had multiple abrasions over the body. 45.5% cases had temporal bone fracture in the skull. More than quarter cases had linear type of fracture. Most of them were rider or driver and majority of them were spot dead. Alcohol consumption was also recorded in most of the cases. Road traffic accidents are one of the miserable epidemics growing silently and has to be controlled efficiently to reduce the economic burden of the country.

Key Words: *Traumatic brain injury, post mortem, Road traffic accidents, Injuries*

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INTRODUCTION

Traumatic brain injury (TBI) is a significant global health and socioeconomic issue [1]. Head Injury is a general term used to describe any trauma to the head but most especially with involvement of the brain. It could be strictly defined as trauma to the brain and/or its coverings due to an externally applied mechanical force [3]. In essence, its functional significance becomes manifest when there is an accompanying cranial neural injury and is known as traumatic brain injury (TBI), a term used specifically to describe affectation of intracranial contents with its potential likelihood of significant functional deficits [4, 5].

Due of its role in traumatic impairment and global death, it is frequently referred to as the "silent epidemic". Each year there are about 500-800 new cases of TBI per 100,000 people, according to multiple studies. One of the main causes of TBIs, especially in young individuals, is automobile accidents. The incidence varied between 1.5% in the Southeast

Asian region and 1.1% in the Region of the Americas, which includes the United States and Canada. The risk of road traffic accidents varied very little throughout the WHO areas, despite the variations in the amount of motor vehicle users [6].

Half of those who die from TBI do so within the first two hours of injury. It is now known that only a portion of neurological damage occurs at the moment of impact (primary injury); damage progresses during the ensuing minutes, hours and days. The secondary brain injury can result in increased mortality and disability.60 percent of all TBIs are caused by RTA [7].

In India, over 80,000 persons die in traffic crashes annually and over 1.2 million get injured seriously and 300,000 get disabled permanently. Road accidents account for 2.5% of total deaths in India and are among the six leading causes of death. India has the highest incidence of death due to road traffic accidents in Uttar Pradesh (11.4%) followed by Tamil Nadu (11.3%), Andhra Pradesh (10.7%), and Maharashtra (9.6%) [8].

Continuous growth in number of motor vehicles, increase in population and poor access to health care are some of the important factors in fatalities due to vehicular accidents [2]. Trauma remains the most under-recognized public health problems (leading cause of morbidity and mortality, disability and socioeconomic burden) among children and adolescents world- wide and every year. Despite the high mortality rate following traffic accidents, the factors that contribute to this rate have received little research attention, and data regarding cause of death, pattern of injuries and epidemiological aspects of road accidents are still scarce [2, 9].

METHODOLOGY

It was a cross-sectional study among the autopsies conducted at the mortuary of a teaching medical college. It included all the cases with traumatic brain injuries due to road traffic accidents recorded during 2019 to 2021. It aimed to study the socio-demographic profile and the pattern of brain injuries. Universal sampling method was used to recruit the cases. Data were extracted from the information furnished from post-mortem examination reports, autopsy requisitions and inquest reports and available medical records.

RESULTS

This study involved 90 autopsy cases with Traumatic brain injuries. Table 1 shows the age distribution of the study population.TBI was highly prevalent among 31-40 years age group. 84 % of them were married; 73% of the victims were males and the rest were females. Table 2 depicts the type of collision which caused the accident. 53.3% were due to hit on pedestrian. The next common was vehicle-to -vehicle collision and followed by others.

Figure 1 shows the pattern of injuries over the body of the victim. Most of them were overlapping not found separately. The commonest injury was multiple abrasions, followed by contusions, crush injury of head and internal injuries.

Linear fracture of skull was the most common fracture found and the least common was depressed fracture. There was no fracture in 8.8 % of the cases (Table 3). Table 4 shows that Fractures were most commonly located in temporal bone and least in parietal bone.

Figure 2 depicts that Subdural haemorrhage was the most common intracranial haemorrhage (35.5%) found, followed by subarachnoid and extradural amounting to 24%. 10% of the cases showed the evidence of meningeal tears. In Table 5, 43.3% of the victims were rider or driver, 30% were pedestrians, 18.8% were passengers and the remaining were pillion rider.74.4 % were spot dead and the rest were admitted in the hospital and then later succumbed in Table 6. 83.3% of the victims were under the influence of alcohol during the accident in Table 7.

Table 1: Demographic details of study participants (N=90)

Socio demographic	Frequency(n)	Percentage(%)
Age		
<10	3	3.3
11 – 20	11	12.2
21– 30	14	15.5
31– 40	46	51.1
41– 50	9	10
51– 60	7	7.7
Marital Status		
Married	76	84
Single	14	15

Table 2:Type of Collision (N=90)

Type of collision	Frequency(n)	Percentage(%)
Hit on Pedestrian	48	53.3
Hit on animal	3	3.3
Skid and fall on side	13	14.4
Collision with other vehicles	26	28.8

