

EPIDEMIOLOGICAL CORRELATES OF ROAD TRAFFIC ACCIDENT INJURED VICTIMS ADMITTED AT TERTIARY CARE CENTER IN WESTERN UTTAR PRADESH, INDIA

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Abstract

Background: Every year the lives of approximately 1.3 million people are cut short as a result of a road traffic crash. Road traffic crashes cost most countries nearly 3% of their gross domestic product. Present study was done to study the demographic profile and circumstances of accident among patients of road traffic injuries admitted in a tertiary care centre and pattern of injury in victims of road traffic accidents. **Materials and Methods:** A cross-sectional study was done among 267 victims of road traffic accidents admitted in the emergency ward from March 2023 to August 2023. Patients who were conscious, cooperative and the unconscious patients who had cooperative attendants were included while non-co-operative patient/attendant and brought dead patients were excluded. **Result:** The mean age of the road traffic accident victims was 34±3.35 years and majority of victims belonged to 16-30 years age group (44.7%). Males have higher number of accidents (76.8%) as compare to females. Majority of the patients were from rural areas (56.5%). A high proportion of the patients were users of motorised two-wheeler driver (47.0%). **Conclusion:** Larger part of the RTA cases is within the financially profitable age are hitched, subsequently their hospitalization or inability places a huge financial burden on the family.

INTRODUCTION

With increasing industrialization and globalisation for overall development good transportation facility is one the essential priority for any country. Road transport is the most cost-effective mode of transportation globally both for freight and passengers, keeping in views its level of penetration in populated area. In any countries development good and efficient transportation plays a crucial role allowing exchange of goods, services, accessibility, mobility of population etc. With the growing population and its need there has been increase in the number of roads as well as the number of vehicles running on these roads creating a risk for accidents.

An accident is defined as “an unexpected and unplanned occurrence which may involve injury”^[1] It is the occurrence in a sequence of events which usually produces unintended injury, death or property damage.^[2] Accidents occurring on the road, involving pedestrian and or vehicles are termed road

traffic accidents (RTA). Road traffic accidents (RTA) are a serious global problem, affecting millions of people every year. They are caused by various factors, such as human error, road condition, vehicle quality, and when traffic rules not followed properly. They result in deaths, injuries, disabilities, and economic losses. Road traffic injuries are the 8th leading cause of death for children and young adults aged 5-29 years. In many countries motor vehicle accidents rank first among all fatal accidents. Every year almost 1.25 million people die from road accidents in the world .In addition for every death there are as many as 20-50 non-fatal injuries and 10-20 serious injuries requiring long periods of expensive care, nursing and treatment.^[2]

According to Ministry of road transport and highways (Transport research wing), Govt. of India, Road accidents in India 2022 survey, a total number of 4,61,312 road accidents have been reported by Police Departments of States and Union Territories, claiming 1,68,491 lives and causing injuries to 4,43,366 persons.^[3] The number of road accidents in

India 2022 increased by 11.9% compared to previous year 2021. Similarly, the number of deaths and injuries on account of road accidents were also increased by 9.4% and 15.3% respectively.^[3] Uttar Pradesh is the most populated state of the country and has topped in the total number of road accident deaths on national highways besides maintain highest position in the road accident fatalities in 2020. UP contribute 16.4% of the road accident deaths followed by Maharashtra (7.4%) and Karnataka (6.9%) whereas Tamil Nadu reported highest number of accidents taking place.^[3] The important aspect is that most of the accidents taking place are preventable. Meerut district is situated on the western part of UP state and included in the region of National Capital Region (NCR) due to its vicinity (70km) to Delhi. Lot of development has taken place in the region in past few years involving establishment of highways connecting to the capital. This has increased in fast moving vehicles continuously for various purposes putting threat to increase in road accidents. Due to increasing road accidents causing deaths, permanent disability which leads to huge economic losses this study is an attempt to know the epidemiology of road accidents injuries and identify various factors associated with it and do needful efforts to reduce the burden of RTA in our country.

