

An epidemiological study on road traffic accident cases admitted to a tertiary care hospital of central Uttar Pradesh

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Received: March 15, 2019; Accepted: April 14, 2019

ABSTRACT

Background: Road traffic accidents (RTAs) are a public health issue and cost a lot to individuals, families, communities, and nations. The estimated cost is around 1–2% of a country's Gross National Product in lower income countries. Rural India has inefficient services for trauma care, due to the varied topography, financial constraints, and lack of appropriate health infrastructure and reach to them in their golden period. **Objectives:** The objectives of the study were to study the pattern of injury and to assess the effectiveness of ambulance services. **Materials and Methods:** This was a hospital-based, cross-sectional study of victims of RTA cases as study subjects who were admitted in the emergency department of a tertiary care hospital after they are stabilized and shifted to orthopedics and surgery ward. It included comatose patients and excluding patients of the outpatient department. **Results:** Majority of RTA victims used government ambulance 354 (54.1%) followed by owned vehicle 214 (32.7%) and least of them used private ambulance 86 (13.2%) to reach the hospital. Only 276 (42.2%) of victims received ambulance services at the time of accident occurrence in their golden period. In our study, mechanism of injury majorly was collision type 451 (69%) followed by acceleration 110 (16.9%) and deceleration 93 (14.3%) among the road accident victims. Among various body head region was most common 254 (39%) followed by lower limb 230 (35.2%). **Conclusion:** The mortality among road accident cases increased with the increase in duration to reach the hospital. The system which was involved in RTA cases was majorly skeletal system followed by the central nervous system.


KEY WORDS: Road Traffic Accidents; Pattern of Injury; Tertiary Care Hospital

INTRODUCTION

The World Health Organization advisory group in 1956 defined an accident as an “un-premediated event resulting in recognizable damage.”^[1] Or according to another definition an accident is that “occurrence in a sequence of events

which usually produces unintended injury, death, or property damage.”^[2]

A road traffic injury is called as a fatal or non-fatal injury incurred as a result of a collision on a public road involving at least one moving vehicle. Children, pedestrians, cyclists, and the elderly are the most vulnerable group of road users.^[3] According to the World Health Organization (WHO) fact sheet-reviewed in February 2018, the newly adopted goal 3.6 for 2030 Sustainable Development Goals has set an ambitious target of halving the global number of deaths and injuries from road traffic crashes by 2020.^[4] Gross domestic product amounts to 3% to road traffic crashes. As we all know road traffic injuries (RTIs) are the leading cause of death among

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Website: http://www.ijmsph.com	Quick Response code 
DOI: 10.5455/ijmsph.2019.0408015042019	

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people aged between 15 and 29 years and >1.25 million people die each year as a result of road traffic crashes.^[5] The newly adopted Sustainable Developmental Goal 11.2 targets the aim to provide access to safe, affordable, accessible, and sustainable transport systems for all by 2030 by improving road safety, notably by expanding public transport with special attention to the needs of those in vulnerable situations such as women, children, older persons, and persons with disabilities.^[4]

The motor vehicle population in India is growing at a faster rate than its economic and population growth. The surge in motorization coupled with the expansion of the road network has brought with it the challenge of the increase in road accidents. WHO says that RTIs are the sixth leading cause of death in India with a greater share of hospitalization deaths, disabilities, and socioeconomic losses in the young and middle-aged population.^[6] Although various studies have been carried out to illustrate the losses occurred due to road traffic accidents (RTAs) in metropolitan cities. Limited researches are available to demonstrate the risk factors contributing to RTAs cases in rural areas, small towns referred to tertiary care hospital.

Rationale

In this study, efforts have been made to study various risk factors contributing to RTAs be it host factors (road users), agent (vehicles speed and poorly maintained vehicle) or environmental conditions (roads, seasons, month, defective layout of crossroad, weak enforcement of laws and policy, treatment given in golden period, and referral services). Therefore, the results of this study may be useful in identifying the areas where immediate action is required to prevent this manageable epidemic.

Aim and Objectives

The aim of the study was to study the pattern of injury and to assess the effectiveness of ambulance services of RTAs.

