

Epidemiological Profile of Fatal Road Traffic Accident Cases at a Tertiary Care Center in North India

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ABSTRACT

Introduction: India being one of the fastest developing nations in the world with a huge population density, the road traffic density is also increasing. Although India has only 1% of the world's motor vehicles, but it accounts for 6% of the total global road traffic accident deaths. Thus, keeping this global epidemic of fatal road traffic accidents in mind, the present study was undertaken to study the epidemiology of fatal road accidents and accordingly suggesting suitable methods for better management and prevention of the same.

Methods: The present study was conducted in the department of Forensic Medicine and Toxicology, Govt. Medical College, Patiala. The material for this study included 100 cases taken randomly from total of 830 cases of alleged history of road traffic accident brought in the Department of Forensic Medicine and Toxicology, by police for post-mortem examination during the 2 year period from November 2010 to October 2012. A total of 1450 post-mortems were performed during this period.

Results: In the present study maximum number of cases (34%) was reported in the age group of 15-30 years. Mostly victims were from rural areas (68%) while number of females from urban areas is more (60%). Maximum numbers of victims were educated up to Xth standard (30%). laborers were

maximally involved (22%). Drivers were seen in 40% cases followed by cases of pedestrians (35%). For male and female victims the main vehicle involved was motorized two wheeled vehicles seen in 43% of cases.

Keywords: Road Traffic Accident, Motorised Vehicles, Demographic Profile.

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INTRODUCTION

The word accident comes from the Latin *accidere*, which means "fall upon, to occur by chance". Due to urbanization and the tremendous growth of the road transport sector, vehicular accidents are on the rise in modern times.¹ Rapid motorization and other reasons in developing countries are contributing to the rapid increase in road traffic accidents. The problem is increasing at a fast rate in developing countries due to rapid motorization and other factors.²

India accounts for about 10% of road accident fatalities worldwide.³ India has the second-largest highway and road network after the United States. It is estimated that by the year 2050, there will be over 267 million automobiles on Indian roads.⁴ The proportion of deaths and injuries as a result of road traffic accidents is alarming.⁵ According to WHO, road traffic injuries are the sixth leading cause of death in India with a greater share of hospitalizations, deaths, disabilities and socioeconomic losses in young and middle-age populations.⁶

Thus, keeping this epidemic of fatal road traffic accidents in mind, the present study was undertaken to study the epidemiology of fatal road accidents and suggesting suitable methods for better management and prevention of the same.

MATERIALS AND METHODS

The present study was conducted in the department of Forensic Medicine and Toxicology, Govt. Medical College, Patiala. The material for this study included 100 cases taken randomly from total of 830 cases of alleged history of road traffic accident brought in the Department of Forensic Medicine and Toxicology, by police for post-mortem examination during the 2 year period. The individual details of cases and details of accident were recorded from inquest papers submitted by police investigating officer, and relatives or friends accompanying the dead body at the time of post-mortem. The survival time and the details of injuries received during the accident and the treatment given were

obtained from the medico legal reports and hospital records. On all the cases a meticulous autopsy was done to record the pattern and distribution of injuries. The data thus collected was analyzed statistically. Only cases of fatal road traffic accidents brought by police for post-mortem examination were included. Cases with injuries not received due to road traffic accidents and decomposed and putrefied bodies were excluded from the study.

OBSERVATIONS AND RESULTS

In the present study maximum number of cases (34%) reported in the age group of 15-30 years followed by the age group of 30-45 years (31%). (Table 1) It is also observed that cases in two extremes of life i.e. during childhood and those above 60 years were lowest. Overall males have higher number of (90%) case at all age groups than females. Most of the victims were from rural areas (68%) while number of females from urban areas is more (60%) than males. (Table 2)

Majority of cases were of low level of education, maximum number were educated up to Xth standard (30%) while only few cases were postgraduate. (Table 3) Overall there is decrease in number of cases with increase in the education status. In the present study labourers were maximally involved (22%) followed by farmers (20%) and students (20%). (Table 4) Overall males of

any occupation have higher incidence than females of same occupation. It was observed that most of the victims were drivers (40%) followed by pedestrians (35%) and occupants (25%). (Table 5)

Most of drivers were male whereas most of the female victims were occupants of vehicles. It was observed that most of the vehicles of victims of both males and females were motorized two wheeled vehicles (43%), (Table 6) whereas involvement of females in other type of vehicles was negligible.

