

A CROSS SECTIONAL STUDY ON RISK FACTORS OF ROAD TRAFFIC ACCIDENT CASES ADMITTED IN A TERTIARY CARE HOSPITAL, TIRUPATI

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Abstract

Background: Rapid urbanization and industrialization have produced a massive increase in the number of motor vehicles on the road worldwide resulting in an increase in morbidity and deaths from traffic accidents, particularly in developing nations like India. Road traffic collisions are a prominent cause of death among teenagers. Children, pedestrians, cyclists, and older people are among the most vulnerable to road traffic accidents. **Objectives:** To determine the various risk factors influencing road traffic accident cases admitted in a tertiary care hospital, Tirupati. **Materials and Methods:** A Hospital based cross-sectional study, carried out at Sri Venkateswara Ramnarayan Ruia Government General Hospital (SVRRGGH), a tertiary care hospital in Tirupati. All road traffic accident cases admitted in Tertiary Care Hospital for more than 24 hours were included in the study. **Results:** The majority of the study subjects were in the age group of 20–29 years (27.1%), 721 were males and 31.6% of study participants finished degree. Most of the victims in road traffic accidents were driver (46.3%), followed by pedestrian (31.9%) and highest number of accidents reported between 6 PM to 10 PM (41.5%). It was found that 26.6 % were speaking with others while 18.8% of people were using mobile phones and 16.9% were driving under the influence of alcohol at the time of accident. **Conclusion:** It was found that over speed of the vehicles is a common finding along with other proven risk factors like speaking over mobile or speaking with others while driving, driving under the influence of alcohol.

INTRODUCTION

A road traffic accident occurs when at least one moving vehicle collides with another on a public or private road, resulting in at least one person being hurt or killed.^[1] Rapid urbanization and industrialization have produced a massive increase in the number of motor vehicles on the road worldwide resulting in an increase in morbidity and deaths from traffic accidents, particularly in developing nations like India. Road traffic collisions are a prominent cause of death among teenagers. Children, pedestrians, cyclists, and older people are among the most vulnerable to road traffic accidents.^[2]

According to the World Health Organization (WHO) (2018), approximately 1.3 million people

die each year in road traffic accidents around the world, with another 20-50 million suffering from non-fatal injuries, resulting in significant economic losses for victims, their families, and the nation as a whole. In many countries, Road traffic accidents cost 3% of their Gross Domestic Product (GDP). Around 93% of Road accident fatalities of the world occur in low and middle-income countries but they only account for 60% of the world's vehicles.^[3]

Road traffic injury is now the leading cause of death for children and young adults aged 5–29 years and the eighth leading cause of death for all age groups surpassing HIV/AIDS, Tuberculosis, and diarrheal diseases. Pedestrians, cyclists, and motorcyclists, as well as those living in low- and middle-income countries, bear a disproportionate share of the burden of road traffic injuries and deaths which is

exacerbated by increasing motorized transportation.^[4]

Road accidents are common in India and stand first in the number of road traffic accidents (11%) around the World. As per the Road Accident Report for 2019, around 4.5 lakh accidents occurred in India, with approximately 1.5 lakh deaths. The most common causes of road accidents are distracted driving, driving under the influence of alcohol, over speed, use of mobile phones, not wearing seat belts or helmets, potholes, and bad road conditions.^[5] The present study was conducted to determine the various risk factors influencing the road traffic accident cases admitted in a tertiary care hospital, Tirupati.

MATERIALS AND METHODS

The present study was a Hospital based cross-sectional study, carried out at Sri Venkateswara Ramnarayan Ruia Government General Hospital (SVRRGGH), a tertiary care hospital in Tirupati. The study period was from November 2020 to October 2021. All road traffic accident cases admitted in Tertiary Care Hospital for more than 24 hours were included in the study. The following subjects were excluded: 1) Non cooperative patients and 2) Comatose patients where the information from attendants are not reliable. As per the data from the Medical Record Department of SVRRGGH, the average number of Road Traffic Accidents (RTA) for the past three years (2017-2019) was 1513. By taking either side of 10%, the expected sample size was 1362-1664. The total number of RTAs during the period November 2020 to October 2021 was 1455. After satisfying, the inclusion criteria of victims admitted more than 24 hours (989) and the exclusion criteria of non-cooperative patients (79), the final sample size attained was 910.