Aims and Objectives

1. To study the demographic profile and circumstances of accident among patients of Road Traffic Injuries admitted in a Tertiary Care Centre.
2. To study pattern of injury in victims of road traffic accidents.

MATERIALS AND METHODS

A hospital based cross-sectional study was conducted in the Trauma Centre of Lala Lajpat Rai Memorial Medical College, Meerut which is a tertiary care center in western Uttar Pradesh. Data of all the patients of Road traffic injuries (RTI) admitted in emergency ward from March 2023 to August 2023 was collected.

A pretested semi-structured interview schedule was done. Assuming that prevalence of RTA was 50%, taking permissible error of 6% and using the formula $n = Z^2_{1-\alpha/2} pq/d^2$ (where n= sample size, $Z^2_{1-\alpha/2}$ = value of normal deviate at 95% confidence interval, p=prevalence=50%, q=1-prevalence=50%, d= permissible error=6%), the final sample size was calculated to be 267. Simple random sampling was used to select the sample of 267 patients.

Inclusion Criteria

1. Patients of RTI admitted at emergency ward that were conscious and cooperative.
2. Patients who were unconscious but have cooperative attendants.

Exclusion Criteria

1. Patients who were brought dead.

2. Patient or attendant refused to co-operate.

Data entry and statistical analysis was done by using Microsoft Excel. Ethical approval was obtained from the Institutional Ethical Committee before commencing the study (Certificate no./SC-1/2023/2408).

RESULTS

The present study was conducted among 267 patients admitted in the emergency ward. The mean age of road traffic accident (RTA) victims was 34 ± 3.35 years. Maximum number of participants were in the age group of 16-30 years i.e. 120 (44.7%) followed by 31-45 years i.e. 77 (28.7%) followed by 46-60 years i.e. 32 (11.9%) followed by >60 years i.e. 22 (8.2%) and only 16 (5.9%) were less than 15 years. Majority victims were males 206 (76.8%) and only 61 (22.8%) were females. More RTA victims belonged to rural area 151 (56.5%) as compared to urban area i.e.116 (43.2%). Among RTA victims 180 (67.4%) were married while 87 (32.5%) were single. 72 (26.9%) RTA victims were having primary level of education followed by Intermediate and graduate level i.e. 64 (23.9%), high school education level 61 (22.8%), illiterate i.e. 43 (16%) and only 27 (10.4%) were educated up to middle school. RTA victims who belongs to class-III socio-economic status were 105 (39.3%) followed by class-IV i.e. 83 (31.1%) , class-II 59 (22.1%) , class-V and class-I 17 (6.4%) and 3 (1.1%) respectively. Socio-economic status was calculated according to modified B.G. Prasad classification. [Table No 1]

Majority of road traffic accidents (RTA) victims were motorised two-wheeled vehicle drivers i.e. 126 (47.0%) , followed by motorised two-wheeled vehicle Pillion i.e. 48 (17.9%) , pedestrian 24 (8.9%) , three-wheeler occupant , pedal cyclist , light motor vehicle occupant , tricycle occupant , heavy motor vehicle occupant and others i.e. 20 (7.4%) , 12 (4.4%) , 12 (4.4%) , 12 (4.4%) , 8 (2.9%) and 5 (1.8%) respectively. Others include bullock cart, horse cart etc. Among 174 motorised two-wheeled vehicle user only 28 people (16.1%) were using helmet while 146 (83.9%) were not using .Similarly out of 12 Light motor vehicle users only 4 people (33.3%) were using seatbelt while rest were not using. [Table No 2]

Most of the road traffic accidents were observed on Friday (21%) followed by Wednesday (20%), Monday (18%), Thursday (14%), and Saturday (10%) Tuesday (9%) and minimum on Sunday (8%).(Figure no.01)The difference in the number of accidents on different days of the week was significant. Most of the accidents took place in between 04-08 pm (31%), followed by 12-4 pm (25%), 08am -12 noon (23%), 04-08 am (10%), 08pm-12 midnight (9%) while least happened in between 12-04 am (2%). The difference in the

number of accidents occurring at different time was significant statistically. [Figure No.2]

