EXTERNAL INJURY PATTERN OF ROAD TRAFFIC ACCIDENTS- AN EPIDEMIOLOGICAL STUDY IN A TERTIARY CARE SETTING, BHOPAL

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ABSTRACT: BACKGROUND: With over 130,000 deaths annually, India has overtaken China for the world worst Road traffic accidents rate. **OBJECTIVE:** To assess the pattern of external injuries and various associated factors among RTA victims admitted in a tertiary care setting. **MATERIAL AND METHODS:** This is a hospital-based prospective study conducted in a tertiary care setting in Bhopal, India from May 2011 to June, 2013. All subjects were road traffic accident victims admitted in Chirayu Medical College and hospital Bhopal. **RESULTS:** Among the total 1000 RTA victims there were 818 (81.80%) male and 182 (18.20%) females. The highest number of victims (615, 61.50%) belongs to 15-35 years of age group. Rate of accident was slightly higher on weekends i.e. Sunday (18.5%) and Saturday (18%). Among the various injuries, the limbs and the face were the commonly affected areas to suffer external injury. **CONCLUSION:** The study highlighted interaction of several factors like lack of experience of drivers, low awareness of safety measures, narrow, broken and ill-illuminated roads, excessive speed with overloaded vehicles responsible for road traffic accidents.
KEY WORDS: Injury pattern, Road traffic accident, Tertiary care settings, Traffic accidents.

INTRODUCTION: The World Health Organization's Global Status Report on Road Safety highlighted that more people die in road traffic accidents (RTAs) in India than anywhere else in the world, including the more populous China. [1] Member countries of the South-East Asia Region have been passing though a major epidemiological transition, socio-demographic changes and technology revolution during the past two decades. Countries are passing though significant urbanization, motorization, industrialization and changes in the socio-economic values of societies. Injuries on roads, at homes, and in the workplace have increased due to lack of safety-related policies and programmes. The health sector in these countries bears the maximum burden in terms of provision of acute care, and short-term and long-term rehabilitation service.[1] In India alone, the death toll rose to 14/hour in 2009 as opposed to 13/hour the previous year. According to the latest report of National Crime Records Bureau (NCRB), the total number of deaths every year due to road accidents has now surpassed the 135,000 mark. [2] About 40% of spinal cord injuries occur in RTAs and the accident survivors are either confined to the bed or are wheelchair bound for the rest of their lives. The best chance of survival for a serious RTA victim is if they are brought into the emergency department within the first hour of trauma or the so-called golden hour.[3] A better understanding of the common factors implicated in RTAs will help in appropriate allotment of resources and procurement of logistics. With this in mind, we planned and implemented our study with an aim to build a database of epidemiological factors of RTA pattern of injuries.

MATERIAL AND METHODS:

Study design: This prospective study was conducted in Chirayu Medical College and hospital Bhopal, Madhya Pradesh, India

Study period: May 2011 to June, 2013.

Study Population: Before conducting the study, institutional ethical clearance and verbal informed consent of the victims was obtained. For the purpose of the study, an RTA was defined as an accident which took place on the road between two or more objects, one of which had to be any kind of a moving vehicle. Any injury on the road without involvement of a vehicle (e.g. a person slipping and falling on the road and sustaining injury) or injury involving a stationary vehicle (e.g. person getting injured while washing or loading a vehicle) were excluded from the study.

Sample size: A total of 1000 individuals admitted to the hospital with RTA consenting to participate.

Study technique adopted: The victims of the accidents were interviewed to obtain information about the circumstances leading to the accident. A pre-tested questionnaire especially designed for this purpose was used for interviewing the accident victims, either during the emergency or in the wards of the hospital; where the condition of the victims did not warrant the interview, the relatives or attendants were interviewed. The information collected comprised: personal identification data; time data; day; type of vehicle and pattern of external injuries involved in RTA.

