

A cross-sectional study of road traffic accident victims at a tertiary care teaching hospital at Gwalior city in Madhya Pradesh of Central India



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ABSTRACT

Background: Road crash deaths in India, which were the highest in the world, are a burden on its demographic dividend and have a tangible impact on poverty. **Aims and Objectives:** The present study was conducted 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). **Materials and Methods:** The present cross-sectional study was conducted at Trauma Center, Madhav Dispensary, J.A. Group of Hospitals Gwalior, M.P. on 528 Victims of RTA between the period of January 01, 2020, and June 30, 2021. The descriptive statistical measures such as mean, standard deviation, frequency, and percentage were used. The data analysis was done in Microsoft Excel Software. **Results:** In the present study, a total of 528 RTA victims were enquired. Their average age was 33.02 ± 13.31 years, with 81.8% were male and 18.2% were female. Most of the victims (67.80%) were on two-wheeler vehicles. About half of the victims were found to have Head on Collision during accidents. The accidents mostly occurred in the time period from 9.00 am to 9.00 pm. It was observed that 65.90% RTA victims had soft-tissue injury and bony injury. **Conclusion:** It was vital to obtain valid information of the real importance of RTA along with the preventive action concerning RTAs. It was recommended to provide the basic treatment to victims related with RTA at Primary Care Center of the nearest accident place.

Key words: Age; Collision; Injury; Vehicles

INTRODUCTION

Road mobility was always an essential part of life for daily routine activities. The road traffic accidents (RTA) were one of the leading causes of death, disability, and hospitalization for people worldwide, especially in India. The cost of road accidents was borne not only by the victims and their families but also by the economy as a whole in terms of untimely deaths, injuries, disabilities, and loss of potential income. Globally, road traffic injuries are the eighth leading cause of death (WHO, 2018).¹ There was a distinct correlation between socioeconomic

status and road use patterns; large share of which were pedestrians and cyclists, mainly representing working age adults from the poorer strata of society (GRSP, 2018).² Figures from the Ministry of Road Transport and Highways (Morth, 2020 year)³ recorded 366,138 road accidents which caused loss of 131,714 persons lives and injured 348,279 persons. The transport literature confirms that road injury and fatalities had severe long term effects on income growth and wealth loss, further constraining human productivity in emerging economies. A previous World Bank macroeconomic study on road safety showed that halving the number of road accidents could increase GDP

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per capita by another 15–22% over 24 years.⁴ It was vital to obtain the valid information of the real importance of this health problem. Primary care physicians comprehensively investigate RTA rates among users of primary clinics, and through effective and effective outpatient emergency response, disseminate information on safety standards as primary, secondary, and tertiary prevention, and to prevent RTA. They must take necessary precautions regarding thorough rehabilitation of the accident victims.

Aims and objectives

Aim of the present study was to assess the profile of RTAs victims.

The present study was conducted with the following objectives:

1. To assess the sociodemographic factors of the victims of RTAs
2. To assess environmental factors associated with RTAs
3. To assess the factors related with condition of vehicle involved in RTAs
4. To assess the primary health care, injury occurred to victims, and actions taken for the care of victims of RTAs.

MATERIALS AND METHODS

The present study was a cross-sectional descriptive study conducted at Trauma Center, Madhav Dispensary, J.A. Group of Hospitals Gwalior during period of January 01, 2020, to June 30, 2021 on 528 Victims of RTA. The sample size was calculated using the formula $n = Z_{\alpha/2}^2 * P * Q / d^2$. =528; using P=14.5%, α =5%, d=3%. The study was ethically approved by the Ethics Committee of G.R. Medical College Gwalior, M.P. India (Ethical Clearance Number; D.No: 290/IEC-GRMC/2019; Dated May 01, 2020). An informed consent was taken from the victims and a predesigned pre-structured questionnaire was used for data collection and was translated into Hindi language. The patients reporting to Trauma Center and who were willing to participate in this study with their consent were included in the study. Those victims who were brought dead, head injury cases and who were not ready to participate in this study were excluded from the study. The suitable modifications were made in the study questionnaire after a pilot study done on 20 victims of RTAs. The data was compiled, analyzed, and interpreted by different statistical tools using Microsoft Excel Software (Window-10) software.

