

Original Research Article

Epidemiological study of road traffic accident cases admitted in government tertiary hospital: a study from Punjab, India

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ABSTRACT

Background: Among all types of injuries road traffic injuries constitute a major public health problem. They lead to not only deaths but many more cases of morbidity and disability. People from all economic groups are affected but poor are affected the worst because they suffer from double brunt of injuries and also the economic loss; sometimes pushing them below the poverty line. The present study was conducted to study the epidemiological variables involved in road traffic accidents.

Methods: 500 road traffic accident victims admitted in emergency department of Rajindra Hospital, a tertiary institute; attached to Government Medical College, Patiala (Punjab) were studied from July 2002 to February 2003. In this descriptive study pretested proforma was used to know the various epidemiological factors related to road traffic accident victims. The demographic variables, category of road users, details of injured pedestrians and types of vehicles involved in road traffic accidents were studied.

Results: The road traffic accident victims mainly include the young males, especially 21-30 years (31.4%), married (70.6%), and men (86.8%) mainly literate (66.6%), from rural areas of Punjab. Maximum accidents occurred during night time (8pm- 4am) and major involvement was of two wheelers (63.4%). Mainly drivers were affected in the road crashes (46.6%) followed by pedestrians (21.4%).

Conclusions: young male drivers are affected the most, mainly involving two wheelers. There should be regular and continuous on-going traffic safety and awareness programs covering all the media especially directed towards education of drivers, pedestrians and young population; mainly focusing on the schools and colleges youth.

Keywords: Injured pedestrians, Road accidents, Traffic injuries, Two wheelers, Young male drivers

INTRODUCTION

1.25 million deaths occur each year as a result of road traffic injuries where 15-29 years age group people are affected the most and half of the deaths are among 'vulnerable road users' i.e. Pedestrians, cyclists and

motorcyclists. 90% of the world's fatalities occur in low- and middle-income countries, although these countries have about half of the world's vehicles.

After drivers, pedestrians are the next most vulnerable group in the present study. According to world health organization statistics, every four minutes a child is

loosing life prematurely due to road accidents in the world. Road traffic injuries are the most common cause of death among the children in the age group 15-17 years.¹

If appropriate actions are not taken, road traffic accidents can become the 7th leading cause of death by 2030. The 'Sustainable Development goals' has set an road safety target of halving the global number of deaths and injuries from road traffic crashes by 2020.²

In the year 2010, India reported 133938 deaths due to road traffic accidents; 85% were males and 15% were females and estimated GDP lost due to road traffic crashes was 3%.³ The present study is a sincere effort to highlight some of the epidemiological factors involved in road traffic accidents in this part of the country.

METHODS

Study design/ type of study: It is a descriptive study.

Study population: Road traffic accident victims admitted in emergency department of Rajindra hospital, Patiala.

Study settings: Daily visits were made in Emergency ward of Rajindra Hospital, Patiala for enrollment of cases and for follow up the surgery and orthopedics ward of Rajindra Hospital, Patiala attached to Government Medical College, Patiala, a famous tertiary institution in north India (Punjab); to note down the relevant information.

Sample size: 500 road traffic accident victims

Sampling technique: Consecutive sampling till completion of sample size of 500 cases.

Statistical analysis: Ratio and proportions.

Exclusion criteria: Unconscious or non-cooperative patients or their attendants, patient referred to some other institution from emergency ward or died before being interviewed by the author.

Study period: July 2002 to February 2003.

Instrument: Pretested Proforma to know the epidemiological aspects and demographic variables related to road traffic accidents. Where the condition of the victims did not warrant the interview, the relatives or attendants were interviewed, who had either seen the accident happening or had visited the site of accident afterwards and had full knowledge of accident happening through the police enquiry; in case where it was made.

Information as regard the demographic data of victims, time, location of accident, residence of victims and also about vehicle, road and other conditions was obtained by interviewing the accident victims.

RESULTS

Table 1A showing the demographic profile of road accident victims revealed that out of total 500 cases of road accidents 434 (86.8%) were males and 66 (13.2%) were females with male to female ratio of 6.57 : 1. The maximum number of victims were in the age group less than 50 years 426 (85.2%) and that too in the age group of 11-50 years i.e. 405 (81%). About 70.2% of the victims were under 40 years age group. In all the age groups, males were predominant victims.

Table 1B shows that 167 (33.4%) of road accident victims were illiterate and 333 (66.6%) were literate. Among the literates 162 (32.4%) were having education up to primary standard, 81 (32.4%) were up to matric and 90 (18%) were higher than matric. The majority of the victims were literate. As literate people constitute the major proportion of road users in Punjab and also they have more needs and better means of transport; hence more chances of getting involved in the road accidents.