MATERIALS AND METHODS

This was a hospital-based, cross-sectional study of victims of RTA cases as study subjects who were admitted in the emergency department of a tertiary care hospital after they were stabilized and shifted to orthopedics and surgery ward. The present study excludes patients in the outpatient department. The victims were interviewed bedside. In cases, where the condition of victims does not warrant to give an interview, their relatives or attendants were interviewed. Records of the cases who died on admission or a few hours later before being shifted to the ward were taken from their respective case sheet on the same day. Furthermore, the records of patients who were absconded were also taken

from the medical records on the same day. For the treatment outcome, the patient was followed until his stay in the hospital. A pre-designed pre-tested semi-structured questionnaire was filled by the interviewer. Before the interview, informed consent was taken from each participant and confidentiality of the information collected was ensured. Convenience type of sampling was done on road accident victims admitted to the emergency department between January 1, 2017, and December 31, 2017. The study area was the Emergency Department, Orthopaedic ward, Surgery Ward, Neurosurgery ward of Uttar Pradesh University of Medical Sciences, Saifai, Etawah.

Inclusion Criteria

1. Injury involving moving vehicle while persons sitting on/ in it or a person hit by moving the vehicle as a pedestrian.

Exclusion Criteria

1. Injury involving a stationary vehicle (e.g., persons getting injured while loading or washing a vehicle).
2. Road injuries in which there was no involvement of the vehicle in the accident, such as a person falling and slipping on the road from the vehicle and sustaining an injury.

Data were entered into Microsoft Excel sheet and exported and analyzed using Statistical Package for the Social Sciences version 24.0, IBM Inc. Chicago, USA software. Data have been presented in the form of percentage and proportions and relationship was established using the Chi-square test. The difference among the proportions was calculated with the help of Z-test of proportion. This study is a part of a bigger study which was conducted to know various epidemiological factors of RTA victims.

Ethical clearance was obtained from of Ethical Committee of Uttar Pradesh University of Medical Sciences, Saifai, Etawah before the study. Informed written consent has been taken from all the subjects after explaining the purpose, nature, and procedure of the study. They were assured that confidentiality will be strictly maintained.

RESULTS

Table 2 showed that age group of 16–30 years, 200 (39.4%) were male and 32 (21.8%) were female followed by 31–45 years 147 (29%) were male and 47 (32%) were female. In the age group <15 and >60 years', males were 38 (7.5%) and 37 (7.3%), respectively, and females were 19 (12.9%) and 13 (8.8%), respectively. On looking for the sex-wise difference in proportion in various age groups, Z-test of proportion was applied and found to be significant in 16–30 years, 31–45 years, and >60 years and also overall.

Figure 1 depicts the distribution of road accident victims according to their mode of transport to tertiary care hospital majority of them used government ambulance 354 (54.1%) followed by own vehicle 214 (32.7%) and least of them used private ambulance 86 (13.2%).

Figure 2 shows only 276 (42.2%) of victims who called for an ambulance at the time of accident occurrence.

Table 4 shows the association between the final outcome and system involved. Where the central nervous system (CNS) involved the majority of victims 146 (61) died in hospital, escaped and referred to the higher center followed

by discharged when symptoms improved 49 (21), whereas in skeletal system, 172 (64) were discharged when symptoms improved followed by fully treated 44 (16.9) and this association is found to be significant.

Impact of injury majority was found in combinations of primary impact, secondary impact, a secondary injury which were 267 (40.8%) followed by primary impact and secondary impact injury 192 (29.4%) and least were of secondary impact with secondary injury 64 (9.8%). In our study, mechanism of injury majorly was collision type 451 (69%) followed by acceleration

Table 1: Demographic profile of road traffic accident victims (n=654)

Demographic variable	Number (%)
Gender	
Male	507 (77.5)
Female	147 (22.5)
Locale	
Rural	438 (67)
Urban	216 (33)
Religion	
Hindu	595 (91)
Muslims	46 (7)
Sikh	13 (2)
Education	
Illiterate	144 (22.2)
Just literate	47 (7.0)
Primary school	90 (13.8)
Junior high school	112 (17.1)
High school	118 (18.0)
Intermediate	72 (11.0)
Graduate	60 (9.2)
Postgraduate and above	11 (1.7)
Socioeconomic status	
Upper class	31 (4.7)
Upper-middle class	111 (17)
Middle class	161 (24.6)
Lower-middle class	230 (35.2)
Lower class	121 (18.5)