RESULTS

The present study was conducted on 528 participants. The average age of RTA victims was 33.02 ± 13.31 years. In this

study, age-wise categories were made and it was observed that the maximum number of victims of RTAs were found in the age group of 15–30 years, 236 (44.7), followed by age group of 30–45 years, 181 (34.3%), and least number of victims were in the age group of above 60 years, that is, 12 (2.3%). It was observed that the maximum numbers of victims were males, that is, 432 (81.8%) and females were only 96 (18.2%). The mean age of the male RTA victims was 32.16 ± 12.49 and for females the mean age was 36.59 ± 16.06 . The difference was statistically significant, $P < 0.05$. Table 1 showed that the maximum numbers of victims were followers of Hindu religion, 515 (97.5%) followed by Muslims (2.5%). It also showed that the maximum number of victims were from OBC category,

Table 1: Distribution of sociodemographic factors associated with RTA victims

Variables	Number	Percentage
Age		
<15 years	31	5.87
15–30 years	236	44.70
30–45 years	181	34.28
45–60 years	68	12.88
>60 years	12	2.27
Information provided by		
Self	481	91.10
Others	47	8.90
Gender		
Males	432	81.8
Females	96	18.2
Religion		
Hindu	515	97.50
Muslim	13	2.50
Caste		
UR	169	32.0
OBC	300	56.8
SC	43	8.1
ST	16	3.0
Educational status		
Illiterate	10	1.89
Primary school	22	4.16
Middle school	30	5.68
High school	110	21.83
Higher secondary	274	51.89
Graduate/postgraduate	82	15.33
Occupation		
Professional	03	0.60
Semi professional	85	16.10
Clerical/shop/farm	99	18.30
Skilled worker	63	11.90
Semiskilled worker	72	13.60
Unskilled worker	09	1.70
Unemployed	197	37.30
Type of family		
Nuclear	223	42.33
Joint	305	57.77
Socioeconomic status of victims		
Upper	38	7.20
Upper middle	218	41.30
Middle	213	40.30
Lower middle	57	10.80
Lower	02	0.40

300 (56.8%), followed by others (general) 169 (32%) and minimum number were of ST category, 16 (3%). In the same table, the maximum number of victims were educated up to high secondary, 274 (51.89%), followed by the victims educated up-to high school, 110 (21.83%). Least number of victims were illiterate, 10 (1.89%). It also showed that the maximum number of victims were unemployed, 197 (37.3%) which included students, house wives, and retired persons. This is followed by workers in clerical job, farming and shop keeping, 99 (18.8%) and least number of victims were professional, 03 (0.6%) and unskilled worker, 09 (1.7%). It showed that the maximum number of victims were of joint family, 305 (57.77%) and 223 (42.23) were of nuclear family. The table also revealed that the maximum number of victims were of upper middle class, 218 (41.3%) and middle class, 213 (40.3%), respectively, and least number of victims 2 (0.4%) were of lower socioeconomic class (Table 1).

In the present study in Table 2, the maximum number of accidents were due to head on collision, 280 (53.01%), followed by 115 (21.81%) accidents which were due to side on collision. Only 25 (4.71%) accidents were due to collision from back. The study showed that the maximum number of accidents took place between 03 PM and 06 PM, that is, 132 (25.0%) and least number of accidents were reported between 03 AM and 06 AM, that is, 3 (0.6%).