Table 1C reveals that out of the 500 victims of road traffic accidents 88 (17.6%) had monthly income from all the sources less than Rs. 1000, 150 (30%) had 1001-3000, 129 (25.8%) had 3001-5000, 107 (21.4%) had 5000-10000 and only 26 (5.2%) had monthly income more than 10,000. The majority of the victims 367 (73.4%) had monthly income <5000 rupees.

Table 1D shows that majority 353 (70.6%) of the victims of both sexes, involved were married and only 147 (29.4%) were single (minor, unmarried, divorcee, widow/widower).

Table 2 shows that a total of 228 (45.6%) victims were resident of urban areas and 272 (54.4%) were residing in the rural areas.

Table 3 shows distribution of cases according to their occupation. Maximum 156 (31.2%) number of cases were unskilled workers, and laborers. The next major group of victims were doing service 82 (16.4%), then students 60 (12%), farmers (agriculturist) 49 (9.8%), businessmen 42 (8.4%), housewives 32 (6.4%), professional drivers 24 (4.8%), retired persons 24 (4.8%), skilled workers 23 (4.6%) and unemployed adults 2 (0.4%) and pre-school children (0.4%).

Table 4 shows time of occurrence of accidents. It was observed that maximum number of accidents (29.4%) occurred in between 8 p.m. and 4 a.m. i.e. during night followed by 4a.m. and 12 noon (26.2%) and minimum accidents occurred afternoon between 12 pm and 4 p.m.

Table 5 shows that majority of the victims 233 (46.6%) were drivers and majority of the drivers were males. The next major group involved were the Pedestrians 107 (21.4%) followed by passengers 98 (19.6%) and others

62 (12.4%). Others included the bicyclists, occupants of cycle rickshaw or animal driven vehicles and rehri occupants.

Table 6 shows the behavior of pedestrians on the road, when they met with an accident. Out of 107 pedestrians only 12 (11.21%) were walking on the footpath while

majority of the pedestrians 95 (88.79%) were walking on the road. 37 (34.58%) pedestrians were crossing the road either at intersection or on the midway of the road. 22 (20.56%) out of 107 were in intoxicated state, 8 (7.48%) were under stress or anxiety, 25 (23.36%) were walking on the wrong side, when accident occurred.

Table 1: Demographic profile of road accident victims.

A Distribution of victims according to age and sex						
Age group (in years)	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
0-10	14	2.8	7	1.4	21	4.2
11-20	77	15.4	7	1.4	84	16.8
21-30	150	30	7	1.4	157	31.4
31-40	74	14.8	15	3	89	17.8
41-50	63	12.6	12	2.4	75	15.0
51-60	24	4.8	9	1.8	33	6.6
61-70	25	5	6	1.2	31	6.2
Above 70	7	1.4	3	0.6	10	2
Total	434	86.8	66	13.2	500	100
B Distribution of victims according to educational status						
Educational status		No. of cases		%		
Illiterate		167		33.4		
Literate						
Primary		162		32.4		
Matric		81		16.2		
Above Matric		90		18.0		
Total		500		100		
C Distribution according to income						
Income (Rs.)	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Upto-1000	52	10.4	36	7.2	88	17.6
1001-3000	143	28.6	7	1.41	150	30.0
3001-5000	123	24.6	6	1.2	129	25.8
50001-10000	93	18.6	14	2.8	107	21.4
>10000	23	4.6	3	0.6	26	5.2
Total	434	86.8	66	13.2	500	100
D Distribution of victims according to marital status						
Marital status	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Married	305	61	48	9.6	353	70.6
Single /any other	129	25.8	18	3.6	147	29.4
Total	434	86.8	66	13.2	500	100

(Any other - included - minor, unmarried, divorcee, widow/widower).

Table 2: Distribution of victims according to place of residence.

Residence	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Urban	208	41.6	20	4.0	228	45.6
Rural	226	45.2	46	9.2	272	54.4
Total	434	86.8	66	13.2	500	100

Table 3: Distribution of victims according to occupation.