The number of accidents were mainly reported on municipal roads and city roads i.e. 111 (41.4%) followed by state highways i.e. 91 (33.9%), major district roads & rural road i.e. 40 (14.9%) while 25 (9.4%) on national highways. It was seen that divider was absent on the road in case of 160 accidents (59.7%) while it was present in 107 accident cases (40.1%). 119 (44.5%) counterpart of accident was found to be light motor vehicle followed by heavy motor vehicle 52 (19.4%), two - wheeler ,three-wheeler, bicycle, fixed object, divider, tractor trolley, pedestrian, animal and other i.e. 44 (16.4%), 19 (7.1%), 10 (3.7%), 6 (2.2%), 5 (1.9%), 5 (1.9%), 4 (1.5%), 2 (0.7%) and 1 (0.4%) respectively. Other includes people who were standing in front of shop situated beside road. [Table No 3]

Of all the types of injuries fracture was found in 83.5% of the total RTA victims , cut wound or laceration in 42.5% , Internal hemorrhage in 35.07% , dislocation in 17.9% , blunt injury and crush injury in 10.44% and 3.7% respectively (figure no.03). Lower limb injury was present in 64.5% of victims, upper limb injury in 33.2%, head injury in 11.2%, thorax injury in 8.2%, maxillo-facial injury in 4.1%, spine and pelvis injury was present in 2.6% and 1.1% respectively. [Figure No.4]

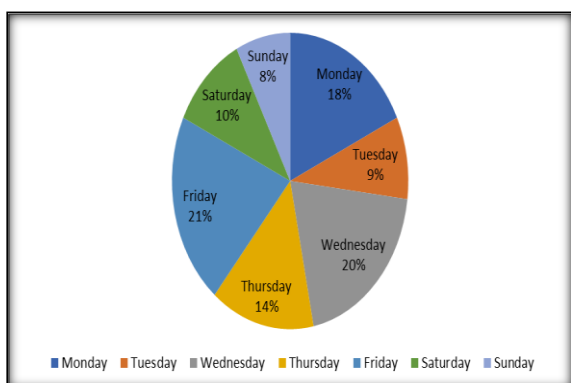


Figure 1: Day variation of the accidents

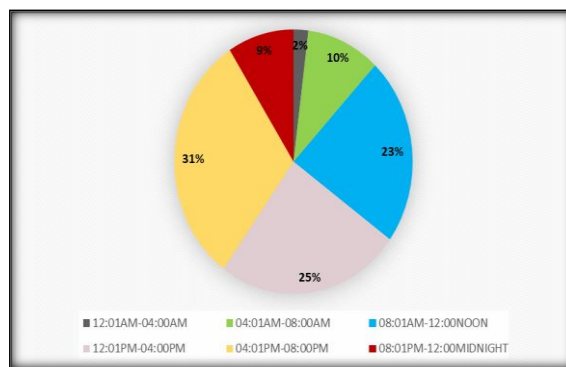


Figure 2: Time variation of the accidents
Chi square-125.71 p value: 0.000-significant.