In the present study, it was observed that the maximum accidents took place on Tuesday, that is, 103 (19.5%) closely followed by on Wednesday, that is, 98 (18.6) and the maximum number of accidents occurred in 4th week of month, that is, 161 (30.5%). The findings showed that the maximum accidents took place where the road was straight, that is, 361 (68.37%) and least number of accidents took place at T-Point pattern of road, that is, 13 (2.46%). In the same table, more than half of the accidents took place on street roads, that is, 277 (52.5%), followed by accidents on National Highways, that is, 153 (29.0%). Most of the RTA victims (83.5%) reported that the visibility was adequate at the time of accident. In the present study, only 7 (1.3%) victims reported that it was raining at the time of accident.

In Table 3, the study findings indicated that the maximum number of accidents involved two wheelers, that is, 358 (67.8), followed by four wheelers with sitting capacity of 5–7, that is, 102 (19.3%). The results of this study showed that 403 (76.3%) vehicles were 5–10 years old and 411 (77.8%) were in average condition.

In Table 4, it was observed that 243 (46.0%) victims came directly to JAH after accident and 285 (54.0%) victims were referred from some other centers. It was observed that out of 285 referred victims, the majority were referred from

Table 2: Distribution of environmental factors associated with RTA victims

Variables	Number	Percentage
Mode of accidents		
Head on collision	280	53.01
Side on collision	115	21.81
Back collision	25	4.71
Self	108	20.46
Time of road traffic accidents		
12 am–03 am	00	00.00
03 am–06 am	03	00.60
06 am–09 am	48	09.10
09 am–12 pm	112	21.20
12 pm–03 pm	109	20.60
03 pm–6 pm	132	25.00
06 pm–09 pm	108	20.50
09 pm–12 am	16	03.00
Day of a week		
Sunday	88	16.70
Monday	72	13.60
Tuesday	103	19.50
Wednesday	98	18.60
Thursday	44	08.30
Friday	60	11.40
Saturday	63	11.90
Weeks of a months		
First	59	11.20
Second	112	21.20
Third	110	20.80
Fourth	161	30.50
Fifth	86	16.30
Pattern of road		
Straight	361	68.37
Curve	75	14.20
T-point	13	2.46
Square	79	14.97
Type of road		
Kacha road	10	1.90
Gram sadak yojna road	07	1.30
State highway	81	15.30
National highway	153	29.0
Street road	277	52.50
Visibility at the time of accident		
Adequate	441	83.50
Not adequate	87	16.50
Raining		
Yes	07	1.30
No	521	98.70

different District Hospitals, that is, 173 (60.71) and the maximum number of victims, that is, 384 (72.7) received primary treatment in golden period, that is, within 1 h of trauma. The maximum number of victims came to JAH by 108 Ambulance, that is, 337 (63.8%), followed by victims coming in private vehicle, that is, 108 (20.5%). More than half of the victims came to JAH within 1 h of accident or referral, that is, 310 (58.7%) and it took more than 2 h for 23 (4.4%) victims to reach trauma center of JAH. 3/4th of the victims (77.7%) were in fair condition and 93 (17.6) were in poor condition. The majority of the victims had injuries at multiple sites, and among these sites, limbs, including upper limbs and lower limbs, were the most

Table 3: Distribution of vehicle factors associated with RTA victims

Variables	Number	Percentage
Type of vehicle		
Two wheeler	358	67.80
Three wheeler	48	9.09
Light motor vehicle (car, jeep, etc.)	102	19.32
Heavy motor vehicle (truck, tractor)	15	2.84
Pedestrian	05	0.95
Age of the vehicle		
<5 years	105	19.9
5–10 years	403	76.3
>10 years	20	3.8
Condition of the vehicle		
Good	106	20.1
Average	411	77.8
Poor	11	2.1

RTA: Road traffic accidents

common site of injury in victims, that is, 494 (93.56%). The study revealed that that the maximum number of victims, that is, 348 (65.9%) had a combination of soft-tissue injury and bony injury and least number of victims had soft-tissue injury with bony injury and with some degree of internal hemorrhage, that is, 32 (6.1%). The majority of the victims 488 (92.42%) were not having any previous medical illness, 15 (2.84%) were having some kind of heart disease, 11 (2.08%) were suffering from diabetes mellitus, and 14 (2.65%) were suffering with both heart disease and diabetes mellitus (Table 4).

