



Original Research Article

Socio-demographic profile of head injury victims in road traffic accidents, an autopsy based study at SAMC & PGI, Indore

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ABSTRACT

Globally, deaths and injuries following Road Traffic Accident are a significant and increasing public health concern. Death due to road traffic accidents is becoming alarming in India and rest of the countries. A prospective study has been conducted at Department of Forensic Medicine & Toxicology, Sri Aurobindo Medical College & Post Graduate Institute, Indore, Madhya Pradesh. The study was carried out from October 2015 to March 2017. The study was undertaken to analyze Socio-demographic profile in fatal road traffic accident victims. Total 102 cases of both sexes and all age groups having head injuries due to road traffic accident, brought to our postmortem centre for medico-legal autopsy were included. Out of total 102 cases, male to female ratio was 5.8:1 and commonest age group affected was 21-30 years (36.8%). Among total victims, majority of cases were Hindu (93.1%). 28.4% of the victims were educated up to secondary school and 28.4% were farmer & laborers by occupation. Most of the deaths occurred due to accidents on Highway roads (47.1%). Most of the victims were on two wheeler (61.8%) and majority of them were without helmet (97%). Accidents were most common in summer months of March, April, May and June (39.2%). This study aims to provide epidemiological facts in head injury victims involved in vehicular accidents.

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1. Introduction

Road Traffic Accidents (RTAs) have emerged as a new health challenge in the world which not only leads to injuries, disabilities and loss of precious human lives but also imparts a substantial economic burden on the family concerned and the nation as whole.¹

As progress is made in the prevention and control of infectious diseases, the relative contribution of deaths from non-communicable diseases and injuries has increased. Road traffic injuries are the eighth leading cause of death for all age groups.² More people now die as a result of road traffic injuries than from HIV/AIDS, tuberculosis or diarrheal diseases. According to the WHO report (GLOBAL

STATUS REPORT ON ROAD SAFETY 2018) road traffic injuries are currently the leading cause of death for children and young adults aged 5–29 years, signaling a need for a shift in the current child and adolescent health agenda which, to date, has largely neglected road safety. With an average rate of 27.5 deaths per 100,000 populations, the risk of a road traffic death is more than three times higher in low-income countries than in high-income countries where the average rate is 8.3 deaths per 100,000 populations.²

The increase in the incidence of road traffic accidents in India has been observed to be 8% per year for last ten years and it is not showing any signs of reduction, reason behind it might be, vehicle sales growth per year in India has reached to 6% per year.³ Indian National highways comprises of 2% of total world road network. The sustainable development goals include a target of 50% reduction in road traffic deaths

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and injuries by 2020. In 2010, the United Nations General Assembly adopted resolution to stabilize and reduce the increasing trend in road traffic fatalities for saving an estimated 5 million lives over the period of decade of action for road safety.⁴

The present study was carried out to assess the correlation of head injury in RTA with factors such as age, sex, time of incidence, seasonal variations, economic status wise distribution, condition of roads, type of vehicle involved etc.

2. Materials and Methods

The current study was carried out from October 2015 to March 2017. The study included all the 102 victims of head injury in various vehicular accidents brought for medico-legal autopsy in our institute, Department of Forensic Medicine and Toxicology of Sri Aurobindo Medical College & Post Graduate Institute. It included cases who died in the institute while getting the treatment, dead on arrival to casualty department and also brought dead by the investigating agencies. The inquest report was carefully read before starting post-mortem examination, detailed history regarding socio-demographic details were noted, the mode of head injury was obtained from inquest report, hospital records, from the concerned Investigating officer and also from relatives. Thorough perusal of case papers including investigation, medico-legal register and police records like panchanama, police case diary, photograph of site of incidence was carried out to collect relevant information. Detailed history related to time, manner and hospitalization taken from hospital records and relatives. A semi-structured proforma was designed to collect information on socio-demographic profile of cases. Before commencing the study approval has been taken by institutional ethical committee of Medical College.

3. Observation and Results

In this study, total 102 cases were analysed which clearly demonstrated the male preponderance (85.3%) in all age groups. It was observed in the study that most affected age group was between 21-30 years having total 34 cases (33.3%), followed by 19.61% belonged to the age group 31-40 years. Thus 52.9% of the cases comprised of age group of 21-40 years in the study. Individuals in the age group less than 10 years were the least affected (2%), followed by elderly people i.e. 60 years and above in 6% of total cases. The lowest age of the victim was one year and the highest age observed was 71 years (Table 1).