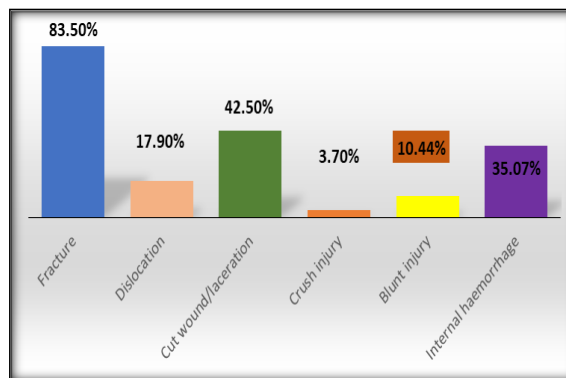


Figure 3: Distribution of the patients according to type of injury

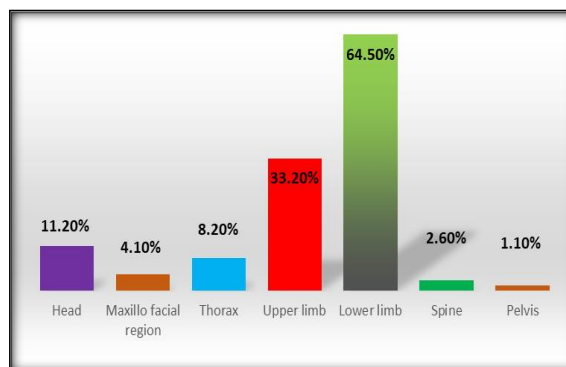


Figure 4: Distribution of the patients of RTI according to site of injury

Table 1: Description of sociodemographic characteristics of patients of Road Traffic Accidents

Demographic characteristic	Number(n=267)	Percentage (%)
Age group (in completed years)		
<15	16	5.9
16-30	120	44.7
31-45	77	28.7
46-60	32	11.9
>60	22	8.2
Mean ± SD	34±3.35	
Gender		
Male	206	76.8
Female	61	22.8
Residence		
Urban	116	43.2
Rural	151	56.5
Marital status		
Married	180	67.4
Unmarried	87	32.5
Education		

Illiterate	43	16
Primary	72	26.9
High school	61	22.8
Middle school	27	10.4
Graduate/Intermediate	64	23.9
Socioeconomic classes (According to modified B.G. Prasad classification)		
Class I	3	1.1
Class II	59	22.1
Class III	105	39.3
Class IV	83	31.1
Class V	17	6.4

Table 2: Road user category and safety measures used by the patients of RTA

Characteristics of the patient	Number	Percentage (%)
Road User Category (n = 267)		
Pedestrian	24	8.9
Pedal Cyclist	12	4.5
Motorised two-wheeled vehicle Driver	126	47.0
Motorised two-wheeled vehicle Pillion	48	17.9
3-Wheeler Occupant	20	7.4
Light motor vehicle Occupant	12	4.4
Heavy motor vehicle Occupant	8	2.9
Tricycle Occupant	12	4.4
Others*	5	1.8
Safety Measure, If MTV (Motorised two-wheeled vehicle) user (n = 174)		
Helmet	28	16.1
None	146	83.9
Safety Measure, If LMV (Light motor vehicle) user (n = 12)		
Seatbelt	4	33.3
None	8	66.7

*Others include bullock cart, tonga horse cart etc.

Table 3: Distribution of the patients of road traffic injury according to type of road and counterpart involved in accident

Characteristics	Number (n=267)	Percentage (%)
Type of Road		
National highway	25	9.4
State Highway	91	33.9
City/Municipal Road	111	41.4
MDR** & Rural Road	40	14.9
Divider on Road		
Present	107	40.1
Absent	160	59.7
Counterpart of Accident		
Fixed object	6	2.2
Pedestrian	4	1.5
Divider	5	1.9
Bicycle	10	3.7
2-Wheeler	44	16.4
3-Wheeler	19	7.1
Light motor vehicle	119	44.5
Heavy motor vehicle	52	19.4
Animal	2	0.7
Tractor-trolley	5	1.9
Other***	1	0.4

DISCUSSION

The present study was done to study the demographic profile and circumstances of accident among patients of road traffic injuries admitted in a tertiary care center and to know the pattern of injury in victims of the accidents. Maximum number of RTA victims was in the age group 16-30 years followed by 31-45 years and only few less than 15 years. The mean age group was 34±3.35 years, majority victims were male, belonging to rural area, married and maximum patients belonged to class-III socio-economic status. Similar results was found in

the study done by Chauhan A et al,^[4] to know the epidemiology of Road Traffic Injuries in a tertiary care centre of Lucknow (2014), as they mentioned that majority of the patients of RTI belonged to 16 to 30 years age group, followed by 31 to 45 years age group, more males compared to females, majority were from rural areas, married, belonging to Socio-economic class-III have met road accidents. Study done by Verma P. et al,^[6] to study the sociodemographic profile of RTA cases and to know the type of road users and the counterpart involved in the road traffic accidents (9205) showed the similar results they stated that majority cases

were males, maximum cases belonged to 16-30 years age group followed by 31-45 years age group, majority cases were married and illiterate and majority of the cases belonged to upper- lower social class. Study done by Harna et al,^[7] to study the epidemiology of Trauma Patients Admitted to a Trauma Center in New Delhi (2020) also showed that the average age of RTA patients was 33.4 years, the adults between 20-40 years suffered most of the trauma and reported to the hospital and most of the patients were illiterate.

