

Original Article

EPIDEMIOLOGICAL STUDY OF ROAD TRAFFIC ACCIDENT CASES ATTENDING TERTIARY CARE HOSPITAL, IN BHOPAL MADHYA PRADESH

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ABSTRACT

Background: Road Traffic Accident (RTA) is one among the top five causes of morbidity and mortality in South-East Asian countries including India. ¹ Its socioeconomic repercussions are a matter of great concern. Efficient addressing of the issue requires quality information on different causative factors. **Objectives-** What are different epidemiological determinants of RTA in Bhopal MP and examine the factors associated with RTA.

Methodology: Study Design: retrospective observational. Setting: Study was performed in a tertiary healthcare delivery institute in Bhopal MP. Participants: All RTA cases coming to Emergency of Peoples hospital. Study Periods: 2009 JAN to OCT 2011. Study Variables: Demographic, human, vehicular, environmental and time factors.

Results: In studied cases most of them were males 1047 (82.5%) and 16-31 years of age 647 (51%). Most common time duration of occurrence of RTA was 6PM to 12 PM 783(62%), most common injury after RTA was head injury 808 (64%), and most common cause of RTA according to type of vehicle was motor cycle (Two wheelers) 929(73%). The RTA cases according to place of occurrence more common on Ayodhya bypass Road 463 (37%) and least common on Raisen Road 91(7%). RTA cases according to time taken to reach hospital were less than 30 minutes in more of the cases 774(61%). Overall mortality among RTA cases was 40 (3.15%).

Conclusion: Most of the factors responsible for RTA and its fatal consequences are preventable. A comprehensive multi-programme approach can mitigate most of them.

Keywords: Road traffic accidents, Epidemiological factors, Outcome, Bhopal MP

INTRODUCTION

An accident has been defined as: "an unexpected, unplanned occurrence which may involve injury".¹ A WHO Advisory Group in 1956 defined accident as an "unpremeditated event resulting in recognizable damage".² According to another definition, an accident is that "occurrence in a sequence of events which usually produces unintended injury, death or property damage". Accidents represent a major epidemic of non communicable disease in the present century. They are no longer considered accidental. They are part of the price we pay for technological progress. Accidents have their own natural history and follow the same epidemiological pattern as any other disease - that is, the agent, the host and the environment interacting together to produce injury or damage. They occur more frequently in certain age-groups, at certain times of day and week and at certain localities. Some people are more prone to accidents than others and susceptibility is increased by the effect of alcohol and other drugs as well as physiological state such as fatigue. Lastly, a majority of accidents are preventable.

Measurement of the problem. Mortality: The following epidemiological indices will be useful in assessing the magnitude of the problem :

(i) proportional mortality rate: That is, the number of deaths due to accidents per 100 (or 1000) total deaths. (ii) Number of deaths per million population: The term "killed" (in a road traffic accident) is defined as any person who was killed outright or who died within 30 days as a result of the accident³ (iii) Death rate per 1000 (or 100,000) registered vehicles per year. (iv) Number of accidents or fatalities as a ratio of the number of vehicles per kilometre or passengers per kilometre. (v) Deaths of vehicle occupants per 1000 vehicles per year, etc. Morbidity is measured in terms of "serious injuries" and "slight injuries"⁴. The seriousness of the injury is assessed by a scale known as "Abbreviated Injury Scale". Morbidity rates are generally less reliable because of under-reporting and mis-reporting. Disability: An important outcome of the accident process is disability, which may be temporary or permanent, partial or total. Measurement of disability in terms of its duration is a limited. Road traffic accident (RTA) have emerged as a major global public health problem of this century & are now recognized as "veritable

neglected pandemic".¹ Road traffic crashes kill 1.2 million peoples each year and injure 50 millions. It is estimated that road traffic death will increase worldwide from 0.99 million in 1990 to 2.34 million in 2020 (representing 3.4% of all deaths).² Road accident cause 1 death every 9 minutes (160 everyday & 60,000 every year) & four and half times as many non-fatal accident road traffic accident injury are currently ranked 9th globally amongst the leading cause of DALY (Disability Adjusted Life Year) and the ranking is projected to rise to 3rd by 2020.³ Road traffic accident are essentially caused by 1) Rapid increase in personalized modes of transport (agent); 2) A lack of road discipline (host) and 3) Improper roadway features (Environment)⁴

In fact road traffic injuries alone ranked as the number one cause of disease burden among children between 5 & 14 years and as the number three cause among those in the age group 15-29 yr with a male female ratio of 3:1.⁵⁻⁶ The majority of Road traffic injuries occur in low-and middle -income countries. They account for about 85% of the death and for 90% of the annual DALYS lost because of road traffic crashes, the South-East Asia & Western pacific regions of WHO account for more than half of all road traffic death in the world.⁷

The economic cost of road crashes and injuries is enormous. Estimates suggest that they cost low-and middle-income countries between 1% and 1.5% of their gross national product (GNP) and high-income countries 2% of GNP.⁸ Economic cost are just the tip of iceberg for everyone killed, injured or disabled by a road traffic crash there are countless others deeper in to poverty by the expenses of prolonged medical care, loss of a family bread winner or the added burden of caring for the disabled.⁹ A high prevalence of old vehicles that often carry many more people than they are designed to carry, lack of safety belt and helmet use, poor road design and maintenance and the traffic mix on road are other factors that contribute to the high rate of crashes in India.¹⁰ A huge number of researches have been conducted to analyze road crashes. This paper aims to critically analyze the epidemiology of road traffic accident.