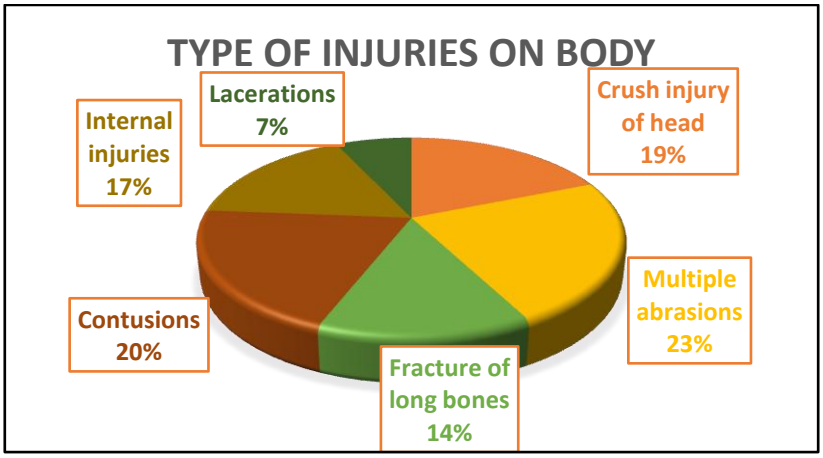

Figure 1: Injury pattern in the body of the victim (N=90)

Table 3: Type of fracture of skull bone (N=90)

Type of fracture of skull bone	Frequency(n)	Percentage(%)
Linear	33	36
Depressed	9	10
Comminuted	15	16.6
Sutural	25	27.7
No fracture	8	8.8

Table 4: Location of fracture (N=90)

Type of fracture of skull bone	Frequency(n)	Percentage(%)
Temporal	41	45.5
Parietal	8	8.8
Occipital	12	13.3
Frontal	21	23.3
No fracture	8	8.8

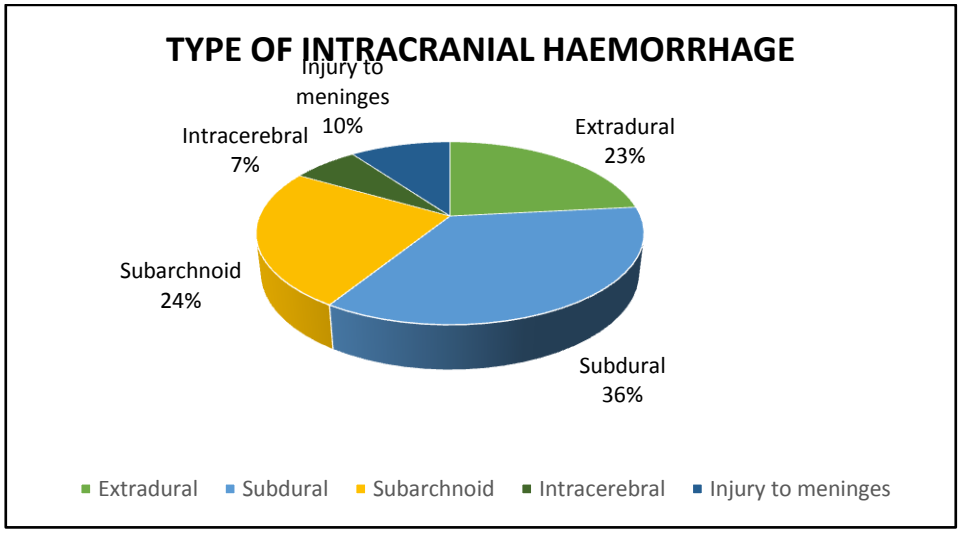

Figure 2: Type of Intracranial haemorrhage (N=90)

Table 5: Role of Deceased (N=90)

Role of the Deceased	Frequency(n)	Percentage(%)
Rider / Driver	39	43.3
Pedestrian	27	30
Pillion rider	7	7.7
Passenger	17	18.8

Table 6: Presence of hospital admission (N=90)

Hospital admission	Frequency(n)	Percentage(%)
Yes	23	25.5
No	67	74.4

Table 7: Alcohol consumption (N=90)

Alcohol Consumption	Frequency(n)	Percentage(%)
Yes	75	83.3
No	15	16.6

DISCUSSION

Similar to our study, Ahmed et al conducted a similar study in Bangladesh, in which they found that majority of cases fell into 31 – 40 years age group. The highest number of victims were pedestrians. All the victims had multiple abrasions and bruises over the body. The most common type of skull fracture of skull was linear fracture and the most common location was temporal bone. The most common type of haemorrhage was subdural haemorrhage.

Vipul et al concluded that majority of them belonged to 21 to 30 years. The victims were mostly two-wheeler riders followed by pedestrian. 84.2% of the injury pattern over the victim's body were abrasions, contusions and followed by others. Intestinal injuries were commonly involved in the cases. Male predominance was seen which is parallel to our study.

Arvind Kumar et al conducted a cross-sectional study which also proved the male predominance and was most common among 21 to 30 years age group. Base of skull was most commonly involved in fracture, followed by temporal bone. Subdural haemorrhage was the frequently observed type of intracranial haemorrhage.

Another cross-sectional study done by Heydari et al concluded that majority of the victims belonged to 25 to 34 years age group with male predominance. Majority of the victims were pedestrians. Vehicle-to-Vehicle collision was the most common incident responsible for Brain injuries.

CONCLUSION

Nearly half of the of TBI was found among 31 – 40 years age group. 48 % of the cases have resulted due to hit on pedestrians. Almost one-fourth of the cases had multiple abrasions over the body. 45.5% cases had temporal bone fracture in the skull. More than quarter cases had linear type of fracture. Most of them were rider or driver and majority of them were spot dead. Alcohol consumption was also recorded in most of the cases. Road traffic accidents are one of the miserable epidemic growing silently and has to be controlled efficiently to reduce the economic burden of the country [10, 11&12].

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