

## Pattern of Head Injuries in Road Traffic Accidents Cases Brought to Post Mortem Center

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### Abstract

Road traffic accidents are one of the major causes of morbidity & mortality especially in developing countries including India. Craniocerebral injuries are the most common injuries found in fatal road traffic accidents. The objective of our study was to analyze the pattern of craniocerebral injuries in these types of fatal accidents. The study was conducted at the Department of Forensic Medicine, Government Medical College, Kota during January 2017 to December 2018. During this period 290 victims of fatal road traffic accident were autopsied. In the present study the male ratio was more compared to female. Most of the victims in the present study belonged to the age group of 21 to 30 years. Mechanized two wheelers were the commonest off ending vehicle. Most of the death occurred in the winter season. Most common intracranial hemorrhage was Subdural hemorrhage with combination and fracture of vault was the commonest fracture found.

**Keywords:** Accident; Craniocerebral injuries; Intracranial Hemorrhage.

### Introduction

Road traffic injuries are the leading cause of death globally, and the leading cause of death for young people aged 15-29 years. More than a million people die each year on the world's roads, and the cost of dealing with the consequences of these road traffic crashes runs to billions of rupees. Current trends suggest that by 2030 road traffic deaths will become the fifth leading cause of death unless urgent action is taken. Only 28 countries, covering

7% of the world's population, have comprehensive road safety laws on all five key risk factors: drinking and driving, speeding, and failing to use helmets, seat-belts, and child restraints as per the global status report on Road Safety 2013 by World Health Organization<sup>1</sup>. India is undergoing major economic and demographic transition coupled with increasing urbanization and motorization. Injuries on roads, at homes, and in the workplace have increased due to lack of safety-related policies and programs. The health sector bears the maximum brunt in terms of provision of acute care, and short-term and long-term rehabilitation service. Some of the factors that increase the risk of road crashes in India are unsafe traffic environment, poor road infrastructure and encroachments that restrict safe areas for pedestrians; lack of safety engineering measures; traffic mix and an increasing number of motorized vehicles; unsafe driving behavior and lack of valid or fake driving licenses. Craniofacial injury, a common term which actually means craniocerebral damage and injury to face, has been recognized since ages. As found in medico-legal practice blunt craniofacial injuries are most frequently caused by traffic accidents, fall from

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height, assault, train accidents etc. and road traffic accidents are the main component, followed by fall from height and railway accidents. World Health Organization defined accidents as "an unexpected, unplanned occurrence which may involve injury".<sup>1</sup>

The present study has been carried out regarding the various epidemiological and medico legal aspects of vehicular accidents. An attempt was made to analyze various risk factors, distribution and pattern of head injuries with respect to skull fracture and different intracranial hemorrhages.

### Materials and Methods

This study has been carried out in the mortuary of the Department of Forensic Medicine and Toxicology, Government Medical college, Kota; Rajasthan during the period of 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2018. During this period; fatal craniocerebral injury cases numbered at 290. All these 290 cases selected for the study were due to craniocerebral injuries. Pre-designed and pre-tested questionnaire were prepared and information or data was collected from the following sources.

- (1) Inquest reports
- (2) History taken from the relatives
- (3) Hospital records
- (4) Post-mortem examination findings.

Detail post mortem examination of the cases were done and the findings were recorded in a master chart prepared then appropriate statistical analysis using percentage and proportions was done for data analysis.

### Results

Out of these cases a total 290 cases were due to road traffic accidents which constituted and that have been charted are represented in the form of diagrams which are as follows: Seasonal wise variation are as depicted in the Table 1 shows more deaths occurred in winter and least were in Rainy season. The peak incidence was observed in the age group of 21–30 years in both sex male as well as female. Individuals in the age group of more than 80 years were least affected, in female age group of 0–10 years shows least affected individuals. In table no 2 it is shown that female were the less affected individual than males with gender ratio of male to female 2.41:1. Table 3 shown that vehicle which was involved during incidence, it is observed that Motor cycle involved in highest number of cases with 104 cases and next one is pedestrian. 13.78% deceased showed only head injuries without any other detectable body injuries on rest of body, followed by head, neck face injuries 33.82% (Table 4). Distribution of types of vault fracture is summarized in the Table 5 which shows 31.72% cases fissured fracture of vault was observed, in about 18.62% cases fissured fracture of both vault and base seen. Only in 4.13% cases surgical intervention was seen. However death occurred in 10% cases, due to internal damages to brain without any fracture of skull. Lesion to brain due to trauma was observed in 17 cases which were about 5.86 percentages. Subdural hemorrhage and subarachnoid hemorrhage both observed in 44.13 cases and extradural hemorrhage was observed lonely in 1 case.

