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An Epidemiological Study of Road Traffic Accidents in Rajendra Institute of Medical Sciences (RIMS), Ranchi

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Abstract
Injury and deaths due to road traffic accidents (RTA) are a major public health problem in developing countries where more than 85% of all deaths and 90% of disability-adjusted life years were lost from road traffic injuries.(1) Road safety is an issue of national concern, considering its magnitude and gravity and the consequent negative impacts on the economy, public health and the general welfare of the people. The following were the objectives of the study: Age and sex distribution in RTAs. 2.pattern and circumstances leading to RTAs.It was a cross sectional, descriptive and hospital based study conducted among accident victims during March2015-June2015 in Rajendra Institute of Medical Sciences (RIMS) Ranchi. A total of 129 accident patients were selected as study subjects and interviewed by a pre-tested semi structured questionnaire. It was found that male victims 111 (86%) were more commonly involved than females 18(14%) and majority of the victims were in the age group of 21-40(55.1%). Most common site of injury was head and face 62(51.2%). Out of total accident victims, 62(48.1%) were drivers and riders. Among driver/riders, 44(71%) were 2 wheeler riders. 87(67.4%) managed to reach hospital in less than 1 hour. 62(48.1%) of accidents occurred between 2pm to 8 pm. Most accidents 53(41.1%) occurred on highways. 43(69.4%) drivers/riders mentioned not taken safety measure (helmet/seat belt) during accident.It may be concluded that RTAs constitute a major preventive public health problem and a greater awareness about traffic rules is required both for drivers and vulnerable groups.
Key words: road traffic accidents, injuries, trauma, Ranchi

Introduction

Road transport is a critical structure for economic development of a country. It influences the pace, structure and pattern of development. Surge in population and motorization in the country along with expansion of road network contributes to the number of road accidents, injuries and fatalities.(2)

Over 1.2 million people die each year on the world's roads, with millions more sustaining serious injuries and living with long-term adverse health consequences. Globally, road traffic

crashes are a leading cause of death among young people, and the main cause of death among those aged 15–29 years.(3) Road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by 2030. As well as being a public health problem, road traffic injuries are a development issue: low- and middle income countries lose approximately 3% of GDP as a result of road traffic crashes (3). During the year 2013, there were 4, 86,476 road accidents, which resulted in deaths of 1, 37,572 people and injury of 4, 94,893 persons in India. These numbers translate into 1 road accident every minute and 1 road accident death every four minutes (2).

Roads in Ranchi, which is the capital of Jharkhand are congested and encroached by other activities. Roads and foot paths are mostly encroached by parked vehicle, hawkers and road side business. In addition to this, lane marking and traffic signs are missing in almost all places. This causes the road user's life at a great risk.

Material and methods

This study was conducted at Rajendra Institute of Medical Sciences (RIMS) ,Ranchi from March 2015 to June 2015. All the patients of RTA who got admitted during above period were interviewed using a pretested semi structured questionnaire. It was conducted in neurosurgery, orthopaedics and casualty departments. Written consent was taken before interview. Details were taken from family members of the patients who were unable to interact. For study purpose, RTA was defined as an accident which took place on road between two or more objects, one of which must be any kind of moving vehicle and other a human being. 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. persons getting injured while washing or loading a vehicle) or deaths due to RTA were excluded from the study. Ethical approval was taken from institution ethical committee of RIMS.

Statistical analysis: Data were entered in MS Excel and analysis was done with SPSS statistical software (20.0 versions). Results were interpreted in terms of percentage, mean, S.D, χ^2 test . $P<0.05$ was considered significant.

Results

Out of total 129 patients, 111(86%) were male and 18(14%) were females. The mean age of males was 30.98 and that of females was 30. Males were 6.1 times more affected than females. Mean age of males was more than that of females but the difference was not statistically significant (table1).

Out of total male patients, 65(58.6%) patients belonged to age group 20 to 40 followed by 25(22.5%) belonged to less than 20 age group and 21(18.9%) belonged to age more than 40. Among female patients 38.9% belonged to age less than 20, 33.3% belonged to 20 to 40 years age group and 27.8% belonged to age more than 40 years and the difference was not found to be statistically significant (table 2).

Out of total accident victims 62(48.1%) were drivers/riders, 41(31.8%) were passengers/occupants and 26(20.2%) were pedestrians (table 3).The results shows that out of total 62 drivers/riders, 71% were 2 wheeler riders, followed by 4 wheelers drivers and bicyclist.(table 4)

It was observed from the study that out of total 50 vehicle for which helmet or seat belt were mandatory, they were missing in 44(88%) of the drivers/riders. 14(25%) of the drivers/riders didn't have driving license out of 56 vehicle for which it was required.Driving license was not required for bicycle and rickshaw. 17(27.4%) of the drivers/riders had consumed alcohol at the time of accident.8 drivers accepted that they were very fast and trying to overtake the nearby vehicle. 26 drivers/riders told bad road condition as cause of accident. According to 6 drivers/riders weather was foggy and visibility was poor. 2 drivers were talking on phone while driving(table 5).