Occupation	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Pre-school children	2	0.4	-	-	2	0.4
Unemployed	2	0.4	-	-	2	0.4
Service	68	13.6	14	2.8	82	16.4
Business	42	8.4	-	-	42	8.4
Unskilled worker and labourers	153	30.6	3	0.6	156	31.2
Skilled worker	23	4.6	-	-	23	4.6
Retired	24	4.8	-	-	24	4.8
Student	50	10.0	10	2.0	60	12.0
Housewives	-	-	32	6.4	32	6.4
Professional driver	24	4.8	-	-	24	4.8
Farmer (agriculturist)	46	9.2	3	0.6	49	9.8
Any other	-	-	4	0.8	4	0.8
Total	434	86.8	66	13.2	500	100

(Any other - included Professionals & Part-time workers (being small group).

Table 4: Time of occurrence of accidents.

Time of Accident	No. of cases	%
Morning (4 am to 12 noon)	131	26.2
Afternoon (12 to 4 pm)	98	19.6
Evening (4 to 8 pm)	124	24.8
Night (8 pm to 4 am)	147	29.4
Total	500	100

Table 5: Status (category) of road user involved in accident.

Road user Status/ Category	Male		Female		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Driver	222	44.4	11	2.2	233	46.6
Passenger	64	12.8	34	6.8	98	19.6
Pedestrian	86	17.2	21	4.2	107	21.4
Any other	62	12.4	-	-	62	12.4
Total	434	86.8	66	13.2	500	100

(Any other: Bicyclist, occupants of cycle rickshaw or animal driven vehicle and rehri occupants.).

Table 6: Details of the injured pedestrians.

Details of pedestrian	Yes		No		Total	
	No. of cases	%	No. of cases	%	No. of cases	%
Walking on footpath	12	11.21	95	88.79	107	100
Accompanying any person	37	34.58	70	65.42	107	100
Crossing the road	71	66.36	36	33.64	107	100
Stationary	9	8.41	98	91.59	107	100
Intoxicated	22	20.56	85	79.44	107	100
Under stress or anxiety	8	7.48	99	92.52	107	100
On correct side of the road	82	76.64	25	23.36	107	100

Table 7 shows involvement of two wheelers in most of the accidents (63.4%), Three wheelers i.e. auto-rickshaw

or pedal rickshaw were involved in 12 (2.4%) cases. Four wheelers accounted for 158 (31.6%) accidents.

Table 7: Types of vehicles involved in accidents.

Type of vehicle	No. of cases	%
Two wheelers	317	63.4
Scooter/ Moped	185	37.0
Motorcycle	76	15.2
Bicycles	56	11.2
Three wheelers (Auto Rickshaw, pedal rickshaw)	12	2.4
Four wheelers and heavy automobiles	158	31.6
Bus	9	1.8
Truck	24	4.8
Car	51	10.2
Tractor	33	6.6
Tempo	34	6.8
Jeep	7	1.4
Others (Animal driven or hand driven cart/ rehri)	13	2.6
Total	500	100

DISCUSSION

Over the past few decades there is rapid urbanization and population is increasing to an alarming proportions. Death rates in most of the countries have declined and life expectancy has increased; but traffic injuries have emerged as a highly visible cause of morbidity, disability and mortality. In particular, injuries disproportionately affect young adults, the poor and men. Accidents have got multi factorial causation. Interaction among the agent (vehicle), host (road user) and environment are concerned including the working condition of the vehicle, awareness, attitude and behavior of road user and the road quality and other environmental circumstances

In the present study, it was observed that the majority of the cases were in the age group of 21-30 years. More number of cases in this age group can be explained on the basis that this is the most active period of life with tendency to take risks and also the care free attitude of the younger population. The male predominance (M:F = 6.57 : 1) was due to the fact that females lead less active life and mostly remain indoors (Ghosh, 1975), while males form the predominant working class and as such more active and outgoing.⁴ Similarly male predominance was observed in different other studies with sex ratio of (male: female) 7.1 : 1 (Singh et al, 1993), 5.4 : 1 (Mehta, 1968), 9:1 (Ghosh, 1975), 3-5:1 (Norman, 1962)⁷, 4.9 : 1 (Jha et al, 2003).^{4,8}

The majority of the victims 367 (73.4%) had monthly income <5000 rupees. This is because the majority of the patients coming to government hospital are from low or middle class families. People belonging to high class prefer private hospitals. Secondly the people from lower class mostly have two wheeled vehicles which are more

prone to accidents and also lower educational status with less awareness of traffic rules.