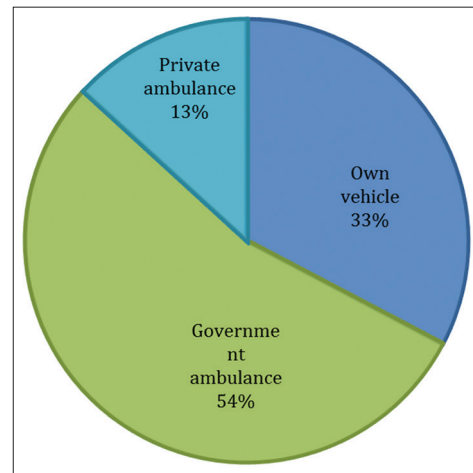


Figure 1: Distribution of road traffic victims on the basis of the facility used for transportation to the hospital

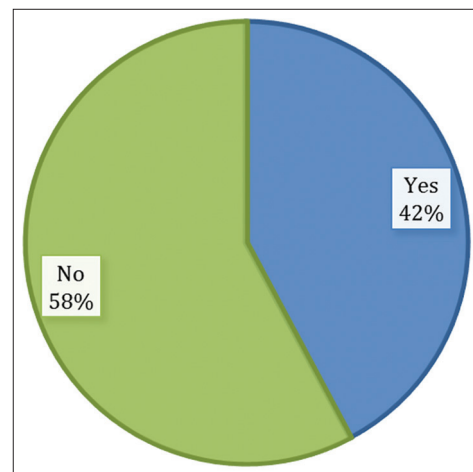


Figure 2: Utilization of government ambulance services by victims of road traffic accidents

Table 2: Distribution of road traffic accident victims according to their age and gender

Age group in years	Male no (%)	Female no (%)	Total no (%)	Z-value, (P value)
<15	38 (7.5)	19 (12.9)	57 (8.7)	0.001, >0.9999
16–30	200 (39.4)	32 (21.8)	232 (35.5)	9.617, <0.001*
31–45	147 (29.0)	47 (32.0)	194 (29.7)	4.371, 0.002*
46–60	85 (16.8)	36 (24.3)	121 (18.5)	1.41, 0.1585
>60	37 (7.3)	13 (8.8)	50 (7.6)	1.808, 0.05*
Total	507 (100.0)	147 (100.0)	654 (100.0)	9.389, <0.001*

110 (16.9%) and deceleration 93 (14.3%) among the road accident victims. Among various body head region was most common 254 (39%) followed by lower limb 230 (35.2%) and least were of thorax/abdomen/spine 96 (14.7%).

DISCUSSION

RTIs are the only public health problem where society and decision makers still accept death and disability on a large scale among young people. This human sacrifice is deemed necessary to maintain high levels of mobility and is seen as a necessary “externality” of doing business. Our discussion only revolves around the number of deaths and injuries we are willing to accept.

Out of 654 road accident victims, 155 (23.7%) died during their stay in hospital. Among them, the majority were males 504 (77%) and 438 (67%) belong to a rural area. RTAs were found majorly in 16–30 years of age-group 232 (35.5%) followed by 31–45 years 194 (29.7%) with mean age 35.5 ± 17. On looking for the sex-wise difference in proportion in various age groups, Z-test of proportion was applied and found to be significant in 16–30 years, 31–45 years, and >60 years and also overall.

Table 3: Distribution of the road traffic injury cases according to the system involved

System involved in injury	Number (%)
CNS	192 (29.4)
CVS	21 (3.2)
Respiratory system	41 (6.2)
Gastrointestinal system	63 (9.6)
Renal system	22 (3.4)
Reproductive system	5 (0.8)
Skeletal system	268 (41.0)
Central nervous system with the skeletal system	42 (6.4)
Total	654 (100.0)

CNS: Central nervous system, CVS: Cardiovascular system

Majority of the victims used government ambulance (54.1%) for transportation but only (42%) victims called for an ambulance at the time of accident during the golden period.

