

Epidemiological study of road traffic accidents: cross sectional study of western Rajasthan

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Abstract

Background: Road traffic injuries (RTIs) have become an important public health issue along with communicable and non communicable diseases globally and in India Road traffic accident. The aim of study to risk factors ,pattern and epidemiology of injury of trauma patients.

Methods: This is prospective observational descriptive study done at Mathuradas Mathur Hospital affiliated to Dr. S. N. Medical College, Jodhpur, Rajasthan .Total 220 patient were included in study who admitted in trauma center of MDM hospital. Detail history of road traffic accident taken from each patient to find out cause. Specific attention was paid to factors including two wheeler/four wheeler accident, timing of injury, cause of accident, mental status of patient with reference to alcohol/drug consumption, use/nonuse of safety measure like wearing helmets, seat belts etc, time interval between accident and arrival of help and arrival

to hospital. All collected data were analysed using chi square and Fischer test.

Results: Total 220 patients were included in this study. More than 80% patients were male. Mean age was 32.14 years. Most common presentation was loss of consciousness (64%). Most people (76%) were of rural back ground. Only 10.45% of patients were admitted in tertiary care hospital within golden first hour of the accident. Most of the patients (70.45%) were victims of collision with two wheelers. 16.36% of patients were under the influence of alcohol at the time of trauma, while (3.18%) were substance abuse. Only (12.25%) patients in two wheelers accident had wore helmets during accident.

Conclusion: In road traffic accidents some lesser known epidemiological data were generated that may be useful in defining preventive measures.

Keywords: Road traffic injury, Epidemiology, Accidents

Introduction

Road traffic injuries (RTIs) have become an important public health issue along with communicable and non communicable diseases globally and in India Road traffic accident[1]. It is the price we pay for the rapid urbanization, modernization and economic development. RTA has become a leading cause of deaths, disabilities and hospitalizations which causes major socio-economic burden to the society across the world. Human, vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution [2]. Significant growth in RTA needs concern to prevent RTA by decreasing factor responsible (better roads, road side illumination, strict traffic rule, first aids and establishment of trauma centers .After admission in tertiary care centre, rapid management is also important for the survival of patient. In India, due to high population and proportionate shortage of hospital beds, more effective management is required to minimize morbidity and mortality. In tertiary care centre, surgeons work as team leader in trauma centre and has to co-ordinate between various speciality departments. Early diagnosis and transfer of patient to concern department is recommended to reduce morbidity and mortality, hospital stay. The aim of study to risk factors and epidemiology of injury of trauma.

Method

This is prospective observational descriptive study done at Mathuradas Mathur Hospital affiliated to Dr. S. N. Medical College, Jodhpur, Rajasthan .Total 220 patient were included in study who admitted in trauma center of MDM hospital. An informed consent was obtained from the conscious adult patients themselves or their

relatives in their known familiar language. Active intervention needed for patient was carried out on priority basis then a pre-tested Performa was used by the investigator for interviewing the RTA victim. Detail history of road traffic accident taken from each patient to find out cause. When the condition of the victim does not warrant the interview, in case of severe injury, under the influence of alcohol, death etc., the relatives or the attendants were interviewed. Assessment of patient by surgeon and relative broad and super specialties was done. Specific attention was paid to factors including two wheeler/four wheeler accident, timing of injury, cause of accident, mental status of patient with reference to alcohol/drug consumption, use/nonuse of safety measure like wearing helmets, seat belts etc, time interval between accident and arrival of help and arrival to hospital. All collected data were analysed using chi square and Fischer test.

Results

Table 1: age wise distribution of patients of RTA

Age (yrs)	No. of patients	Percentage
<18	22	10.00
18-25	61	27.73
26-35	60	27.27
36-45	43	19.55
46-60	22	10.00
>60	12	5.45
Total	220	100.00

More than 74% patients were between 18 to 45 years of age. Mean age was 32.86±14.77 years.