It was observed that in the age group <30 years four wheeled heavy vehicles were more involved (52.55%) than in the age group >30 years (48.33%), while four wheeled light vehicles were more involved in age >30 years (31.66%) than age <30 years (25%). Most of the offending vehicles of accused were four wheeled heavy vehicle (50%), second in number were four wheeled light vehicle (29%). (Table:7)

Maximum number of case of road side accidents involved front (41%) type of collision, while in females most number of cases involved side type of collisions (60%). (Table: 9)

It showed that most of the victims were brought dead (60%). Among the hospital deaths most of victims died in first 6 hours of arrival. (Table 10) It can be seen that most of victims survived more than a day were better educated than others.

Table 1: Age and sex wise distribution of cases.

Age group	Male	%	Female	%	No. of cases	%
Less than 15 years	05	5.55	01	10.00	006	06.00
15 to 30 years	33	36.66	01	10.00	034	34.00
30 to 45 years	27	30.00	04	40.00	031	31.00
More than 45	25	27.77	04	40.00	029	29.00
Total	90	90.00	10	100.0	100	100.0

Table 2: Distribution of cases according to residential address of the victims

Residential address	Male		Female		Total cases	
	No.	%	No.	%	No.	%
Rural	64	71.11	04	40.00	068	68.00
Urban	21	23.33	06	60.00	027	27.00
Not known	05	05.55	00	00.00	005	05.00
Total	90	90.00	10	100.0	100	100.0

Table 3: Education status wise distribution of cases

Education status	Male	%	Female	%	No. of cases	%
Illiterate	09	10.00	02	20.00	011	11.00
< V class	06	06.67	01	10.00	007	07.00
VI th to X th class	28	31.11	02	20.00	030	30.00
XI th to XII th	21	23.33	00	00.00	021	21.00
Graduate	17	18.89	04	40.00	021	21.00
Post graduate	06	06.67	01	10.00	007	07.00
Not known	03	03.33	00	00.00	003	03.00
Total	90	100.0	10	100.0	100	100.0

Table 4: Occupation wise distribution of cases.

Occupation	Male		Female		Total	
	n	%	n	%	n	%
Farmer	20	22.22	00	00.00	020	20.00
Shop-keeper	03	03.33	00	00.00	003	03.00
Housewife	00	00.00	05	50.00	005	05.00
Govt employee	09	10.00	01	10.00	010	10.00
Student	20	22.22	01	10.00	021	21.00
Labourer	22	24.44	00	00.00	022	22.00
Retired	02	02.22	00	00.00	002	02.00
Pvt. Job	14	15.56	03	30.00	017	17.00
Total	90	100.0	10	100.0	100	100.0

Table 5: Type of victims involved in road traffic accidents.

Type of victim	Male		Female		No. of cases	
	n	%	n	%	n	%
Driver	39	43.33	01	10.00	040	40.00
Occupant	18	20.00	07	70.00	025	25.00
Pedestrian	33	36.66	02	20.00	035	35.00
Total	90	90.00	10	10.00	100	100.0

Table 6: Distribution of cases in relation to the type of vehicle involved of victims.

Type of vehicle/ victim	Male		Female		Total	
	n	%	n	%	n	%
Four wheeled heavy vehicles	05	05.56	00	00.00	005	05.00
Four wheeled light vehicle	12	13.33	00	00.00	012	12.00
Motorized two wheeled vehicles	35	38.89	08	80.00	043	43.00
Three wheelers	01	01.11	00	00.00	001	01.00
Bicycles	04	04.44	00	00.00	004	04.00
Pedestrian	33	36.67	02	20.00	035	35.00
Total	90	100.0	10	100.0	100	100.0

Table 7: Distribution of cases in relation to the age of victim and offending vehicle

Type of vehicle	Age < 30 years		Age > 30 years		No of cases	
	n	%	n	%	N	%
Four wheeled heavy vehicle	21	52.50	29	48.33	050	50.00
Four wheeled light vehicle	10	25.00	19	31.67	029	29.00
Motorized two wheeled vehicle	02	05.00	01	01.67	003	03.00
Three wheelers	02	05.00	01	01.67	003	03.00
Unknown	02	05.00	07	11.67	009	09.00
Self suffered	03	07.50	03	05.00	006	06.00
Total	40	100.0	60	100.0	100	100.0

Table 8: Distribution of cases in relation to the type of vehicle involved of accused.