Table 1: Weather

Weather	Winter	Summer	Rainy	Total
No of cases	130	85	75	290

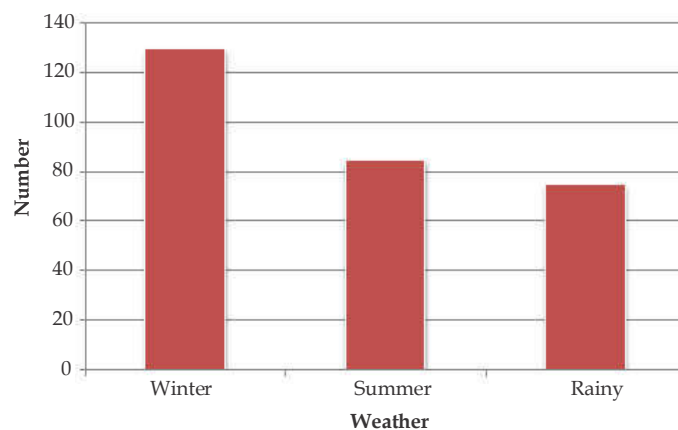
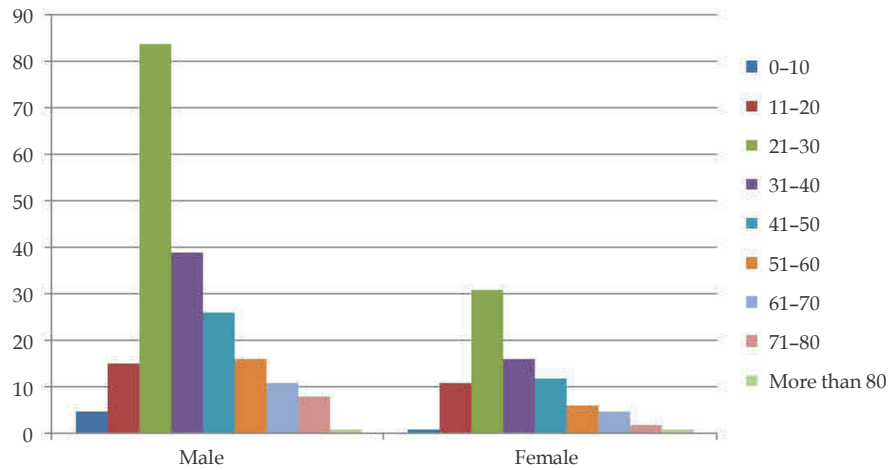


Fig. 1: Weather

**Table 2:** Age wise distribution

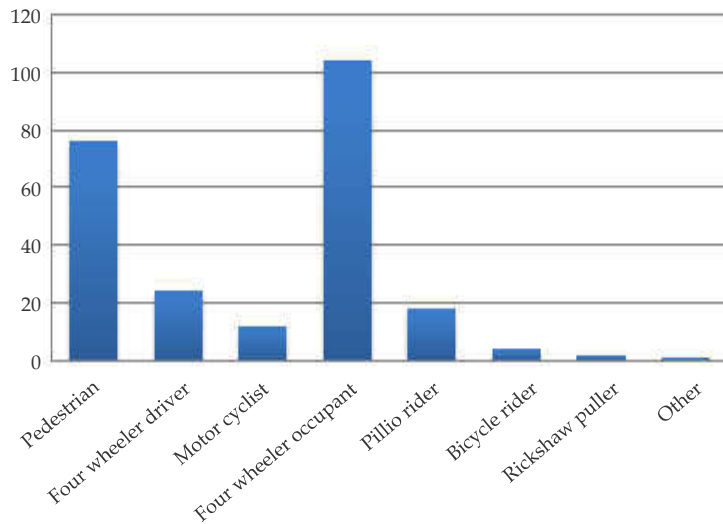
Age groups	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	More than 80	Total
Male	5	15	84	39	26	16	11	8	1	205
Female	1	11	31	16	12	6	5	2	1	85



**Fig. 2:** Age wise distribution

**Table 3:** Vehicle wise distribution

	Pedestrian	Four wheeler driver	Four wheeler Occupant	Motor cycle	Pillion rider	Bicycle rider	Rickshaw puller	Other	Total
No of deceased	96	38	26	104	18	4	2	2	290