Table 5 shown that the there was no association between mode of accidents with age and gender while mode of accidents was found to be associated with the type of vehicle and pattern of road. Among the light motor vehicle and heavy motor vehicle Head on Collision were found significantly higher as compared with the other mode of accidents.

DISCUSSION

The present study was conducted on 528 participants, in which half of the victims of RTAs were from the age group of 15–30 years i.e. 236 (44.70), followed by age group of 30–45 years, 181 (34.28%) and least number of victims were from age group of up to 15 and from age group of above 60 years, 31 (5.87%), and 12 (2.27%), respectively. Similar observations were made in a study conducted by Qureshi and Yousuf⁵ and Lalchand et al.,⁶ as they stated in there study that maximum number of victims were found in the age group of 20–40 years, while minimum were above 60 years of age group (0.5%). Similar findings were reported in studies done by Pathak et al., (2020),⁷ Muthukumar et al.,⁸ and Singh et al.,⁹ who observed that the maximum number of victims were in the age group

Table 4: Distribution of primary health care, injury of victim, and actions taken for the RTA victims

Variables	Number	Percentage
Action taken for treatment		
Directly came to tertiary care center	243	46.00
Referred from other center	285	54.00
Place of referral		
District hospital	173	60.71
Community health center	75	26.31
Civil hospital	25	8.77
Primary health center	12	4.21
Time taken to primary treatment		
1 h	384	72.70
1 h	143	27.10
>02 h	01	0.20
Mode of transport of the victims from the place of accidents to the hospital		
108 ambulance	337	63.80
Private ambulance	75	14.20
Private vehicle	108	20.50
Any other	08	1.50
Time taken for the victims of RTA to reach tertiary trauma center		
1 h	310	58.70
2 h	195	36.70
>02 h	23	4.40
General condition of the victims		
Good	25	4.70
Fair	410	77.70
Poor	93	17.60
Site of injury		
Face	191	36.17
Neck	00	00
Chest	260	49.24
Back	132	25.00
Abdomen	222	42.05
Limbs	494	93.56
Type of injury		
Soft-tissue injury	77	14.60
Bony injury	71	13.40
Soft-tissue injury and bony injury	348	65.90
Soft-tissue injury and bony injury with internal hemorrhage	32	6.10
Type of medical illness		
Heart disease	15	2.84
DM.	11	2.08
HD and DM	14	2.65
None	488	92.42

of 21–30 years followed by 31–40 years. Kumar et al.,¹⁰ and Chauhan et al.,¹¹ also found in their study that the maximum numbers of victims were in the age group of 16–30. These finding indicated that the most active age group were more commonly involved in RTAs. The reason behind this finding might be that these people have to face more traffic as they have to travel more to fulfill their own and family requirements.

In this study, it was observed that most of victims were males, that is, 432 (81.8%). Similar observations were made in a similar study done by Qureshi and Yousuf,⁵ Lalchand et al.,⁶ and Muthukumar et al.,⁸ also observed

Table 5: Association of mode of accidents with age, gender, type of vehicle, and pattern of road