In the study most of RTA victims were motorised two-wheeled vehicle drivers (47%) followed by motorised two-wheeled vehicle Pillion (17.9%). Similar results was found in the study done by Verma P. et al⁶ and Harna et al,^[7] and the study done to investigate the sociodemographic characteristics, type of vehicle, types of road, primary treatment, and safety measures adopted by the victims of road traffic accidents (RTA) done in the year 2023 by Khare et al.^[5] They also observed that majority RTA victims were two wheeler vehicles drivers.

According to the present study very few people were using safety measures like helmet (16.1%) and seatbelt (33.3%). Similar results was observed in the study done by Rajesh N et al,^[9] (2018) which was done to study the socio-demographic profile, to identify the risk factors responsible and to identify the various presenting injuries of road traffic accident victims as they mentioned that 26.19% of victims reported usage of helmet while driving two wheelers and only 18.18% of victims used seat belt while driving four wheelers. Another study done by Singh et al,^[10] to find out the reasons leading to road traffic accident (2016) also found that protective equipments was used by only 31% drivers whereas rest 69% did not use anything.

Our study shows that maximum number of accidents was observed in between 04-08 pm and day variation showed that maximum accidents took place on Friday followed by Wednesday. Similar results was observed in study done by Khare et al,^[5] as they mentioned that the maximum number of accidents took place between 03-06 pm. Other Study done by Rajesh N et al,^[9] also found that maximum accidents happened in between 6pm to 12 midnight. Study done by Sharma et al,^[11] to find out the prevalence of road traffic accidents among patients visiting the Department of Emergency of a tertiary care centre observed that maximum accidents took place on Friday and Sunday followed by Saturday. Study done by Chauhan et al,^[4] showed that majority of the accidents occurred on Tuesdays followed by Wednesdays.

Present study also states that majority accidents were reported on municipal roads and city roads and divider was absent on more number of roads where accidents have occurred. Similar results was found in study done by Khare et al,^[5] as they mentioned that more than half of the accidents took place on street roads in the city. Similar results was also observed in the study done by Chauhan et al,^[4] showing that

majority of the accidents on city and municipal roads followed by rural roads and divider was absent on majority of the roads whereas study done by Singh et al,^[10] showed that most of the RTAs occurred on city roads followed by highways.

The study shows that fracture is the most common injury followed by laceration and extremities (lower limb as compared to upper limb) are the most common site of injury. While the study done by Ambade et al,^[8] (2021) to study the pattern of injuries in different types of victims of road traffic accident in central India showed that head was the most common site of injury followed by thorax and abrasion was the most common type of injury. Study done by Khare, et al,^[5] shows that the majority of the victims had injuries at multiple sites and among these sites, limbs including upper limbs and lower limbs were the most common site of injury in victims and the maximum number of victims had a combination of soft-tissue injury and bony injury. Study done by Harna et al,^[7] shows that fracture was the most common radiologically proven injury followed by brain injury, abrasions, bruises and laceration. Study done by Chauhan A et al,^[4] showed similar results as they mentioned that fracture was the most common type of injury in the patients of RTI, followed by cut wound or laceration and internal haemorrhage whereas lower limb was the most common site of injury, followed by head. Study done by Sharma et al,^[11] shows that limbs followed by head and neck were the most common site injured with blunt injury followed by laceration being the most common type of injury.

CONCLUSION

The results of this study shows that young people, males, socio-economic class III, IV & II, motorized two wheeler vehicle (MTV) users and without safety measures are amongst the victims of road traffic injury. Among injuries fracture was the most common injury followed by lacerations and internal hemorrhage. Lower limb was the most common site of injury compared to upper limb and head.

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