Necessary permission was taken from the authorities concerned in order to collect data from different departments of the hospital. Written consent was taken from all the study participants before inclusion in the study. A pre-designed, semi-structured questionnaire was used for interviewing the study participants in the study. The collected data includes the socio-demographic profile of study participants, circumstances of the accident, type of injuries sustained and risk factors associated with RTA were

collected. The data was entered in MS EXCEL 2019 and analyzed using SPSS statistics 16.0. Quantitative variables were expressed in mean standard deviation and qualitative variables were expressed in proportions. The differences between proportions were analyzed using Chi-Square test. A probability value of less than 0.05 is considered to be statistically significant.

RESULTS

The present study was carried out at SVRRGGH, a tertiary care hospital in Tirupati. The majority of the study subjects were in the age group of 20–29 years (27.1%), 721 were males and 189 were females. The mean age of males and females were 36.8 and 34.9 years respectively. The majority of subjects' educational status was degree (31.6%), followed by intermediate (28.9%). Most of the subjects were semi-skilled by occupation (20.1%), followed by students (17.1%) and unskilled (14.7%) (Table 1).

The current study showed that the month of January 2021 had a slightly higher prevalence of accident cases (4.2%), followed by February 2021 (3.8%) (Table 2). The number of accidents increased during the day from 6 AM to 10 PM with highest number reported between 6 PM to 10 PM (41.5%). In the majority of cases (46.5%), there was head on collision while in 28.4% of cases, the collision was sideways. In the majority of the subjects, the road user was motorcycle related (48.0%), followed by Pedestrian (31.9%) (Table 3). Most of the victims in road traffic accidents were driver (46.3%), followed by pedestrian (31.9%) and passengers (21.8%) (Figure 1).

It was observed that 26.6 % were speaking with others while 18.8% of people were using mobile phones and 16.9% were driving under the influence of alcohol at the time of accident. Most of the victims using four wheeler including driver and passengers had not used seat belt (53.6%) at the time of accident. (Table 4)

The majority of passengers were found to be seated in the back (64.3%) as opposed to the front (19.1%) and middle positions (16.6%). The passenger density was found to be normal in majority of cases (61.3%). A slightly higher proportion (50.7%) felt that the vehicle was over speeding at the time of accident (Table 5).

Table 1: Socio demographic profile of study subjects (N = 910)

S.No	Demographic variable	No. of subjects	Percentage
1	Age group (Years)		
	(a) Less than 20	78	8.6
	(b) 20 – 29	247	27.1
	(c) 30 – 39	238	26.1
	(d) 40 -49	168	18.5
	(e) 50 -59	77	8.5
	(f) 60 & above	102	11.2
2	Gender		
	(a) Male	721	79.2

	(b)	Female	189	20.8
3	Place of residence			
	(a)	Rural	538	59.2
	(b)	Urban	372	40.8
4	Occupational status			
	(a)	Unemployed	123	13.5
	(b)	Student	156	17.1
	(c)	Unskilled	134	14.7
	(d)	Semiskilled	183	20.1
	(e)	Skilled	77	8.5
	(f)	Semiprofessional	49	5.4
	(g)	Professional	77	8.5
	(h)	Housewife	101	11.1
	(i)	NA	10	1.1

Table 2: Proportion of road traffic accidents among casualty admissions in Various months

Month of accident	Total number of casualty admissions	Number of road accident cases	Prevalence rate(%)
November 2020	2254	80	3.5
December 2020	2176	66	3.0
January 2021	2285	97	4.2
February 2021	2405	92	3.8
March 2021	4465	75	1.7
April 2021	4228	61	1.4
May 2021	3254	39	1.2
June 2021	3162	75	2.4
July 2021	3519	103	2.9
August 2021	4070	99	2.4
September 2021	4470	50	1.1
October 2021	4100	73	1.8
Total	40388	910	2.2