Table 2: gender wise distribution of patients of RTA

Sex	No. of patients	Percentage
Male	178	80.91
Female	42	19.09
Total	220	100.00

More than 80% patients were male. p value 0.614 (NS) mean age of male was 32.62+14.65 and of female was 33.90+15.39

Table 3: distribution of patients on basis of presenting symptoms

Presenting symptoms	No. of patients	Percentage
Loss of consciousness	141	64.09
Pain at orthopedic injury site	54	24.54
Bleeding from injured site	43	19.54
Difficulty in breathing	18	8.18
Pain abdomen	18	8.18

Most of the traumatized patients 141(64.09%) presented as loss of consciousness. 24.54% patient were of orthopedic injury. 19.54% patients had with bleeding from the wound. 8.18% patients had presented with breathing difficulties and pain abdomen each.

Table 4: area wise distribution of RTA patients

Area	No. of patients	Percentage
Rural	167	75.91
Urban	53	24.09

Most people (76%) were of rural back ground

Table 5: distribution of patients on the basis of duration of RTA

Duration of RTA	No. of patients	Percentage
<1 hr	23	10.45
1-2 hr	60	27.27
2-4 hrs	73	33.18
>4 hrs	64	29.09
Total	220	100.00

Only 10.45% of patients were admitted in tertiary care hospital within golden first hour of the accident.

Table 6: causes of delay for arrival to casualty

Causes	No. of patients	Percentage
Distance	95	43.18
Referral delay	74	33.64

No delay	23	10.45
Transport delay	22	10.0
Self-ignorance	6	2.73
Total	220	100.00

Site of accident being away from the hospital (>100 km) was major cause of delay in arrival to hospital (43.18%) followed by delay in referral from the primary hospital (33.64%).

Table 7: distribution of patients with consumption of alcohol and substance abuse at the time of accident

History of alcohol consumption & substance abuse	No. of patients	Percentage
No history of alcohol/drug abuse	177	80.45
Alcohol consumption prior to accident	36	16.36
Substance Abuse(smack/opium)	7	3.18
Total	220	100.00

16.36% of patients were under the influence of alcohol at the time of trauma, while (3.18%) were substance abuse.

Table 8: Comparison of patients with co morbidities and their outcome

	Patients with co-morbidities		Patient without co-morbidities		Total	
	Number	%	Number	%	Number	%
Discharge	11	55	112	56	123	55.91
Discharge with Disability	6	30	68	34	74	33.64
Death	3	15	20	10	23	10.45

Mortality following RTA in patient with co-morbidity was 15% whereas it was 10% in patients without co-morbidity. P value: 0.769

Table 9: distribution of patients according to type of vehicle involved in accident

Type of vehicle	No. of patients	Percentage
2 wheeler	155	70.45
4 wheeler(LMV)	39	17.72
Pedestrian	17	7.73
Commercial motor vehicle	9	4.09
Total	220	100.00

Most of the patients (70.45%) were victims of collision with two wheelers.

Table 10: distribution of patients on basis of use of safety measures

Safety major		No. of patients	Percentage
Two wheeler	Helmet wearer	19	12.26
	Non helmet wearer	136	87.74
Seat belt	Fastened	7	17.95
	Not fastened	32	82.05
Air bag	Yes	1	2.56
	No	38	97.44

Only (12.25%) patients in two wheelers accident had wore helmets during accident.

Table 11: Comparison of outcome of patients who got first aid at periphery

Outcome	Discharge		Discharge With Disability		Death	
	N	%	N	%	N	%
Patients got First Aid(81)	56	69.13	14	17.28	11	13.58
Patients not	67	48.20	60	43.16	12	8.63

got First Aid (139)						
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Out of 81 patients who got first aid at periphery, 56 (69.13%) were discharged, 14 (17.28%) were discharged with disability, and 11 (13.58%) were expired. Among 139 patients who didn't get first aid, 67 (48.20%) were discharged, 60 (43.16%) were discharged with disability, and 12 (8.63%) were expired. P value 0.0005

Discussion

The present study was a hospital based study carried out in the emergency department of a tertiary care trauma center. In present study, out of total 220 patients, maximum number (74%) of patients were between 18 to 45 years of age. Similarly Agarwal et al.[3] showed that maximum cases were younger age group. Gender distribution of accident cases showed male preponderance, accounting for 81% of cases and male: female ratio was 4.5:1. Mean age of men was 32.62 while female was 33.90 years. Chaudhary et al [4] also concluded the male preponderance. This can be attributed to the truth that this younger age group both males and females are a frequent road traveler due to educational and occupational purposes. The male preponderance may be due to paternalistic nature of our society where males keep themselves most of the time outdoors and male gender lead a much more proactive life and in most of the time are involved in activities such as risky driving, alcohol consumption and travelling. On the contrary, females keep themselves indoor mostly due to cultural background. Even female drivers are more likely to follow traffic rules and preference of limited speed.