Variables	Number	Mode of accidents				Chi-square/ P-value
		Head on Collision (280)	Side on Collision (115)	Back Collision (25)	Self (108)	
Age						
<15 years	31	15 (48.4)	9 (29.0)	1 (3.2)	6 (19.4)	14.195/0.288
15–30 years	236	131 (55.5)	48 (20.3)	8 (3.4)	49 (20.8)	
30–45 years	181	95 (52.5)	38 (21.0)	11 (6.1)	37 (20.4)	
45–60 years	68	35 (51.5)	13 (19.1)	5 (7.4)	15 (22.1)	
>60 years	12	4 (33.3)	7 (58.3)	0 (0.0)	1 (8.3)	
Gender						
Males	432	233 (53.9)	90 (20.8)	23 (5.3)	86 (19.9)	3.435/0.329
Females	96	47 (49.0)	25 (26.0)	2 (2.1)	22 (22.9)	
Type of vehicle						
Two wheeler	358	170 (47.5)	94 (26.3)	15 (4.2)	79 (22.1)	67.73/0.001
Three wheeler	48	25 (52.1)	14 (29.2)	4 (8.3)	5 (10.4)	
Light motor vehicle	102	73 (71.6)	6 (5.9)	3 (2.9)	20 (19.6)	
Heavy motor vehicle	15	10 (66.7)	1 (6.7)	0 (0.0)	4 (26.7)	
Pedestrian	05	2 (40.0)	0 (0.0)	3 (60.0)	0 (0.0)	
Pattern of road						
Straight	361	205 (56.8)	73 (20.2)	19 (5.3)	64 (17.7)	36.890/0.001
Curve	75	39 (52.0)	15 (20.0)	0 (0.0)	21 (28.0)	
T-point	13	2 (15.4)	10 (76.9)	0 (0.0)	1 (7.7)	
Square	79	34 (43.0)	17 (21.5)	6 (7.6)	22 (27.8)	

that about 3/4th of the patients were male. Similar finding were observed by Pathak et al., (2020)⁷ and Shaira et al., (2020)¹² in their study which quoted large majority of the subjects were males. Prasad et al., (2017)¹³ also reported similar findings and it was stated that 135 (88.23%) victims were male and females were 18 (11.76%). Dutta et al.,¹⁴ stated that the males accounted for a majority (n=293, 83.5%) of the RTA victims and only 58 (16.5%) females were involved. The reason for these finding might be that males are more exposed to road traffic in comparison to females as they go out for their basic needs and other household activities.

In this study, it was observed that the maximum number of victims were Hindu by religion, 515 (97.5%) and 13 victims (2.5%) were of Muslims by religion. Similar observation was made by Shaira et al., (2020)¹² which quoted that a large majority of the subjects were male (85.0%) and Hindus by religion (87.2%). The present findings are not with their accordance with observation as mentioned in a study done by Srivastava et al., (2014)¹⁵ which reviewed that a total of the 48 participants interviewed, out of which 32 (66.66) were Hindus, 9 (18.75) were Muslims, and 7 (14.58) were of other religion.

In the present study, it was found that the maximum number of victims were from OBC category, 300 (56.8%) followed by unreserved category, 169 (32%). Similar observations were made in a study done by Mitra et al.,¹⁶ which stated that 25.0% belonged to general caste. In this study, it was observed that the maximum number of victims were educated up to higher secondary, 274 (51.89%) followed by victims educated up-to high school, 110 (21.83%). Similar

observations closely related were made in this study in a study conducted by Chauhan et al.,¹¹ In the present study, it was observed that the maximum number of victims were unemployed, 197 (37.3%), followed by workers in clerical job, farming, and shop keeping followed by semiskilled workers. Similar observations were made in a study conducted by Qureshi and Yousuf,⁵ Srivastava et al., (2014),¹⁵ but results were not matched with Shaira et al., (2020).¹² In this study, it was observed that the maximum number of victims were belonging to upper middle class, 218 (41.3%) and middle class, 213 (40.3%), respectively. Similar observations were made in a study conducted by Chauhan et al.,¹¹ but findings were dissimilar with Lalchand et al., (2018)⁶ and Mitra et al.¹⁶