It was observed from the study that 53(41.1%) of the accidents took place on national highway in which 39 accident occurred among urban victims and 14 accidents took place among rural victims. 32(24.8%) of accident occurred on state highway. 30(23.3%) of accident took place on city road. 8 accidents took place in village road and 4 accidents occurred on connecting roads. A significant relationship was observed between place of accident and residence of victims.(table 6)

Result shows that 67.4% of the victims were taken to the nearest hospital in less than 1 hour. 31% of the patients who were admitted in this hospital after being referred from nearby hospital from site of accident.20.9% of the victims reached hospital in 1-2 hours. It took more than 4 hours for 3 patients to reach the hospital(table 7).

It was shown in the study that 62(48.1%) of the accident took place between 2 pm to 8 pm followed by 32(24.8%) between 8am to 2 pm.(table 8)

It was observed that study population had injuries at different parts of the body. Most of them had multiple injuries. 52(40.3%) of the patients had injuries at head and face. 66(51.2%) of the patients had injuries at lower limb followed by 45(34.9%) who had injuries at upper limbs (table 9).

Discussion

RTAs are a major public health problem in all over the world. In developing countries like India, exposure to potential road traffic injuries have increased largely because of expansion in road network, rapid motorization, urbanization, poor road condition, lack of safety feature in vehicles, crowded roads, poor road maintenance and lack of prevailing law enforcement by the police[4].

In Ranchi like other cities in India, roads are congested and encroached mostly by parked vehicle and road side business. Even foot path are not spared for pedestrian. There are very few traffic signals and zebra crossings in the city. There is insufficient public transport facilities and people mostly rely on own vehicle or auto rickshaw for transportation. This all causes road user's life at great risk.

In the present study, the highest no. of RTA victims were males as compared to females and were mostly in 3rd and 4th decade of their life. Similar results were found from studies from south India, Maharastra, Nepal, Hapur ,Ghaziabad,Assam etc([5,6,7,8,9,10,11]) . Ganveer and Tiwari[12] in their study in Nagpur found that ratio of male victims to female victims was 6:1,Bhuyan and Ahmed[10] in their study in Assam found the ration to be 7.13:1. Similar results of males to females ration of 6.1:1 was also seen in our study. The probable causes of male preponderance in RTA can be that in Indian setup outdoor activities are mostly carried by male counterpart. Male counterparts are more involvement in almost all kinds of transportation systems and services.

The probable causes of RTA in youth group can be rash, speedy driving, negligence as well as inexperience among this group. This results in great loss to family members as well the country. Because this is the most productive age group and expenditure incurred in the treatment of these victims is not less.

We also found that among all accident victims maximum were drivers followed by passengers/occupants and pedestrians. It was in conformity with findings of study done in by others[10,13] . In the study done by patil SS ,et al[6] and Jha et al[14] maximum victims were vehicle occupants. This may be due to involvement of significant no. of buses in RTA in that area which carry large no. of passengers.

In the present study, we found that users of two wheelers were injured maximum followed by four wheeler user and bicyclist. Similar results were seen in study done by Gururaj et al [15] and Sahadev et al[16]. The reason could be insufficient public transport system in Ranchi and people use 2 wheelers for transportation which is comparatively unstable.

In the present study it was observed that majority of the drivers had not taken safety measures like wearing helmet or seat belts. This may be due to people's negligence or unawareness regarding these measures. This could also be due to easy accessibility of the vehicle and inadequate enforcement of existing laws. Similar results were obtained in studies done by other researchers[17].

In this study it was found that 27.4% of the drivers had consumed alcohol during driving. It is well documented that alcohol impairs driving ability which leads to accidents. Similar findings were obtained in studies done by patil SS[6] where 29.5% of the drivers involved had consumed alcohol. In the study done by Jha N et al[14] in

south India, 15% of the drivers had consumed alcohol. Lesser percentage of drivers had consumed alcohol in studies done by many researchers [5,8,18]. According to WHO enforcing sobriety checkpoints and random breath testing can lead to reduction in alcohol related crashes of about 20% and have shown to be very cost-effective[19]. The result of this study showed that 14(25%) of the drivers/riders didn't have driving license out of 56 vehicle for which it was mandatory. Driving license was not required for bicycle and rickshaw. Similar results were obtained by Patil SS, et al [6] where 29.5% of the drivers were without driving license. The reason could be easy accessibility of the vehicle and inadequate enforcement of existing law. 2 (3.2%) of the driver accepted distraction due to mobile phone as cause of accident. Use of mobile phones by drivers is becoming a matter of concern for road safety all over the world. It causes longer reaction times, impaired ability to keep in correct lane and shorter following distances[19]. This study showed that majority of the RTAs occurred on national highway (NH). This can be explained on the fact that it is one of the busiest roads and it consists of commercial, residential and industrial establishments. Similar results were obtained by other researchers also [8,9,20] .