In present study most of the traumatised patients 141(64.09%) presented as loss of consciousness, 24.54% patient were having pain at extremities,

19.54% patients had with bleeding from the wound and 8.18% patients presented with breathing difficulties and pain abdomen each. Majority of patient thus arrived at trauma centre in haemodynamically stable condition. In present study most of the patients reached trauma centre were the residents of Jodhpur district itself 137(62.2%) as well as most patients (76%) were from rural background. The reasons for more number of RTA cases in rural areas may be the bad condition of the roads in rural are, inadequate knowledge about road safety among rural people, no proper traffic rules implementation in rural areas.

Only 10.45% of patients were admitted in tertiary care hospital within golden first hour of the accident. Major cause of delay in arrival to hospital was site of accident being away from the hospital (>100 km) was in 43.18% patients followed by delay in referral from the primary hospital (33.64%). Sixteen percent of patients were under the influence of alcohol at the time of trauma, while (3.18%) were substance abused. The role of alcohol consumption in impairing the driving capability is well known and proved by similar studies Agarwal A et al.[3] and Ghimire A et al.[5]. The level of impairment increases as the blood alcohol concentration increases. Alcohol intake had increased the death from serious injury and its outcome. Intoxicated patient are twice likely require intubation for effective airway control and reliability of physical examination is reduced requiring evaluation by CT scan.

In present study more than 18 % of cases were admitted on Saturday than on any other day and more than one third of cases were admitted on the weekends. Saturday and weekends are likely to be celebrated by younger generation and mixed up to moments of joy. Joy riding are likely cause of reported higher incidence of RTA on

these days. More amount of alcohol consumption was also noted on the weekends similar observations were also made in different studies. In Our study, 20(9.09%) patients were having pre-existing co-morbidities besides the trauma. Most of patients had history of hypertension. Mortality following RTA in patient with co-morbidity was 15% whereas it was 10% in patients without co-morbidity. P value is 0.769 (insignificant). RTA increases the stress and precipitates the metabolic response that can lead to death of patients.

In present study most of the patients (70.45%) were victims of collision with two wheelers followed by 39(17.71%) with four wheelers. 17(7.73%) were pedestrians & 9(4.09%) were exposed to trauma with heavy motor vehicle. Similar observation done by Agarwal A et al. and Gudadinni et al. [3,6]. Rapid increase in two wheelers were mainly due to the affordability rendered by the hire purchase schemes and second hand vehicle market , at the hands of village youth making two wheelers preferred mode of commutation.

Risky driving like high speed driving for thrill , rash driving , driving under alcohol influence, not using safety gadgets like helmets, not following traffic rules were all responsible for high incidence of road traffic accidents in two wheeler riders of age group 18-45 years. In present study out of 155 two wheelers accidents, only 19(12.25%) patients were wearing helmets during accident. Among 39 four wheeler accidents, 7(17.74%) patients had fastened seat belts during collision and only one car (2.56%) could deploy air bags. About 52% drivers don't have the knowledge about safety measures and this may be one of the reasons for not using the safety measure before the RTA. The reasons for not using safety measures may be

lack of seriousness about the use, feels uncomfortable, ignorance, lack of strict implementation of legislation. From safety perspective a helmet is the most important part of a motorcycle. Its use has been shown to have a 72% effectiveness in reducing the incidence of head injuries on a crash[7]. It has been shown that an unprotected rider is 40% more likely to die in a crash than a rider who is wearing a helmet [8]. In present study out of 155 patients of 2 wheeler trauma, 19 ((12.25%) wore helmets, and 2 (1.29%) succumbed with head injury. 136 (87.74%) didn't wear helmets and 48 (35.29%) succumbed with head injury. P- value 0.330 is significant. In present study out of 19 cases who wore helmets during trauma, 9 (47.36%) were discharged, and 10 (52.63%) were discharged with disability. Out of 136 cases who didn't wear helmet during trauma, 80 (58.81%) were discharged, 38 (27.94%) were discharged with disability and 18 (13.23%) expired, it is very much significant than no death was reported in helmet protected group. P value 0.045 is significant. Most of the patients 139(63.18%) were brought directly to the tertiary care centre without even getting first aid and only 10.45% were brought with in very 1st hour of trauma, most of the patients 73(33.18%) were brought to tertiary care hospital within 2-4 hours of duration of the traumatic events. 29.09% were brought after the gap of 4 hours, 27.27% were with the gap of 1-2 hours. First hour after trauma is supposed to be golden hour and adequate treatment within an hour of accident is supposed to give best result but because of different reasons. In present study most patients got accident between 6 pm to 12:00 mid night(37.73%). Similarly Ranganathan et al. [9] had shown that greater than 60.2% of vehicular accidents took place in the day time (6AM - 6PM). Ganveer et al. [10] observed that about 53.19% of the accidents took