In this study, it was observed that the maximum number of accidents involved two wheelers (67.8%) followed by four wheelers (19.3%). Similar observations were made in a study done by Muthukumar et al.,⁸ and Singh et al.,⁹ which stated that more than 50% of the accident victims were travelling by two wheelers at the time of accident followed by four wheeler (20.5%). The observations are not similar to the observations made by a study done by Manna et al.,¹⁷ which stated that buses and heavy transport vehicles were the most common and the most common offending agents, followed by four and three wheelers. Study by Jha et al., (2021) found that two wheelers (50.6%) were the most involved vehicles in the RTAs.¹⁸ A meta-analysis done by Vinish et al., (2023) also reported that two wheelers were the major contributor to the RTA.¹⁹

In the present study, the maximum number of accidents were due to head on collision, 280 (53.01%), followed

by 108 (20.46) self-mode of accidents which included skidding or falling while turning or due to over speeding. Muthukumar et al.,⁸ and Singh et al.,⁹ stated that nearly 50 % of the accidents were due to collision of vehicle with other vehicle followed by skid and fall (19.2%). The observations made in this study were not similar to the observations made by Dutta et al., (2015)¹⁴ who stated that 43.3% victims were injured due to fall from vehicle and collision was reported in 70 (20%) cases. The reason behind this might be due to over speeding and avoidance of traffic rules on straight roads. In the present study, most of the accidents took place between 9.00 A.M. and 9.00 P.M. which were peak hours for the busy roads. The maximum accidents took place during rush hours in the morning and evening hours as it was the time for the maximum population to reach their work places or come back to their homes after their work. Similar results were seen as this study by Kumar et al.,¹⁰ and Chauhan et al.,¹¹ who observed that most of the accidents occurred on Tuesdays and Wednesdays while Srivastava et al., (2014)¹⁵ observed that the maximum number of road traffic incidents were on Saturday followed by Monday.

The observations made by Singh et al.,⁹ were similar to the present study, in which most of the RTAs occurred on main roads 191 (60.4%), followed by highways 37 (11.7%) and majority of the RTAs occurred on the macadamized roads 292 (92.4%), whereas 20 (6.3%) occurred on semi pucca gravel roads and only 4 (1.3%) occurred on kucha earthy roads. The reason behind this might be usage of roads as Street Roads and National Highways were more frequently used by the travellers which cause over traffic conditions at certain places.

In the present study, the vehicles which were 5–10 year older and on moderate maintenance were as similar to the findings of the study conducted by Singh et al.,⁹ In the present study, the majority of the victims (46.0%) came directly to tertiary teaching hospital after accident while 54.0% victims were referred from some other health-care facilities. The reason behind this finding might be that PHCs and CHCs in India were not well equipped to tackle major injuries.

In this study, it was observed that the maximum number of victims came to tertiary teaching hospital by 108 Ambulance, that is, 337 (63.8%), followed by victims coming in private vehicle, that is, 108 (20.5%), 75 (14.2%) victims reached trauma center by private ambulances. There was a difference in observation made in this study from a study done by Srivastava et al., (2014)¹⁵ which stated that the most common mode of transportation of victims from the site of injury to the hospital was private vehicle/ambulance, that is, 36 (75%) followed by own vehicle, that is, 9 (18.7%)

and Government Ambulance 3 (6.3%). In this study, it was observed that limbs, including upper limbs and lower limbs, were the most common site of injury in victims, that is, 494 (93.56%) followed by chest, that is, 260 (49.24%). Face was involved in 191 (36.17%) cases of RTAs. Back injury is found in least number of cases, that is, 132 (25.0%). There were similarities in a study done by Pathak et al., (2020)⁷ who stated that the head injury cases were maximum in numbers in their study as they contributed in 46.09% of cases followed by fracture of femur, a percentage of 17.87% and upper limb fractures were 0.67%. Study by Jha et al., (2021) found that mostly victims were suffered from soft-tissue injury 90 (39.47%), followed by head injury 77 (33.77%) and fracture of limb bone 33 (14.47%).¹⁸ It was observed in other study by Bicholkar and Cacodcar (2022) that the most common pattern of injury was soft-tissue injury among 429 (97.5%) victims followed by bone and/or joint injury in 272 (61.8%) victims. Abdominal trauma was present in 182 (41.4%), head and/or face and/or neck injuries were present in 86 (19.5%), chest trauma was seen in 42 (9.5%), and 2 (0.45%) had other injuries like injury to the genitals.²⁰ Similar observations were made in a study conducted by Chauhan et al.,¹¹ and Anantharaman and Logaraj²¹ which stated that the majority had lower limb injury followed by multiple sites injury while Sharad et al.,²² which stated that the face and neck accounted for (50%) of the injuries which were not similar to the present study. The reason for this observation in this study might be the exclusion of head injury victims.