Type of vehicle/ Accused	Male		Female		Total	
	n	%	n	%	N	%
Four wheeled heavy vehicle	46	51.11	04	40.00	050	50.00
Four wheeled light vehicle	23	25.56	06	60.00	029	29.00
Motorized two wheeled vehicle	03	03.33	00	00.00	003	03.00
Three wheelers	03	03.33	00	00.00	003	03.00
Unknown	09	10.00	00	00.00	009	09.00
Self suffered	06	06.67	00	00.00	006	06.00
Total	90	100.0	10	100.0	100	100.0

Table 9: Type of collisions involved in road traffic accidents.

Type of collision	Male		Female		Total cases	
	n.	%	n.	%	n.	%
Front	41	45.56	00	00.00	41	41.00
Back	24	26.67	04	40.00	28	28.00
Side	25	27.78	06	60.00	31	31.00
Total	90	100.0	10	100.0	100	100.0

Table 10: Distribution of cases in relation to survival time

Survival time (hours)	Illiterate		>5 th		6 to 10		11 to 12		Graduate		Post Graduate		Total Cases	
	N	%	n	%	n	%	n	%	n	%	n	%	n	%
Brought dead	08	57.1	4	57.1	21	70.0	11	52.3	12	57.1	04	57.1	60	60.0
< 6	04	28.5	2	28.5	06	20.0	09	42.8	06	28.5	03	42.8	30	30.0
6-12	02	14.2	1	14.2	01	03.3	-	-	01	4.76	00	00.0	05	05.0
12-24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
> 24	-	-	-	-	02	06.6	01	04.7	02	09.5	00	00.0	05	05.0
Total	14	14.0	7	07.0	30	30.0	21	21.0	21	21.0	07	07.0	100	100

DISCUSSION

Due to urbanisation and the explosive growth of the road transportation industry, there has been a sharp increase in vehicle accidents in recent years.⁷ Population explosion is a catalysing factor for increased number of accidents. Epidemiological techniques are very helpful for the research and control of accidents since they are multifactorial. In this study 100 autopsies of road traffic accident victims were conducted in the department of Forensic Medicine, Government Medical College & Rajindra hospital Patiala.

Age

The present study revealed that, majority of the Road Traffic Accident victims were in the age group of 15 to 30 years (34%) followed by 30-45 (31%) (Table1). Tendency of this age group to show scarce attention to traffic rules & regulations and non use of safety devices like helmets, seatbelts, restraints etc. can be a possible explanation for the same. This shows that the people of the most active and productive age group are involved, which adds a serious economic loss to the community. These observations are similar to the study conducted in Wardha⁸ and Nepal.⁹ More than half of the road traffic casualties are in the wage earning age group. Males have higher incidence in all age groups. The loss of the main earning member can be disastrous, leading to fall in income of the household and lower living standards. Involvement of younger age group individuals in these studies owing to the fact that they have an inherent tendency to take risk, pay scanty regard to traffic rules, lead more active life and keep themselves outdoor mostly. Besides, young individuals are fascinated with activities like boarding a moving vehicle, risky high-speed driving, crossing roads carelessly and low respect for traffic rules.

Sex

The males were more involved (90%) compared to females (10%) (Table1). Male to female ratio was 9:1. This finding that males outnumbered females can be explained by the fact that males are

more involved in activities such as driving and travelling and also males have more tendencies to take risks during driving. Males are also more habitual to drinking or other type of addiction during driving. In contrast females remain mostly indoors due to cultural backgrounds and reduced outdoor activities. The findings of this study are consistent with studies done at Pondicherry¹⁰ and Rohtak.¹

Residence

In this study most of the victims were from rural (60%) areas than urban areas (40%) (Table 2). This can be explained on the basis that most of the cases included in this study were from surrounding areas of Patiala living in the villages, also most of the victims who were labourers or farmers belonged to rural areas whereas females of urban areas were more involved than rural areas because they form the working class in urban areas and more exposed to traffic. Similar findings were seen in study done at western Nepal in 2010 in which victims from rural areas were more (65.83%) as compared to urban areas (34.17%).¹¹

Education

Majority of cases are educated up to Xth (30%) standard whereas only few persons were postgraduate/professionals (Table 3). It shows that education plays important role in road safety. Regarding educational level of victims this study confirms the results concluded by others. Above observation indicates that lack of road traffic senses resulting either from illiteracy or poor literacy may have been a significant contributory factor to the causation of road traffic accidents. Our findings are in agreement with those of other workers from Pondicherry¹⁰ and Wardha.¹¹ Females with good education were more involved in road traffic accident cases because they are mostly working outside and exposed to the traffic.