Table 3: Distribution of study participants by accident site related factors (n=910)

Variable	Category	No. of participants (%)
Time of Accident	6 AM -12 Noon	138 (15.2)
	12PM– 6 PM	240 (26.4)
	6 PM – 10 PM	378 (41.5)
	10 PM – 6 AM	154 (16.9)
Type of collision	Headon	423 (46.5)
	Sideways	258 (28.4)
	Frombehind	229 (25.1)
Type of road user	Motorcycle	437 (48.0)
	Pedestrian	290 (31.9)
	Light motor vehicle	110 (12.1)
	Three wheeler	34 (3.7)
	Heavy motor vehicle	17(1.9)
	Tractor	14 (1.5)
	Bicycle	8 (0.9)
Type of injury	Simple	371 (40.8)
	Grievous	539 (59.2)

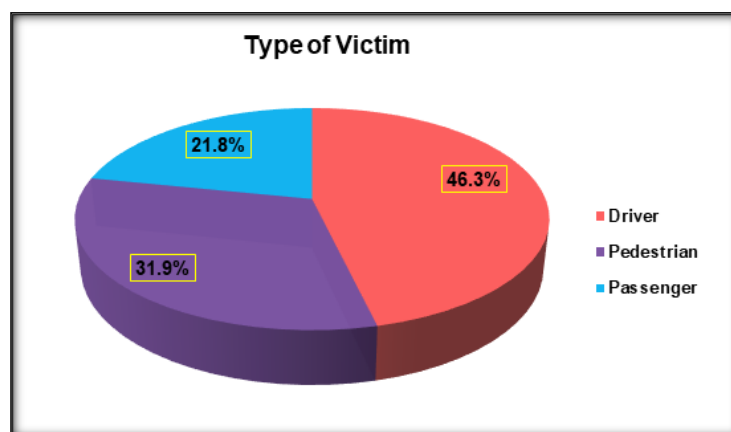


Figure 1: Type of the victim in road traffic accidents (N = 910)

Table 4: Selected risk factors among drivers and pedestrians (N = 711)

Particulars	Number of subjects	Percentage
Conversation with others at the time of accident	189	26.6
Using mobile at the time of accident	134	18.8
Under the influence of alcohol	120	16.9
Person is under stress	98	13.8
Lack of sleep the previous day for driver	89	12.5
Previous history of road traffic accidents	69	9.7
Using music player	45	6.3
Tobacco use	29	4.1

Table 5: Particulars of passengers involved in RTA (N = 199)

S.no	Particulars	Number of subjects	Percentage
1.	Passenger Position		
	a) Back	128	64.3
	b) Front	38	19.1
	c) Middle	33	16.6
2.	Passenger density		
	a) Normal	122	61.3
	b) Crowded	63	31.7
	c) Low occupancy	14	7.0
3.	Felt that vehicle was over speed		
	a) Yes	101	50.7
	b) No	98	49.3

Table 6: Type of injury by certain risk factors in driver and pedestrian (N=711)

S. No	Risk factor	No. with grievous injury	Total no. of patient with risk factor	Percentage (%)	P value
1	No driver seat belt	23	29	79.3	P=0.016;S
2	Previous history of RTA	46	69	66.7	P=0.22;NS
3	Using mobile phone	75	134	56.0	P=0.36;NS
4	Using music player	38	45	84.4	P<0.001; S
5	Conversation with others	122	189	64.5	P=0.089;NS
6	Under the influence of alcohol	61	89	68.5	P<0.001; S
7	Lack of sleep the previous day for driver	89	120	74.2	P=0.055;NS
8	Tobacco use	23	29	79.3	P=0.026;S
9	Person is under stress	58	98	59.2	P=0.946;NS

DISCUSSION

In the modern world, road traffic accidents are of major concern as they lead to mortality, morbidity, and disability. The disability can also be a huge burden to society. As the risk factors account for the road traffic accidents can be prevented with awareness and education, all efforts should be taken by individuals using the vehicles and roads coupled with government efforts to implement the legal provisions.