RESULTS: A total of 1000 RTA victims were enrolled in the study. There were 818 (81.80%) male and 182 (18.20%) female casualties. The highest number of victims (615, 61.50%) were from 15-35 years of age followed by 216 (21.60%) in the age group 36-45 years. More than (80%) of victims were under 40 years of age. About (25.4%) of victims were students. Not much variation was seen in victims according to the day of the week, though it was slightly higher on weekends i.e. Sunday (18.5%) and Saturday (18%), Tuesday and Wednesday followed by (16.1%) and (17.7%) respectively (Table no. 1). The peak time for occurrence of RTA was observed to be between 10am to 2 pm (24.2%) and 6 pm to 10 pm (24.2%). The lowest accident rate was observed between 2am to 6 am (3.8%) (Table no. 2).

436 victims were admitted to hospital within 1st hour of accident. 18 victims came to the center after 48 hours. The categories of road users involved in these accidents were occupants of different vehicles (46%), drivers (24.5%) and pedestrians (27.5%). (71.4%) of victims were hit by four wheelers and the rest (28.6%) were injured by two wheelers. Other factors which are associated with the accident are poor road condition (14.5%). Crossing speed limit and not following traffic rules was the cause of accident in (57.26%) of cases. (4%) of cases were using their cell phones at the time of accident and another (4%) were drunk (Table no. 3).

In the present study, almost (60%) victims reached hospital on stretcher. Among the various external injuries, the lower limbs (66.6%) and the upper limbs (16.6%) were the commonly affected body parts (Table no. 4). These injuries were common amongst bicycle riders, pedestrians and riders of motorized two wheelers. The commonest site for fracture was the lower limbs (43.4%). It was observed that about one half of all injuries were of minor nature, another 48% were moderately severe injuries and only 5% had sustained severe injuries. The severity of injuries suffered by the victims was graded according to the Trauma index.

DISCUSSION: With exploding population, increasing registration of automobiles every month, rampant encroachment of roads, nasty tendency of violating traffic rules and chaotic traffic systems have greatly contributed rapid strides in road traffic accidents. An increased incidence of RTA has direct repercussion on increased fatalities observed in RTA. In India over 80,000person die in traffic crashes annually, over 1.2 million are injured seriously and about 30,000 disabled permanently.[4] Our findings that males outnumbered females in the ratio of 4.5:1 can be explained by the fact that males lead a more active life and keep themselves most of the time outdoors to earn bread and butter for families besides they are more involved in activities such as driving and travelling. On the contrary, females mostly keep themselves indoor mostly due to cultural background, lack of industries and low potential for employment rate owing to poor literacy, along with the tendency that some male members mostly accompany females and extra precautions are taken on roads. These are reasons for their less involvement in RTA. Our findings are in general agreement with those of others [5-7] Singh and Dhattarwalhas however observed a M/F ratio of 9:1 contrary to our ratio of 4.5:1. Moreover, excess male mortality increases the number of widows and orphans and exposes them to a higher risk of economic difficulties. In the present study, highest incidence of RTA fatalities has been observed in the age group of 15-35 years (61.50%). This may be due to the fact that persons in this age group lead more active life and keep themselves outdoors most of the time. Besides they have a universal habit of taking risks like boarding a moving vehicle, travelling on footboard of vehicle, crossing the roads carelessly and risky speed driving etc. Our findings are in close accordance with those of other.[5-8]