Occupation

In this study labourers (22%) and students (21%) constituted a major part of road traffic accident cases (Table 4). Labourers are

usually of poor socioeconomic background and are usually illiterate. Students are more involved in road traffic accidents because of their more outdoor activities, bad driving habits, using no protection, and not obeying the traffic rules. Retired persons and housewives are involved least due their confinement to indoor activities. Labourers were highest (29.9%) among the accident victims in study conducted at Pondicherry.¹⁰ Overall males have more cases of road traffic accidents in all occupations than females.

Type of victims

In this study drivers (40%) were the main victims of road traffic accidents followed by pedestrians (35%) and occupants (25%) (Table 5). Drivers because of their sitting position in vehicles are more prone to injuries than other occupants of vehicles in case of road traffic accidents especially in frontal impacts. This is in contrast with study at Rohtak¹ and Wardha¹¹ where pedestrians were commonest victims. Pedestrian being second common victims can be explained by the fact that they are exposed to the traffic because of lack of proper footpaths and also presence of vendors and other commercial installations by the side of the roads that forces pedestrians to walk in middle of roads. Moreover, majority of road users are pedestrians thus are comparatively more exposed to the risk of accidents, and are of low or lower middle socioeconomic status, are illiterate and lack traffic sense. Studies from developed countries have reported lesser involvement of pedestrians. Probably due to the fact that in developed countries motorization is to that extent that pedestrians are scarce on the road.

Vehicles of victim

In this study, in maximum number of cases the vehicles belonged to victims consist of motorised two wheeled motorised vehicles (43%) followed by pedestrians (35%) and four wheeled light vehicle (12%) (Table 6) It can be explained on the basis of less stability, higher speed, restless driving and thrill seeking habits of two wheeler drivers, most of whom are young students. This finding is similar to study done in Pondicherry.¹⁰

Vehicles of accused

In this study majority of the offending vehicles are four wheeled heavy vehicles (50%) followed by four wheeled light vehicles (29%) (Table 8). Bicycles, three wheelers are minimally responsible for accidents. This can be attributed to their high speed, greater momentum, and presence of single Space roads, overtaking, volume of traffic and greater impact of four wheeled vehicles. This finding is consistent with studies done at Pondicherry¹⁰, Wardha¹¹ and Rohtak.¹

Type of impact

In majority of cases front (41%) of the vehicle was found responsible for impact followed by side (31) of vehicle (Table 9). Involvement of front of the vehicle may be due to heavy traffic volume, overtaking, and violation of traffic rules. In cases of female victims more cases are of side impact which can be explained on the basis that females are usually occupants of two wheeled motorised vehicles and four wheeled light vehicles and sitting on side or at back of vehicles. Our findings are consistent with study done in Allahabad.¹³

Place of death

In the present study majority of victims (60%) died on spot or were brought dead in hospital whereas (40%) victims died in hospital during course of treatment (table 10). This may be due to delay in

transporting the victims to nearest hospital due to lack of initiative, no mobile vans or police patrol to aid in transport which is in concurrence with the study done in Delhi¹⁴ and North Bengal.¹⁵ This emphasizes the need for setting up specialized trauma centers in all big cities of the country and proper and faster transportation of RTA victims to save the precious lives.

Survival period

Regarding period of survival of fatal RTA victims, it was noted that the majority of deaths occurred in first 6 hours after admission to hospital. A great majority of victims have died within 24 hours hence first 24 hours are quite crucial for road traffic victims (table10). Our findings are in general agreement with studies done at Rohtak.¹

CONCLUSION

Road traffic accidents results in trauma, resulting in morbidity, disability and even mortality. The problem of deaths and injuries as a result of road traffic accidents is serious enough to demand the attention of respective administrative authorities. Maximum numbers of victims of road traffic accidents were in the age group of 15-30 years (34%). Lowest incidence was observed in less than 10 years. Considering the maximum involvement of individuals in the economically productive years, vehicular collision fatalities may have an important economic impact. Males (90%) were more affected than females (10%) in road traffic accidents. This shows that males are more exposed to traffic due to their more outdoor activities. The maximum numbers of the victims were from rural areas (68%) while number of females from urban areas is more (60%). This shows less awareness of traffic rules and low education level in rural areas. Maximum numbers of the victims of road traffic accidents were labourers (22%) and students (20%). Majority of the victims of road traffic accidents were educated up to 10th standard. This shows the need of increase in literacy rate which can greatly help traffic conditions.

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