In the present study, the majority of study subjects were in the age group of 20–29 years (27.1%), followed by 30–39 years (26.1%). Furthermore, it discovered that 61.8% of the subjects were under 40 years. Those above 40 years are generally more careful in driving and would have gained more driving skills over the years. Similar findings were also reported in a study by Rajkumaret al.^[6] where in the majority of study subjects (29.4%) were in the age group of 20 to 29 years and Solanki et al.^[7] study in Udaipur (2016), 31.2% of cases were between 15 to 45 years of age. This indicates the major involvement of the young, productive age group in Road traffic accidents.

In the current study, out of 40,338 casualty admissions, 910 (2.2%) were road traffic accident

cases. Similar results were reported in the study done by Getachew et al.^[8] (2016) in Ethiopia wherein out of 10,007 Emergency department admissions, 779 (8%) were RTI cases and this proportion peaked in January with 11% of RTI cases.

In the present study, the number of accidents increased during the day from 6 a.m. to 10 p.m. with the highest number reported between 6 p.m. to 10 p.m. (41.5%). Similar studies done by Rajkumar et al⁶ (36.2%) and Awasthiet al.^[9] (43.5%), most of the accidents took place in the evening hours (6 p.m. to 12 midnight). In the present study, the majority of subjects were motorcycle-related (48.0%), followed by pedestrian (31.9%) and light motor vehicles (12.1%). A similar study done by Solanki et al.^[7] observed that majority of the victims were motorcyclists (42.5%), followed by occupant of cars/jeeps (20.3%) and a study by Debbarma et al.^[10] revealed that the maximum number of RTA victims were two-wheeler drivers (36.9%), followed by two-wheelers riders (26.6%).

In the current study, majority of the victims using four-wheelers, including the driver and passengers, had not used seat belts (53.6%) at the time of the accident. A study conducted by Muthukumaret al.^[11]

in Puducherry found that 70.8% of the car drivers did not wear seat belts at the time of the accident.

In this present study, it was observed that 26.6% were speaking with others while 18.8% of people were using mobile phones and 16.9% were driving under the influence of alcohol at the time of the accident. Talking or using mobile phones while driving creates a distraction from the road, thus contributing to the causation of accidents. Alcohol also compromises the judgment and attention of drivers, pillion riders, and pedestrians while driving or crossing the road. A similar study conducted by Chourasia et al.^[12] revealed that 17.6% of victims were under the influence of alcohol while another study by Neeluri et al.^[13] found that 22.5% were under the influence of alcohol while driving. In contrast, study conducted by Konlan et al.^[14] found that 34.2% of the victims were under the influence of alcohol at the time of the accident. A study conducted by Misra et al.^[15] revealed that 58.8% had taken less than 6 hours of sleep the previous night.

In the present study, a significant proportion of four-wheeler drivers (79.3%) who did not wear seat belts had a grievous injury ($P = 0.016$; S). It was found that 84.4% of drivers with grievous injuries were using music players at the time of the accident ($P < 0.001$; S), and 74.2% of drivers had a lack of sleep on the previous day of the accident. A significantly higher proportion of the drivers (68.5%) with grievous injuries were under the influence of alcohol ($P < 0.001$; S), and 56.0% of drivers with grievous injuries were using mobile phones at the time of accident.

CONCLUSION

The common risk factors for road traffic accidents in this present study were found to be male gender, young age, two-wheeler vehicles, the time between 6 PM to 10 PM, and intersections of the road. It was found that over speed of the vehicles is a common finding along with other proven risk factors like speaking over mobile or speaking with others while driving, driving under the influence of alcohol. Further, it was found that the seat belt usage by drivers or other co-passengers in four-wheeler vehicles is quite low.

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