In this study males (85.3%) outnumbered the Females (14.7%) with male and female ratio as 5.8:1 in victims of all head injury cases in RTA. Majority of the victims belonged to rural areas (62.7%), whereas 37.3% were from urban area (Table 2). Most of the victims i.e. 66 cases (64.7%)

were educated up to secondary school or below and rest 36 (35.3%) were educated up to senior secondary and above (Table 3).

Most of the deaths occurred due to accidents over Highway roads i.e. 48 cases (47.1%), followed by City roads in 40 cases (39.2%) and then rural roads in 14 cases (13.7%) (Figure 1). Accidents were most common in summer months of March, April, May and June (39.2%) as compare to winter season November, December, January and February (37.3%) and in rainy season (23.5%) (Figure 2). Most of accidents occurred during 4:01pm-12:00am (66.7%) followed by 8:01am-4:00pm (27.50%) and least common during 00:01am -08:00am (Table 5). Most of the victims were two wheeler users (61.8%) - two wheeler riders were 52.9%, whereas 8.8% were pillion riders. Pedestrians and four wheeler victims were 24.5% and 10.8% respectively (Table 6).

Table 1: Distribution of cases of RTA according to age and sex. (N=102)

Age (in years)	Female (%)	Male (%)	Total (%)
Less than 10 years	2 (13.3%)	0 (0%)	2 (2.0%)
11 – 20	2 (13.3%)	9 (10.3%)	11 (10.8%)
21 – 30	2 (13.3%)	32 (36.8%)	34 (33.3%)
31 – 40	4 (26.7%)	16 (18.4%)	20 (19.6%)
41 – 50	3 (20%)	15 (17.2%)	18 (17.6%)
51 – 60	1 (6.7%)	10 (11.5%)	11 (10.8%)
61 – 70	1 (6.7%)	4 (4.6%)	5 (4.9%)
71 and above	0 (0%)	1 (1.1%)	1 (1.0%)
Total	15 (100%)	87 (100%)	102 (100%)

Table 2: Distribution of cases of RTA according to demographic profile (N=102)

Demographic profile	No. of Cases (N=102)	Percentage (%)
Religion		
Hindu	95	93.1
Muslim	6	5.9
Sikh	1	1.0
Marital status		
Married	78	76.5
Unmarried	24	23.5
Type of habitat		
Rural	64	62.7
Urban	38	37.3

4. Discussion

In the present study peak incidence was observed in the age group of 21-30 years comprising 33.3% of cases, followed by age group 31-40 years (19.6%). Individuals in the age group of more than 70 years were the least affected (1%). As 3rd decade (21-30 years age group)

Table 3: Education wise distribution of RTA cases

Education Category	No. of Cases	Percentage (%)
Illiterate	20	19.6
Primary School	4	3.9
Middle School	13	12.7
Secondary School	29	28.4
Senior Secondary School	24	23.4
Graduate	8	7.8
Post Graduate	1	1.0
Professional	3	2.9
Total	102	100.0

Table 4: Occupation wise distribution of cases

Occupation	No. of Cases	Percentage (%)
House Wife	10	9.9
Laborer	29	28.4
Farmer	29	28.4
Student	11	10.8
Businessmen	11	10.8
Professional	11	10.8
Other	1	0.9
Total	102	100.0

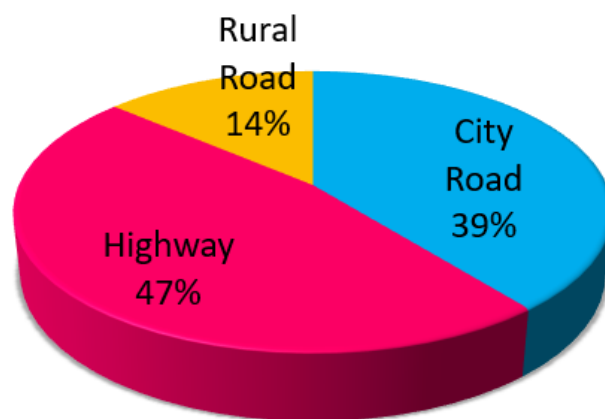
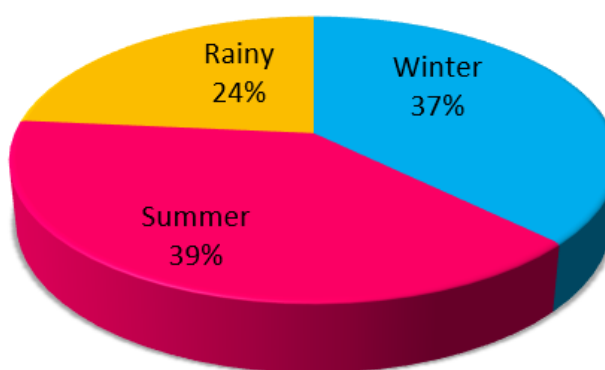
Table 5: Time wise distribution of RTA cases