MATERIAL AND METHOD

The present study is a retrospective record based study and data was collected. The information collected consisted of personal

identification data, time, date, place, and type of Vehicles, injury and death involved in RTA. A total of 1268 RTA cases were studied from the case records of the medical records section of people's medical college & hospital Bhopal in the said period: 1st January 2009 to 31st October 2011. All the road traffic accident cases coming in the particular specified time period were taken. For the purpose of the study a road traffic accident (RTA) was defined as accident which took place on the road between two or more objects, one of which must be any kind of a moving vehicle. Any injury on the road without involvement of a vehicle (e.g. a person slipping & falling on the road and sustaining injury) or injury involving a stationary vehicle (e.g. person getting injured while washing or loading a

vehicle) or death due to RTA were excluded from the study.

Interpretation of the collected data was done by using appropriate statistical methods like percentage & proportions & application of test of significance chi-square test.

OBSERVATION

A total of 1268 RTA cases reported at peoples college of medical science & research centre & peoples hospital during the study period. Out of 1268 RTA cases 1047 (82.5%) of the victims were males & rest 221 (17.5%) were female. The highest number of victims 634 (50%) were from 16 - 30 years of age group. Followed by 317 (25%) in the age group 31 - 45 years.

Table 1: Distribution of RTA cases according to their age, sex and time of occurrence.

Variable	RTA Cases (%)				
	Year 2009	Year 2010	Year 2011	Total	
Age groups	<15	37(9.1)	29(6.9)	45(10.0)	111(8.7)
	16-30	203(50.0)	228(51.0)	216(51.0)	647(51.0)
	31-45	108 (26)	113(25.0)	112(26.0)	333(26.3)
	46-60	47(11.0)	46 (10.0)	48(11.0)	141(11.1)
Sex	Male	334(83.0)	364(81.0)	349(83.0)	1047(82.5)
	Female	71(17.0)	81(19.0)	69(17.0)	221(17.5)
Time of Occurrence	8AM to 6PM	120(30.0)	116(26.0)	94(22.0)	330(26.0)
	6 PM to 12 PM	243(60.0)	273(61.0)	267(64.0)	783(62.0)
	12PM to 8AM	42 (10.0)	56(13.0)	57(14.0)	155(12.0)

Table 2: Distribution of RTA cases according to type of injury

Types of Injury	2009	2010	2011	Total
Head Injury	236(58.3)	252(56.6)	237(56.7)	752 (59.3)
Fracture of Upper limb	86(21.2)	98(22)	86(20.6)	270(21.3)
Fracture of Lower limb	58(14.3)	55(12.4)	61(2)	174(13.7)
Chest injury	15 (3.7)	23(5)	18(4.3)	56 (4.4)
Others(Rib+Vertebra)	10 (2.5)	17(3.8)	16(3.8)	43 (3.3)
Total	405 (100)	445 (100)	418(100)	1268(100)

Motorized two-wheeler occupants were highest in number i.e. 929 (73%) followed by occupants of four wheelers 137 (11%), other hit by heavy vehicle 76 (6%) followed by bullock cart, pedestrians, & bicycle 126 (10%). Out of total 1268, RTAs 774 (61%) victims reach the hospital less than 30 minutes followed by 370(29%) cases reach the hospital within 30 - 60 minutes & 124 (10%) cases were reach the hospital more than 60 minutes. Results shows that deaths among users of 2 wheeler 26(65%) was higher than

users of 4 wheeler 14(35%). On analysis the age wise mortality among RTA cases were higher among 16-30 years 12(30%) followed by 31-45 years 11(27.5%). In the present study it was observed that time factor (To reach hospital) is very crucial for increase the chance of survival among RTA victims, death rate significantly low 2 (5%) among those who reached within 30 minutes in comparison to those who reached above 60 and more minutes 25(62.5%).

Table 3: Distribution of RTA cases according to time taken to reach hospital

Time taken to reach hospital	RTA Cases (%)			
	Year 2009	Year 2009	Year 2009	Year 2009
Less than 30 minutes	245(60.0)	264(59.0)	265(63.0)	774(61.0)
30-60 minutes	122(30.0)	136(31.0)	112(27.0)	370(29.0)
More than 60 minutes	38(10.0)	45(10.0)	41(10.0)	124(10.0)
Total	405(100)	445(100)	418(100)	1268(100)

Table 4: Relationship between time taken to reach hospital and mortality among RTA cases.

