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## Epidemiological study of fatal head injury in road traffic accident in Varanasi district

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### Abstract

The present study comprises of 150 fatal head injuries cases in road traffic accident brought for medicolegal autopsy in the Department of Forensic Medicine, IMS, BHU at Varanasi during the period from 1st August 2015 to 31<sup>st</sup> July 2016. It was observed that maximum number of victim were in the age group of 21-30 years followed by 31-40 years. Males predominated over females in a ratio of 5.25:1 and most of the road traffic accidents happened to occur in rural areas. Majority of fatal head injury cases occurred during rainy season (40.66%) with peak incidence in the month of September. Labourer class is most commonly involved in fatal road traffic accidents and most of accident took place during evening hours. Most of the victims of fatal head injury died in hospital (52%) with maximum survival period of 24 hours to one week in 35% cases.

**Keywords:** Medicolegal, September, head injury

### Introduction

Term accident has been defined as an occurrence in the sequence of events which usually produces unintended injury, death or property damage [7]. Accident also defined as an unexpected unplanned occurrence which may involve injury [11]. Road traffic injuries claim more than 1.2 million lives each year and have a huge impact on health and development. They are the leading cause of death among young people aged between 15 and 29 years and costs government approximately 3% of GDP [10].

The head injuries sustained from vehicular accidents is an ever increasing trend due to increase in population, vehicle on the road, speed, ignorance of traffic rules, avoidance of protective equipments and poor road conditions [11]. Head is one of the most important vital organ involved in road traffic accidents and caused death of the injured person in spite of all efforts to save the life of the injured person.

Head injury defined by national advisory neurological diseases and stroke council is as a morbid state resulting from gross and subtle structural changes in scalp, skull and or the content of the skull produced by mechanical forces [1]. The extent and degree of injury to the skull and its content is not necessarily proportional to the quantum of force applied to the head. According to Munro-Any type of cranio-cerebral injury can be caused by any kind of blow on any part of head. Head injury is the principal killer in road traffic fatalities and other circumstances in which the person receives the injury to body including head injury even though prompt treatment is given. Head being the most vital organ of the body.

I have seen the cases of fall from height (Tree) where there are no visible external injuries to the body including head and brain, except extravasation of blood underneath scalp but the person died due to head injury because of axonal disruption which revealed on CT/MRI of head done during diagnosis and treatment of the person. For the purpose of study, road traffic accident was defined as 'an accident which took place on road between two or more objects one of which had to be any kind of moving vehicle.

### Aims and objective

To find out how the fatal head injury received in road traffic accidents affect incidence of age, sex, religion, occupation, socioeconomic status, place of occurrence and educational level of victims and its medico-legal consequences.

**Material and Methods**

Present study carried out on the unnatural death occurred in Road traffic accident brought by police to the Department of Forensic Medicine, Institute of Medical Sciences, Banaras Hindu University for postmortem examination from Varanasi itself and nearby districts and western part of Bihar state and small part of Madhya Pradesh for treatment and then if death at Varanasi in different hospitals occurs then the dead body after inquest send to Department of Forensic Medicine, IMS, BHU, for medico-legal postmortem examination. Prospective data was collected from autopsied fatal head injury cases among road traffic accident cases from 1<sup>st</sup> August 2015 to 31<sup>st</sup> July 2016. During his period, 150 head injury cases were recorded with detailed information out of 2200 Medico-legal postmortem examination. Data's were analyzed in respect of incidence of age, sex, religion, occupation, month and season, place of occurrence.

**Observation and results**

During the study period (1st August 2015 to 31<sup>st</sup> July 2016) a total of 150 cases of fatal head injury were recorded. Males predominated females in the ratio of 5.25:1. Maximum number of victims belonged to age group 21-30years i.e. 23.3% followed by age group 31-40 years (18.7%), next in frequency lies 41-50 years of age group with 17.3%. Extremes of ages are least involved as compared to adult age group. Table 1 & 2

In the study majority of deceased of fatal head injury were Hindu i.e. 89% remaining were Muslims. Involvement of

other religion was nil. Most of the road traffic accidents happened to occur in rural areas i.e. 81.3% while only 28 (18.7%) cases took place in urban areas. Table 1

Rainy season (July to October) saw maximum incidence of fatal head injury death among road traffic accident victims (40.66%) followed by winter (November- February) and least number of cases were recorded in summer season (March-June) i.e. 36(24%). Among the recorded cases highest number of fatal head injury were observed in the month of September 21 (14%), next in frequency lies month of October with 20 cases (13.33%) and December 19 (12.66%). Table 3

Maximum number of cases of fatal head injuries in vehicular accidents took place on Saturday i.e. 33(22%) followed by on Monday 26 (17%) and Friday 23(15%) and least no of cases were recorded on Sunday 13 (9.00%). Table 2

Labourers were most common victims i.e. 36(24%) followed by student 29(19%), farmer 24(16%) and drivers were involved in least no. of cases. Table 4

Regarding educational status of victims, persons with primary and higher secondary educational level each have the equal percent i.e. 35(23%) of involvement in fatal head injury met with road traffic accident followed by illiterate 33(22%). Table 3

Maximum no. of cases were recorded from low socioeconomic status i.e. 79(52.7%) followed by middle class 52(34%) meaning most of the cases belong to these two group. Table 4