Time of Accident	No. of Cases	Percentage (%)
8:01AM-4:00PM	28	27.5
4:01PM-12:00AM	68	66.7
00:01AM-08:00AM	6	5.9
Total	102	100.0

Table 6: Distribution of cases according to mode of transport

Type of Victims	No. of Cases	Percentage (%)
Pedestrian	25	24.5
Bicycle	3	2.9
Two wheeler Motor Cycle	63	61.8
Four wheeler (driver)	9	8.8
Passenger	2	2.0
Total	102	100.0

is one of the most active periods of life in males, working outdoors and thus one is more prone to road traffic accidents. The findings are consistent with other studies where most of the victims were from 21-30 years, followed by 31-40 age group, like Soni SK et al.,⁵ Sonawane S and Jambure M,⁶ Arora S and Khajuria B,⁷ P.V. Srinivasa Kumar and K. Srinivasan,⁸ Patil R C,⁹ Akhade S P, et al.,¹⁰ Shruthi P,¹¹ Kumar R D,¹² Banzal R K et al.¹³ The high mortality observed in this age group may be because of most active period of life and mostly involved in outdoor activities, more enthusiastic and energetic age group with more risk taking tendencies. Low incidence observed in extreme age group because children and old people are

**Fig. 1:** Place of accident**Fig. 2:** Seasonal variation of cases

confined to their homes, hence the risk of exposure to the outer hazardous environment is low. Contrary to present study, findings were not consistent with the studies done by Rupani R et al.¹⁴ and Keisham S,¹⁵ who observed that most of the deaths in age group 41-50 and above, which may be due to difference in selection criteria, slower reflexes and weakening of eyesight of victims in older age group.

In present study majority of victims were Hindu's (93.1%), followed by Muslim (5.9%) and Sikh (1%). Verma P et al.,¹⁶ Banzal RK et al.¹³ also reported maximum incidence among Hindu religion. The reason for the Hindu predominance is that in this region Hinduism is the most commonly followed religion and so is the increase in the Hindu victims. Deaths in road traffic accidents were among married persons (76.5%) compared to unmarried (23.5%), which may additionally be due to the fact that burden of family responsibilities and sole bread earners in their families results in travel extra for livelihood. Similar observations were found in study of various researchers viz Verma P et al.¹⁶ Sonawane S and Jambure M.¹⁷ Majority of the victims were from rural areas (62.7%), whereas urban population was involved in 37.3% of cases, which is due

to more common accidents in rural population, may be due to two wheelers being most common means of transport in rural areas as well as less knowledge and awareness of traffic rules in majority of rural population. Our institute is located beside highway and is at junction of city and village area. Any accident in village area and nearby city area, patient immediately rushes to our hospital. Findings of present study are not consistent with the studies done by Verma P et al.,¹⁶ Shruthi P et al.¹¹ who found majority of the cases from urban population. The variation might be due to location and catchment area of the hospital.

In the present study, out of total 102 cases, 66 (64.7%) were educated up to secondary school or below and rest 36 (35.3%) were educated up to senior secondary and above. When occupation wise distribution was analyzed, majority of the cases i.e. 29 (28.4%) were from agriculture farmer and labor workers, followed by student, businessmen and professionals in 11 cases (10.8%); and least 10 (9.9%) cases were housewives (Table 4). Similar occupation profiles were noted by Verma P et al.¹⁶ More accidents among farmers and laborers may be due to more use of two wheelers or usually being a pedestrian and also due to lack of awareness of traffic rules. Contrary to present study, Jha S et al.¹⁸ in his study observed students to be the highest number of victims in 20.7% cases.

Most of the accidents occurred over Highway roads i.e. 48 (47.1%), followed by City roads 40 (39.2%) and rural roads 14 (13.7%). Similar finding were observed by Shruthi P et al.¹¹ that majority of the cases occurred on highways since vehicles usually ply at very high speeds on these roads, and our study centre is located in outskirts of city where highway is connected to city roads.