**Fig. 3:** Vehicle wise distribution

**Table 4:** Distribution of injuries

Type of injury	No of cases	Percentages
Head injury	40	13.78
Head, neck, face injuries	101	33.82
Head injury + Other body injuries	149	51.37
<b>Total</b>	<b>290</b>	<b>100.00</b>

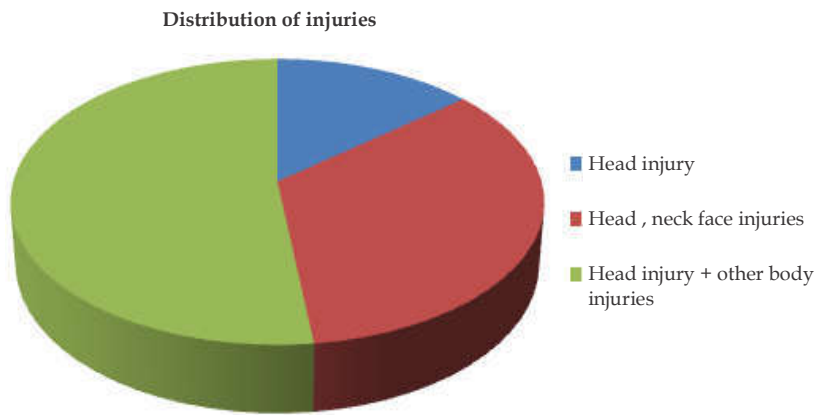


Fig. 4: Distribution of injuries

Table 5: Distribution according to fracture of vault in head injury cases

Fracture of vault	Frequency	Percentages
None	29	10.00
Fissured fracture of vault	92	31.72
Fissured fracture of base	12	4.13
Depressed	10	3.44
Comminuted	14	4.82
Fissured+depressed	19	6.55
Fissured fracture of vault and base	54	18.62
Fissured+depressed+comminuted	17	5.86
Depressed+comminuted	11	3.79
Crush	20	6.89
Craniotomy/burr holes/drain/ other surgical procedures	12	4.13
<b>Total</b>	<b>290</b>	<b>100.00</b>

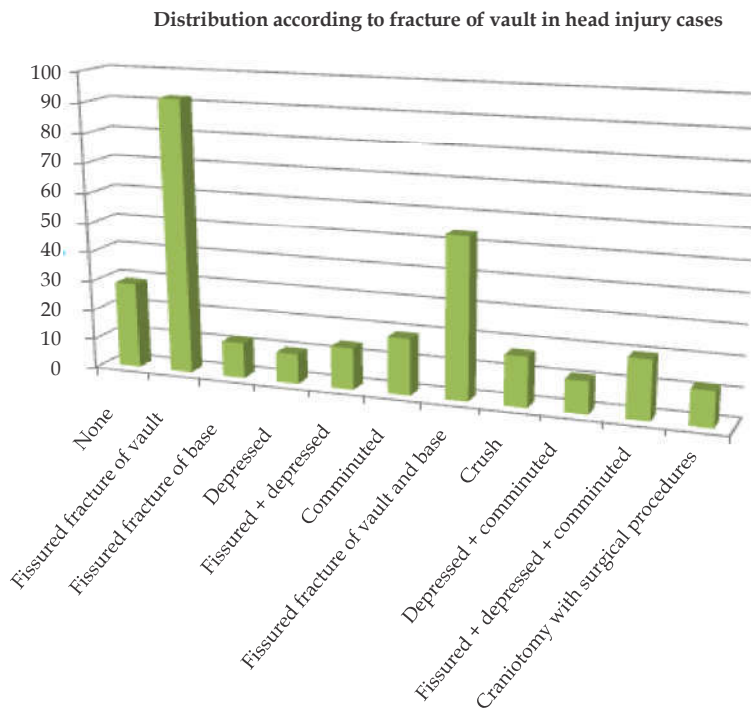
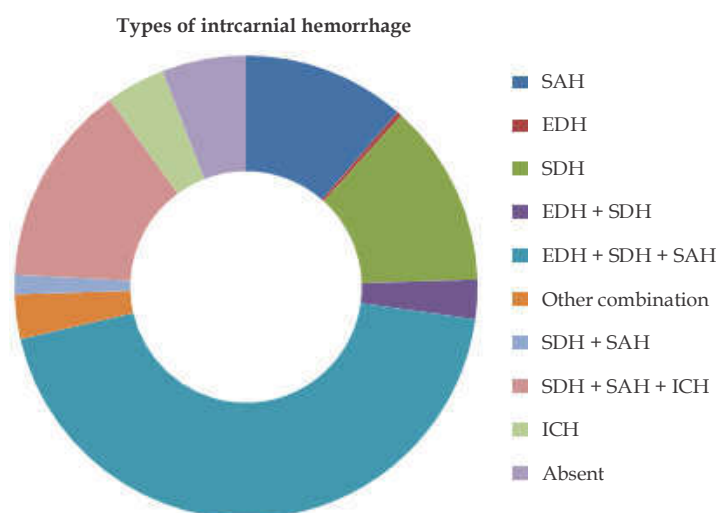