place in the daytime. This is mainly because of the increased activities on road during daytime such as commercial activities, activities like attending the schools, colleges and offices. In contrast to the findings of above study, Bharadwaj et al. [11] had shown that most (40.1%) of the Road traffic accidents occurred in the evening hours from 6pm to 12 midnight. Driving during dawn, night time, poor illumination along roadside, rush hour coinciding with office time, likely use of alcohol after office hours and large number of animals on road on this time could be the reason behind high number of accidents during this time.

In present study, 82 (37.27%) were exposed to RTA because of inappropriately following of traffic rules, followed by 68 (30.90%) because of poor road quality, 45 (20.45%) because of collision with animal, 21 (9.54%) because of high speed, and 4 (1.81%) because of tyre burst. Suhas babu [12] also found that majority of the times it was a sideways collision 46.7% followed by head on collision 27.5%. Victims were hit from behind 16.9 % of the times and 8.9% of them gave history of self-fall. Injuries to the face and lower extremities were significantly greater in frontal collisions; thorax, abdominal, and pelvic injuries were significantly greater in lateral collisions. In addition, drivers in lateral collisions were found to have significantly more multiple injuries to the abdomen and thorax. [13] In present study, most of the patients 129(58.64%) attended had associated head injury or head injury alone. 51(24.53%) had injuries in lower limb. 34(15.45%) had injuries in face, followed by chest (23), clavicle (16), upper limb (16), eyes (13), abdomen (12) , pelvis (4), neck (3), spine (3), teeth & ear (2 each).

In present study out of 220 patients, 145 (65.91%) required NCCT head, 90 (40.91%) required X-ray of

various limb parts, 75 (34.09%) required X-ray chest, 6.36% require USG fast, 7 (3.18%) required X-ray FPA, 2 (0.91%) required CECT abdomen & pelvis. One (0.45%) required HRCT thorax. The Global burden of disease study reveals that nearly 25.1% sustain head injuries, 10% had open wounds and 25% have long bones fracture.[14]

Most of Indian studies have recognized greater occurrence of injuries to brain, face and the long bones. Guru Raj [15] noted polytrauma in nearly 25% of patients, head injuries in 50-60% of patients, facial injuries in nearly 40-50% of patients. Long bone especially lower limb injuries have been noticed in 14-40% patients, fractures in 18-22% of patients. Injury to chest and abdomen had been comparatively less. [16] In present study out of 220 patients, 145 (67.27%) required no surgical intervention at all. Limitation of study was that the study might have underestimated the measurement of some of the factors associated with accidents because of willful suppression or misrepresentation of facts by the participants due to fear of medicolegal complications. Another obvious limitation was that in case of unconscious victims, all the information provided by the attendant may have been fully conversant of relevant facts.

Conclusion

High proportion of RTI victims were young drivers so school based road safety awareness programs should be periodically conducted to decrease high risk behaviors while driving. Increasing awareness in general population also regarding traffic rules like speed regulation, use of side indicators, etc. There is a huge need for development of better trauma system and trauma care services for RTI patients, especially prehospital care. An integrated approach geared toward better coordination between prehospital care and

definitive care (in the hospital) through better availability of trained human resources (particularly on the job training and training of vehicle drivers in first aid), strengthening of ambulance service, infrastructural changes and better supply of logistics would be required for trauma care in the country. Bringing in newer legislations strengthening of existing laws and ensuring their proper implementation for drunken driving, mobile phone use while driving and nonuse of helmets and seat belts.

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