In the present study, slightly higher number of reported accident cases occurred on Sundays (18.5%) and Saturdays (18.0%). Possible reason could be that People celebrate weekend and possibly are in a hurry to go to various places. Ghosh [9] observed the highest number of RTAs on the first working day i.e. Monday in India. Stallones [10] observed more accident cases on a weekend. In this study four wheelers (71.6%) were observed to be involved in RTA in large numbers: a possible reason for this could be that buses are the most common mode of transportation used by people. However to a large extent road traffic accidents are preventable and can be influenced through a rational national policy on road safety, strict licensing policy especially for heavy vehicle, and a greater awareness of different kinds of road-users about traffic rules and use of protective gears like safety belts and motorcycle helmets. Of course, construction of well planned road systems, safe vehicle design implementation of road safety measures and curbing intoxication and drug abuse amongst drivers are the need of hour to check the rising graph of fatal road traffic accidents. In summary, since road users are not uniform population these are exposed to different kinds of hazards depending upon conditions prevailing in that region, hence present different epidemiological parameters. Abrasions and lacerations were the commonest types of injuries among the external injuries noted in this study. Among fractures, present study found that lower limbs were the commonest site for fracture, followed by fracture of upper limbs and facial bones. But in another study it was reported that the highest number of fractures were in upper limbs followed, however their study was confined to only two wheeler accidents whereas the present study takes into account all type of road accident. It was possible to objectively score the injuries by using the trauma index. It was observed that about one half of all injuries were of minor nature, another 48% were moderately severe injuries and only 5% had sustained severe injuries.

CONCLUSION: India has among the highest number of road accident casualties in the world. A government statistic says that a death occurs every four minutes on Indian roads. Causes for road accidents are many; the congested city roads, bad road surfaces, flooding of roads, reckless driving, inadequate traffic management and so on and so forth. In the years 2001 to 2011, more than a million people died in road traffic accidents across India. All-India average is 29.7 deaths per lakh of population. The study highlighted the interaction of several factors involved in the occurrence of road traffic accidents especially the low awareness about the safety measures, lack of experience of drivers, narrow and broken roads with poor lighting especially in the crossings and speed breakers, overloaded vehicles and high speed. The high incidence of RTA injuries in our study highlights the need for urgent steps to protect pedestrians. Wide availability of first aid to the victims of RTA and establishing high quality, modern trauma centers along with recruitment and retention of well-trained trauma specialists will help to mitigate the effects of RTA. Further studies are needed to assess which interventions are more likely to prevent RTAs and decrease the morbidity and mortality associated with RTA.

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Table no. 1: Distribution of the RTA victims according to the weekdays

S. NO.	Day	No. of victims	Percentage
1.	Sun	185	18.5
2.	Mon	124	12.4
3.	Tue	161	16.1
4.	Wed	177	17.7
5.	Thu	104	10.4
6.	Fri	69	6.93
7.	Sat	180	18
	Total	**1000**	**100**

Table no. 2: Distribution of the RTA victims according to the time of accident.

S.NO.	Time	No. of victims	Percentage
1.	6:00AM-10:00AM	115	11.5
2.	10:00AM-2:00PM	242	24.4
3.	2:00AM-6:00PM	210	21.0
4.	6:00PM-10:00PM	242	24.2
5.	10:00PM-2:00AM	153	15.33
6.	2:00AM-6:00AM	38	3.8
	Total	**1000**	**100**

Table no. 3: Distribution of the RTA victims according to the cause of accident.

S NO.	Cause of accident	No. of victims	Percentage
1	Poor road condition	145	14.5
2	Poor Light	18	1.8
3	Improper parked vehicle	60	6
4	Pedestrian on road	200	20
5	Animal on road	37	3.7
6	Speed	236	23.6
7	Not follow traffic rules	236	23.6
8	Mobile use	40	4
9	Alcohol	40	4
	Total	**1000**	**100**

Table no.4: Distribution of the RTA victims according to the type of external injury.

Site	Abrasion		Laceration		Multiple superficial injuries		Crush injuries	
	no.	%	no.	%	no.	%	no.	%
Head	66	8.5	152	23.6	7	6.5	1	4.2
Neck	10	1.3	4	0.6	0	0	0	0
Chest	40	5.2	10	1.5	3	2.4	0	0
Abdomen	4	0.5	8	1.3	2	1.5	0	0
Pelvis	40	5.2	14	2.1	0	0	1	4.2
Upper limbs	260	33.5	119	18.5	27	24	4	16.6
Lower limbs	214	27.6	170	26.4	36	33	16	66.6
Face	114	14.7	151	23.4	37	33	2	8.4
Back	27	3.5	17	2.6	0	0	0	0
Total	**776**	**100**	**644**	**100**	**112**	**100**	**24**	**100**

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