In Singh *et al.* urban victims 222 (64.00%) out-numbered rural which is contradictory to our results where 439 (67%) belong to rural followed by 215 (33%) to urban.^[7] As our study is conducted in a tertiary rural hospital located in Saifai block. Similarly Sahu *et al.* conducted a study among 2378 road accident victims of which majority (65.81%) were residing in rural areas and only 34.18% belonged to urban population.^[8] Likewise, Kahn *et al.* also conducted a study on road accident victims on 820 cases of which 77.7% of the respondents belong to rural areas, respectively, which is also in accordance with our study.^[9] Same results were seen in Urfi *et al.* in which a higher number of patients belonged to rural areas (59.8%) as compared to urban areas (40.2%).^[10]

Degais *et al.* studied 150 road accident victims among them males were more affected, i.e., 85%.^[11] Al-Zamanan *et al.* most of the RTAs’ cases (92%) were male victims with the highest peak among the age group 20–29 years similar to our study.^[12]

Shrestha *et al.* studied 112 RTA victims among them 50% were in the age group of 21–40 years and 71.4% were male.^[13] The results of Chaurasia *et al.* showed that the majority of crash victims (740) were males (82.02%) and females (17.98%) in the age group of 20–44 years.^[14]

In Urfi *et al.* majority of the patients were literate, of which educated up to high school and above constituted 78.8%. Educated up to high school (35.0%) was the largest group followed by graduate and above (27.6%). 30.2% of the patients were unemployed. However, the majority of them were either students or homemakers. Clerical, shop owner and farmers (26.9%) formed the largest recognized group with regard to occupation is similar to our study. The maximum risk of RTA was found in upper-lower class (55.1%), i.e., Class IV followed by lower-middle class (40.6%), i.e., Class III as per Modified Kuppuswamy’s socioeconomic classification; this

Table 4: Association of treatment result with the systems involved

System involved	Treatment results number (%)				Total
	Discharged when symptoms improved	Fully treated	Discharged unhealthy against medical advice/Transferred to rehabilitation	Died in hospital/Escaped/ Referred to the higher center	
CNS	49 (21)	19 (8)	25 (10.6)	146 (61)	239
CVS	9 (42.8)	5 (23.8)	2 (9.4)	5 (24)	21
Respiratory	22 (59.4)	9 (24.2)	1 (3)	5 (13.4)	37
GIT	30 (46)	22 (34)	4 (6.2)	9 (13.8)	65
Renal reproductive system	13 (50)	5 (19)	2 (8)	6 (23)	26
Skeletal system	172 (64)	44 (16.9)	33 (12.6)	17 (6.5)	266
Total	290	104	67	178	654

Pearson Chi-square – 228.1, degree of freedom=15, P<0.001, CNS: Central nervous system, CVS: Cardiovascular system, GIT: Gastrointestinal tract

is in against of our findings. Above findings shows that the majority of students were affected which was due to high-risk behavior of young individuals and having easy access to vehicles, be it of parents or they own it due to peer group pressure and upper-lower class also proves to this reason.^[10]

Sahu *et al.* reveal in their study that out of the total 2378 road accident victims 834 (36.13%) were illiterates, and likewise, 17.37% (401) cases were just literate, only 223 (9.66%) had higher secondary level education which is in accordance with our study.^[8]

Both the Shrestha *et al.* and Chaurasia and Ahlawat have increasing age group of road accident victims which shows the involvement of this age-group would affect the country's productivity. Verma *et al.* studied 425 RTA cases, 381 were males and 44 were females (89.6% and 10.4%, respectively).^[15] According to Singh *et al.*, injury to the head and neck region (81.4%) was responsible for a majority of deaths which is in accordance with our results.^[16] Similarly, Mishra *et al.*, head injury was found in 156 (43.33%) cases and it was associated with case fatality rate which was 90.90%.^[17] In Roy *et al.*, ambulance services had reached in 46.5% cases which in accordance with our study.^[18]

CONCLUSION

Various studies conducted in this area on RTAs did not include the factors which are considered in our study such as ambulance services, association of treatment outcome, and system involved. The system which was involved in RTA cases was major of skeletal system followed by CNS. Association of treatment result and system involved where CNS involved a majority of victims 132 died in hospital followed by discharged when symptoms improved were 49 whereas in skeletal system 170 were discharged when symptoms improved followed by fully treated 44 and this association is found to be significant.

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How to cite this article: Mahima, Kumar S, Jaiswal K, Shukla SK, Jain PK, Bajpai PK. An epidemiological study on road traffic accident cases admitted to a tertiary care hospital of central Uttar Pradesh. Int J Med Sci Public Health 2019;8(6):425-429.

Source of Support: Nil, **Conflict of Interest:** None declared.