Fig. 5: Distribution according to fracture of vault in head injury cases

**Table 6:** Distribution of types of intracranial hemorrhages in head injury cases

Intracranial hemorrhages	Frequency	Percentages
SAH	33	11.37
EDH	1	0.34
SDH	37	12.75
EDH+SDH	08	2.75
SDH + SAH	128	44.13
EDH + SDH + SAH	9	3.10
ICH	4	1.37
Other combination	41	14.13
SDH + SAH + ICH	12	4.13
Absent	17	5.86
<b>Total</b>	<b>290</b>	<b>100.00</b>



**Fig. 6:** Distribution of types of intracranial hemorrhages in head injury cases

**Discussion**

India is developing country where poverty and unemployment in rural areas increases as time progresses day by day, it leads peoples rapidly move towards urbanized cities. As the development associates with rapid and unplanned urbanization. Incomplete traffic system, unplanned roads and highway, violation of traffic rules by drivers and pedestrian, over crowding of peoples and vehicles, unlicensed rickshaw, reckless driving etc are responsible for highest rate of road traffic accidents. In this study season was divided into three categories like summer season (March to June), Rainy season (July to October) and winter season (November to February). It was found from data analysis that maximum craniofacial injury cases occurred during the winter months with a total number of 130 cases. In summer season 85 cases and in rainy season 75 cases occurred.

The findings of the study are similar to those conducted by Kumar A et al. (2001–2005) and Patil et al. (2014).<sup>2,6</sup> These findings are similar to the studies conducted by Kaul A et al.<sup>3</sup> It was seen that maximum fatal craniocerebral injuries in RTA were sustained by those who were in between 21 years to 30 years of age comprising a total 115 cases. 84 males who belonged to 21–30 years age group sustained fatal craniocerebral injuries while 31 females who belonged to 21–30 years age group sustained such injuries in RTAs. These findings are similar to the studies conducted by Momonchand A and Fimate L.<sup>4</sup> For the purpose of study the victims were divided into following categories- Pedestrian, Driver, Occupant, Motor cyclist, Pillion rider, bicycle rider and rickshaw puller. Analyses of the data revealed that majority of the victims were motor cyclist with total number of 104 cases who are followed by the pedestrian with 76 cases. Pillion riders were involved in 18 cases and

occupants of the 4 wheelers in 24 cases. Kumar L et al. and Kremer C et al. do agree in accompanying injuries, in majority of cases (149: 51.37%) deceased head injury was associated with some other bodily injuries.<sup>2,3</sup> Only 13.78% cases only head injury seen without any other injuries. Scalp Injury with skull fracture was the most common presentation of head injury. Linear fracture of skull was the commonest type of skull fracture other researchers Thube HR et al. & Shivakumar BC et al. found the homologous findings.<sup>7,8</sup> Commonest intracranial hemorrhage is subarachnoid hemorrhage with combination of subdural hemorrhage followed by other combinations. Most of other researchers Ahmad et al., Tandle RM et al. and Soni SK et al. founds that subdural hemorrhages as a commonest type.<sup>9-11</sup> This study has shown that traumatic brain injury is one of the important major causes of mortality and morbidity in road traffic accidents.

### Conclusion

Maximum head injury cases occurred during the winter months. most commonly affected victims were the motorcyclist. Road traffic accidents have become significantly responsible for loss of life, economic and social resources even in our city. With the sudden rise in the number of vehicles in the past ten years the incidences of traffic accidents also has risen. It is high time to better define the specific characteristics of the problem in a uniform manner so that preventive measures can be implemented accordingly. Primarily safety measures should focus upon three main factors viz. infrastructure, human behavior and vehicle design. It is required from concern government authority to take appropriate and immediate actions to reduce these kinds of accidents. As far as concern the same time, people should be educated for taking preventive actions to protect themselves like using helmets, speedlimitation while driving, lane systems in schools and public places.

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**Conflict of Interest:** None declared

**Ethical Approval:** Not needed.

### Abbreviation

SAH- Subarachnoid hemorrhage  
EDH- Extradural hemorrhage  
SDH- Subdural hemorrhage  
ICH- Intracranial hemorrhage

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