Time taken to reach hospital	Year wise Mortality			
	2009 (n=405)	2010 (n=445)	2011 (n=418)	Total (n=1268)
Within 30 minutes	1(0.4)	0(0)	1(0.37)	2(0.25)
30-60 minutes	4 (3.27)	4 (2.94)	5 (4.46)	13(3.5)
Above 60 minutes	9(23.68)	7 (15.55)	9 (21.95)	25(20.16)
Total	14(3.45)	11(2.47)	15(3.58)	40(3.15)

Chi-square with Yates correction: Chi squared equals 114.636 with 1 degree of freedom. The two-tailed P value is less than 0.0001, The association between rows (groups) and columns (outcomes) is considered to be extremely statistically significant.

DISCUSSION

Not surprisingly the results of the present study revealed that 1047(82.5%) of the victims were males & the rest 221(17.5%) were females. According to a study done by Nilamber j et al in JIPMER 603(83%) were also males & 123(17%) were females.¹¹ The highest no of victims 647(51%) were from 16-30 year of age group. this group to show scarce attention to traffic rules & regulation and no use of safety devices like helmets, seatbelts etc, in a hospital based study by Ganveer GB majority of the victims were in the age group 18-37years.¹² This show that the people of the most active & productive age group are involved in RTA.

In the present study the peak time for accidents was between 6.00pm to 12.00pm 783(62%) between 8.00am to 6.00pm also a high number of RTA were observed 330(26%).peak times for accidents were also reported in south india¹¹ & New Delhi¹³,Haryana¹⁵ & Western nepal¹⁴ study.

These times coincide with the period when people are more active & mobile.

It was observed that head injury was most common (59.3%) injury among RTA victims followed by fracture of upper limb (21.3%) & lower limb 174(13.7%) respectively similar observation were reported in studies from Karnataka out of 360 RTA cases 156(43.32%) had head injury.¹⁶

Motorized two-wheeler occupants were highest in number 929(73%) followed by occupant of four wheelers 137(11%) & heavy vehicles

76(6%), similar result were also observed at other places^{11,16}, it was also observed that out of total 236 the 2 wheeler user 75%¹⁶ & 19.4%¹¹ among the vehicles involved in RTA. In our study RTA victims reached hospital in less than half an hour 774(61%) followed by in 30-60 minutes. 370(29%) observation by Singh & Dhatarwal (2004)¹⁷ Deepak Sharma & Uday Shankar (2011)¹⁶ in his study found regarding time taken to reach hospital revealed that 24% reached within half an hour & 57% reached in next one hour, same observation 140(33.20%) half an hour & 63(14.90%) within one hour reachthehospital¹⁶. Fatality rate in the present study came out to be 3.1% whereas fatality rate was 1.65% in the study by Deepak Sharma et al (2011).¹⁶

Results show important observation in present study the relationship between time taken to reach hospital & mortality among RTA cases, out of total 40 deaths only 2 (5%) death occurs victims reach the hospital within 30 minutes followed by 13 (32.5%) death occurs victims reach the hospital between 30-60 minutes & 25(62.5%) death occurs victims reach the hospital after 1 hour similar finding was observe by Badrinarayan Mishra at el(2010).¹⁴

This observation shows that time factor is very crucial for better outcome of RTA cases. Need for taking urgent steps for establishing ambulance services and provision of pre-hospital care & trauma services is very essential.

CONCLUSION AND RECOMMENDATION

Total number of RTA cases were studied is 1268(2009-11), out of that 82.5% males and 17.5% females, 50% of them were in age group of 16-30 years. Most common (73%) vehicle was two wheeler and time of occurrence 6PM to 12 PM (62%).

The mortality among those who reached within 30 minute to hospital is significantly low (2%) than those who reached more than 60 minute (62.5%). Mortality among two wheeler users was significantly higher 65% than four wheeler 35%. Age wise mortality was three times higher (30%) among 16-30 years than 60 and above (10%). Most of the factors responsible for RTA and its fatal consequences are preventable. A comprehensive multi-programme approach can mitigate most of them.

The present study revealed that most victims were young age group. This situation can be improved by educating public through the mass media and initiating road safety training campaign. The timing of admission of cases to hospital is crucial in saving the life of the victim.

In the present study it was observed that there was a dramatic improvement in outcome of victims admitted to the hospital within one hour of accident. So an effort should be made to provide timely and proper medical services to RTA victims via mobile emergency services, quality trauma centres and proper rehabilitation services.

Road traffic injuries can be prevented, and their consequences can be alleviated. Many countries have achieved sharp reductions in the number of crashes and injuries by: creating and enforcement laws, governing speed limits, alcohol impairment, and the use of seat-belts, child restraints and crash helmets; making vehicles more protective for occupants, pedestrians and cyclists; and formulating and implementing transport policies that encourage safety.

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