In the present study involvement of higher proportion of married people may be due to the fact that in the age group 21-50 which was most involved, percentage of married persons is higher, secondly the married persons use the road more frequently for various household needs. Similar findings (more involvement of married people in road accidents) were observed by Mehta.⁶

The higher number of road accident victims reporting from rural area in the present study might be due to the fact that a major proportion of population resides in rural areas in Punjab and also there is lack of awareness among them regarding traffic rules. Moreover

Rajindra Hospital in Patiala serves to a larger surrounding area and it is the only referral centre in this region of Punjab. Almost similar observations were made by Singh et al (1993)⁵ when ratio of victims from urban and rural areas was 47.5% and 52.5% respectively.

The majority of the victims involved (unskilled workers and laborers, servicemen and students) were those persons who make the bulk of the crowd as they have to move out of and come back to their houses for their daily work, office or school.

Unskilled workers and farmers and laborers are mostly unaware of the traffic rules, the servicemen mostly in hurry to reach the office in time and students have carefree attitude.

Singh et al reported involvement of laborers up to 20%, people doing private jobs 24%, and 19.5% agriculturist, students (14%), housewives (6.5%), businessmen (4%) and government employee (5.5%).⁵

The maximum number of accidents at night time as confirmed from the victims of accidents was due to reduced visibility either due to poor lighting arrangement on the roads or non-functioning headlights of the vehicles. The other major factor was drunken state of the victim or the driver of the hitting vehicle in the late evening or night hours.

Another interesting finding was that at night hours when truck drivers get tired they allow their helpers to drive who are untrained and try to learn driving during night journey. The glare of headlights at night time was another important cause of accidents.

The next major proportion of accidents occurred during the morning busy hours of the day and evening time when the people are rushing for their jobs or to the schools and colleges or returning back in the evening. Ghosh also reported the higher occurrence of accidents during night hours.⁴

In the present study majority of the victims 233 (46.6%) were drivers and majority of the drivers were males; followed by Pedestrians 107 (21.4%). This shows that drivers are more at the risk of accidents. Singh et al observed involvement of drivers in 50.5% of the victims in his study; followed by passengers 29.5% and pedestrians 20%.⁵

The chances of accident and injury are more when pedestrians are walking on road and not using footpath. The majority of the pedestrians (66.36%) met with an accident when they were crossing the road. 37 (34.58%) pedestrians were crossing the road either at intersection or on the midway of the road. This might be due to their unawareness while walking on the road and non-observance of traffic rules. 9 pedestrian were just standing and not moving while 98 were in motion when they met with an accident. 20.56% were in intoxicated state, 7.48% were under stress or anxiety, 23.36% were walking on the wrong side, when accident occurred. All these behaviors increases the chances of accidents on the road.

There was maximum involvement of two wheelers (63.4%) in road accidents as major proportion of the public own these vehicles and proportion of two wheelers is more on the

roads in this part of region and also as whole on Indian roads. Secondly two wheelers being unstable are more prone to accidents and also the driver and passengers are least protected on these vehicles.

The next major group of automobiles involved in accidents included four wheelers or heavy automobiles (31.6%) which included cars, trucks, tractors, buses, jeep and tempo which are the most common vehicles on the highways and the link roads.

Singh et al reported involvement of two wheelers in 58% cases, three wheelers in 2.5% cases, four wheelers in 34% cases and others in 5.5% cases which included bullockcarts, horse carts etc.⁵ Jha et al reported involvement of bicycle in 5.6% cases, motorized two wheelers (scooter, moped, motorcycle) in 24.4% cases, car, jeep or van in 21.3%, three wheelers in 4.4%, bus in 12.5%, truck in 21.9%, tractor in 4.4% and bullock cart in 5.6% cases in injuries to pedestrians.⁸

CONCLUSION

In the present study the road traffic accident victims mainly include the young (11-50), especially 21-30 years (31.4%), married (70.6%) men (86.8%) mainly literate (66.6%) maximum having monthly income below rupees 5000/- from rural areas of Punjab. Maximum accidents occurred during night time (8pm-4am) followed by morning hours (4am – 12 noon). Majority of victims were unskilled workers and only 4.8% were professional drivers. The maximum involvement was of two wheelers

(63.4%) and mainly drivers were affected in the road crashes (46.6%) followed by pedestrians (21.4%).

Recommendations

- There should be regular and continuous ongoing traffic safety and awareness programs covering all the media especially directed towards education of drivers, pedestrians and young population. Especially involving the schools and colleges youth.
- Strict enforcement of traffic safety law and punishment in case of violation of the law.
- Setting vehicle and road standards and developing appropriate road engineering approaches.
- There should be use of reflectors by bicycles and other small and slow vehicles. Also use of reflectors should be promoted especially while night journey.
- Illegal encroachment of foot paths and road sides should be checked.

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