Most of the accidents occurred during 4:01PM –12:00 AM (68; 66.7%), followed by 8:01AM- 4:00 PM (28; 27.5%) and least common during 00:01AM – 08:00 AM (6; 5.9%)(Table 5). Similar finding were observed by Aggarwal A et al.¹⁹ who found most of the incidents of vehicular accidents occurred in the evening and night hours. It may be because of congestion is more on roads in this period as everybody is in hurry to return back home from jobs and lighting condition are poor on most of the outskirt roads, sub urban and surroundings rural areas.

Largest number of the accidents took place during the summer months of March, April, May and June (39.2%). Similar findings were observed by Akhade S P, et al.¹⁰ This could be due to the fact that in summer season marriages being conducted and also selling of grains and harvesting is in its peak. These are also the holidays and vacation months marked by rise in the flow of people from one location to another by road transport. Contrary to findings of present study, Shruthi P et al.¹¹ recorded highest number of incidents in winter season followed by rainy season, because of longer hours of darkness and poor visibility due to foggy weather and extreme cold.

Out of 102 cases, 63 (61.8%) were using two wheeler motorcycle, with 54 (52.9%) riders & 9 (8.8%) pillion riders, were most common victims of accidents, followed by pedestrians in 25 cases (24.5%). Four wheeler drivers were 9 (8.8%) and minimum incidence was observed in bicycle 3 (2.9%) and public transport passengers 2 (2.0%). Similar findings were observed by Akhade S P, et al.¹⁰ As two wheelers are the most common means of transport in rural areas, increased fatalities among the two wheeler can be explained by the factors like lack of traffic sense, poor lighting of the streets, overcrowding on the foot paths, carelessness by both- the drivers and pedestrians, rash driving, neglect in wearing helmets, in-operability of traffic light signals, alcohol abuse etc. The riders of two wheelers have no protection and are unstable and topple even on slight impact, making riders more vulnerable to contact with hard road surfaces.

Contrary to present study most commonly involved victims were pedestrian in studies conducted by Verma P et al.¹⁶ Shruthi P et al.¹¹

5. Conclusion

According to the 2018 report of the World Health Organization, the highest number of road accidents occurs in India worldwide. Even China, the most populous country, is behind us in this regard. As per the report of the Ministry of Road Transport and Highways, 2017; there are about 5 lakh road accidents occurring in India every year in which around 1.5 lakh people are killed. So in order to prevent the menace of road accidents; the central government has amended the Motor Vehicle Act 1988 by the Motor Vehicles (Amendment) Bill 2019. This new act was passed by the Lok Sabha on Jul 23, 2019 and by Rajya Sabha on Jul 31, 2019. After the passing of this bill, Road and transport Minister Nitin Gadkari said that the Bill will provide an Efficient, Safe and Corruption Free Transport System in the Country.

Motor Vehicles (Amendment) Act 2019 has been implemented throughout the country since September 1, 2019. Now the penalty has been increased 10 times on various violations. A safe transportation and travel ecosystem requires a symbiotic relationship among the various agencies and subsystems. Traffic administration, smart technologies, integrity and professionalism of the government officials, robust road user training systems, honest and holistic transportation system designers, and many such agencies have to come together in a synchronous manner. However, it's heartening to see the governments moving in the right direction after decades of neglect and apathy.

The rate of incidence is higher in India because of its traffic patterns and their demographic profile. Possibly, the lack of preventive measures such as helmets in motor cyclists, seatbelts in automobiles, poorly controlled traffic

conditions and poor road conditions are other factors responsible for injuries.

The present study revealed that most victims were of younger age group. This situation can be improved by educating public through the mass and media initiating road safety training campaign. Most of the deaths from RTA take place either on the spot or within 24 hours of sustaining injury. So an effort should be made to provide timely and proper medical services to RTA victims via mobile emergency services, quality trauma centers and proper rehabilitation services.

Measures should be taken for improving construction and maintenance of the roads, strict traffic rules, better traffic monitoring and also prevention of drunken driving and strict punishment for those breaking the rules. Awareness programs should be regularly held regarding use of proper protective and safety measures and increased road traffic sense in road users. Moreover, national programmes should be started just like 'Swacchh Bharat Abhiyan'; where Indore has been awarded as the cleanest city of India. Similar programmes with ranking of cities can be started in field of road transport departments also, where people can be motivated for using safety measures and following traffic rules for getting best ranking.

The present study is concluded with the hope that given suggestions and methods will help in reducing the number of road traffic accident cases.

6. Source of Funding

None.

7. Conflict of Interest

None.

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