**Table 1:** Sex, Religion and Place of occurrence of accident wise incidence

Sex	Frequency	%	Religion	Frequency	%	Accident Place	Frequency	%
Male	126	84	Hindu	134	89	Rural	122	81.3
Female	24	16	Muslim	16	11	Urban	28	18.7
Total	150	100	Total	150	100	Total	150	

**Table 2:** Age and Day wise incidence of Victims

Age Group	Frequency	%	Days	Frequency	%
0-10	5	3.3	Monday	26	17
11-20	16	10.7	Tuesday	16	11
21-30	35	23.3	Wednesday	18	12
31-40	28	18.7	Thursday	21	14
41-50	26	17.3	Friday	23	15
51-60	21	14.0	Saturday	33	22
>60	19	12.7	Sunday	13	9
Total	150	100	Total	150	100

**Table 3:** Month wise, Season wise and education status wise distribution of Victims

Months	Frequency	%	Educational Status	Frequency	%
January	13	9	Illiterate	33	22
February	11	7	Primary	35	23.3
March	10	7	Secondary	24	16
April	12	8	H. Secondary	35	23.3
May	6	4	Graduate	19	12.7
June	8	5	Post Graduate	4	2.7
July	9	6	Total	150	100
August	11	7	Season	Frequency	%
September	21	14	Rainy	61	41
October	20	13	Winter	53	35
November	10	7	Summer	36	24
December	19	13	Total	150	100
Total	150	100			

**Table 4:** Occupation and Socio-economic status of Victims

Occupation	Frequency	%	Socio-economic Status	Frequency	%
Student	29	19	Very low	15	10.0
Farmer	24	16	Low	79	52
Business	11	7	Middle class	52	34
Service	21	14	Rich	3	2.0
Labour	36	24	Affluent	1	0.7
Housewife	8	5	Total	150	100
Driver	6	4			
Others	17	11			
Total	150	100			

### Discussion

Road traffic injuries account for 2.1% global mortality. Developing countries bear a large share of burden and account for about 85% of death because of road traffic crashes (45). India's killer roads claimed the lives of 75000 people between 15 and 34 years age group last year. Over 82% of these victims were males according to the road accident report for year 2014 prepared by the Road Transport and Highways Ministry (23).

We have recorded the highest percentage of fatal head injury in road traffic accident in the age group of 21-30 years (23.3%) followed by age group 31-40 years (18.7%). Other workers in the field Suresh K. *et al* (2015) S. V. Kuchewar *et al* (2012), Deepak Sharma *et al* (2011), Aggarwal K. K. *et al* (2009) <sup>[15, 14, 5, 4]</sup> reported observations consistent with those of our studies. There are only 5 cases upto 10 years of age. A higher incidence of fatalities in the adult age group (21-40years) may be explained by the fact that the people from these age groups are more often required to move outdoors in pursuit of their works and studies. This age group is the most active phase of life during which there is tendency to take risk. They generally have a craze for speed while driving and disregard for the general traffic rules. In the study done by Shivendra Jha *et al* (2011) <sup>[16]</sup> they found involvement of age group 21-40 years was 68% which is much more than what is reported in the present study.

Males predominated over females in the ratio of 5.25:1. Probably due to the fact that males lead a more active role in life and keep themselves active outdoors most of the time to earn bread and butter for their families. They are more involved in activities such as driving and travelling. Our findings are consistent with those of Shivendra Jha *et al* (2011), Rajeev *et al* (2015), Dhaval J. *et al* (2009) <sup>[16, 13, 6]</sup>. Hindu dominated Muslims 89.3% Vs 10.7%. Preponderance of Hindu is due to larger share Hindu population in our country. A similar result was noted by Rajeev *et al* (2015) <sup>[13]</sup>. Maximum incidence i.e. 81.3% are recorded from rural areas, this is due to fact that most of national highways are passing through rural areas, our findings are contradictory to those of Anand R. *et al* (2016) <sup>[3]</sup> who recorded maximum incidence in urban areas.

In the present study maximum no. of cases of fatal head injuries in road traffic accidents occurred on Saturday 33(22%) followed by on Monday and Friday 17% and 15% respectively. Similar observation made by Anand R. *et al* (2016) <sup>[3]</sup>.

A season wise breakup of fatal head injury cases in road traffic accidents shows that rainy season has recorded maximum cases (41%) with peak of 21 cases in the month of September alone followed by summer (24%).

Taking into consideration the occupational status, labourers are the commonest victim of the fatal head injuries received in

road traffic accidents i.e. 24% followed by students. The reason for this may be attributed to the fact that these classes of persons are most often required to move out on the roads in process of their work and studies, contradictory to Shivendra Jha *et al* (2011) <sup>[16]</sup> where most of the victims were students followed by farmer.

Regarding educational status, no such difference is observed among different education level, victims having primary and higher secondary level education commonly involved (23%) followed by illiterate with 22%. This can be explained by the fact that literacy played no major role in causation of accidents or death. Findings are contradictory to study done by Shivendra Jha *et al* (2011), Anand R. *et al* (2016), <sup>[16, 3]</sup>.

Taking into consideration socioeconomic status, more than half of the cases were recorded from low socioeconomic status i.e.79 (52.75%) followed by middle class 34.75%, this can be explained by the fact that people of low socioeconomic status form a greater chunk of the population, need more hours of outdoor activities to earn their livelihood. Our findings are inconsistent with where middle income group constituted 84.22% of total fatal RTA victims.

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