It was shown in the present study that 67.4% of the accident victims were taken to nearby hospital within an hour i.e within the golden hour in which chances of survival of critical patients are highest. Some of the patients were admitted here after being referred by primary or secondary health care facilities. In the study done in Anand, Gujrat[13] 14% patients reached hospital within ½ hour and 33.2% reached in ½ to 1 hour. Similar results were obtained by many other researchers [10,18].It was shown in our study that peak time of accident was between 2pm to 8pm followed by 8am to 2pm. Study done by Ranjana Singh et al[9] , peak time for accident was between 6am to 6pm. Report of Road accident in India 2013, Ministry of Road Transport and Highway also showed that the peak time of accident is between 3pm to 6 pm followed by 6pm to 9 pm[2]. The reason for day and evening preponderance for accident could be due to more outdoor activities during day time and low visibility and people are in hurry to reach their destination in the evening time.

In the study population, most had injuries on lower limb followed by injuries on head and face. In the study by Singh et al[8] most of the injuries occurred on lower limb, upper limb and head and face. Similar results were obtained by others[10] .

Conclusion

There are several risk factors both human and environmental which are associated with occurrence of RTAs like age, gender, alcoholism, rash driving, poor road condition, lack of safety measures etc. It is suggested to increase awareness about road safety, curbing intoxication of alcohol and drug abuse amongst drivers, strict implementation of road safety measures, construct service lane on both side of highway, provision of traffic signals and zebra crossing and improving emergency medical services.

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TABLES

Table 1-mean age of RTA patients with their gender

gender	No (%) of patients	Mean age	S.D.	
Males	111(86%)	30.98	13.13	T test=0.280
Females	18(14%)	30	17.61	P value=0.780

Table 2: age and sex distribution of the patients:

Age group	**Male(no. & %)**	**Female(no. & %)**	**Total(no. & %)**	
Less than 20	25(22.5%)	7(38.9%)	32(24.8%)	Chi sq=4.06
20 to 40 years	65(58.6%)	6(33.3%)	71(55%)	P =0.131
More than 40	21(18.9%)	5(27.8%)	26(20.2%)	
Total	111(100%)	18(100%)	129(100%)	

Table 3: profile of the accident victims

Accident victims	**No. (%)**
Vehicle drivers/riders	62(48.1%)
Passengers/occupants	41(31.8%)
pedestrians	26(20.2%)
Total	129(100%)

Table 4: type of vehicle used by drivers/riders

Drivers/riders	**No.(%)**
2 wheeler (motorized)	44(71%)
3 wheeler (motorized)	3(4.8%)
4 wheeler(motorized)	6(9.7%)
Heavy vehicle(like bus ,truck)	2(3.2%)
bicycle	5(8.1%)
others	2(3.2%)
total	62(100%)

Table 5: profile of the drivers/riders of the vehicle during an accident (multiple response):

	Condition at the time accident	**No (%)**
1	Helmet or seat belt not used	44(88%)
2	Consumed alcohol	17(27.4%)
3	Driving license not available	14(25%)
4	Bad road condition	26(41.9%)
5	Rash driving	8(12.9%)
6	Defect in vehicle	2(3.2%)
7	Poor weather	6(9.6%)
8	Use of mobile phone during driving	2(3.2%)

Table 6: Association between residence of the patient and place of accident of the victims.

Place of accident	**Residence**				**Total**		
	Urban		Rural				
	No.	%	No.	%	No	%	
NH	39	44.8	14	34.1	53	41.1	
State highway	26	29.9	6	14.6	32	24.8	Chi sq=11.955 P=0.018
City road	17	19.3	13	31.7	30	23.3	
Village road	2	2.3	6	14.5	8	6.2	
others	4	4.5	2	4.9	6	4.7	
Total	88	100	41	100	129	100	

Table 7: transportation time from site of accident to nearest hospital.

Transportation time	**Frequency(%)**
Less than 1 hour	87(67.4%)
1 to 2 hours	27(20.9%)
2 to 3 hours	7(5.4%)
3 to 4 hours	5(3.9%)
More than 4 hours	3(2.3%)
total	129(100%)

Table 8: time of accident

Time of accident	**No.(%)**
8am to 2 pm	32(24.8%)
2pm to 8 pm	62(48.1%)
8pm to 2 am	19(14.7%)
2am to 8am	16(12.4%)
total	129(100%)

Table 9: site of injury(multiple responses)

Site of injury	**No.(%)**
Head and face	52(40.3%)
Neck	14(10.9%)
Thorax	12(9.3%)
Abdomen and pelvis	15(11.6%)
Upper limb	45(34.9)
Lower limb	66(51.2%)
N=129	