In the present study, it was also observed that the maximum number of victims, that is, 348 (65.9%) had a combination of soft-tissue injury and bony injury, followed by victims who had only soft-tissue injuries, that is, 77 (14.6). There are similarities in observations made in this study and a study done by Pathak et al., (2020)⁷ and Anantharaman and Logaraj.²¹ Mitra et al.,¹⁶ observed that out of 206 RTA victims, 141 (68.44%) had fractures, 59 (28.64%) had head injury, 41 (19.91%) had abrasion, bruise, hematoma, and internal organ injury followed by 24 (11.65%) patients who sustained lacerated injury while study by Sharad et al.,²² found that musculoskeletal injuries were the most common (n=69, 57.5%) and 90 (75%) cases had superficial injuries like contusion/abrasion and 69 (57.5%) cases had lacerations. Fracture/dislocation was seen in 48 (40%) cases. The findings were similar which were made by Singh et al.,⁹ who stated in their study that the major history of Medical illness which was seen in the RTA victims was hypertension, followed by diabetes mellitus and hypothyroidism.

Limitations of the study

This was a single Centre study conducted at Trauma Center, Madhav Dispensary, J.A. Group of Hospitals Gwalior. The

severe affected RTAs victims were not inquired for their profile and risk factor.

CONCLUSION

It was observed that younger age group, low educational status, careless attitude of the drivers toward traffic, traffic rules, and not using the safety measure during the peak hours of traffic were the main reasons for injuries due to RTAs. Two wheelers were more involved in the accidents. The majority of the accidents occurred on straight roads, involving street roads and the most common mode of accident was head on collision, which also indicated toward the care less attitude toward driving and the traffic. As the majority of the victims got treatment in the golden hour or just after that, the rate of disability and mortality was low among the victims of the RTA in this study. The majority of the victims used 108 Ambulance for reaching trauma center, which showed general awareness among the population about the government services that were available and were used. As head injury victims were excluded from this study, orthopedic and surgery department were most commonly involved in treating the victims. As the majority of the victims were referred cases with complex injuries, so they needed hospitalization of 2–7 days for their treatment and recovery.

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REFERENCES

1. WHO (World Health Organization). Global Status Report on Road Safety 2018. Geneva: World Health Organization; 2018. Available from: https://www.who.int/violence_injury_prevention/road_safety_status/2018/en [Last accessed on 2021 May 10].
2. Global Road Safety Partnership. "Poverty and Road Safety." A GRSP Positioning Paper. Hosted by International Red Cross and Red Crescent Societies; 2018. Available from: <https://www.grsproadsafety.org/wp-content/uploads/new-factpoverty-pdf.pdf> [Last accessed on 2021 Aug 25].
3. Ahmad JK. World Bank. Traffic Crash Injuries and Disabilities: The Burden on Indian Society. United States: The World Bank; 2021. Available from: <https://documents1.worldbank.org/curated/en/761181612392067411/pdf/traffic-crash-injuries-and-disabilities-the-burden-on-indian-society.pdf> [Last accessed on 2021 Nov 28].
4. Road Accidents in India 2020. Government of India Ministry of Road Transport and Highways Transport Research Wing. New Delhi. Available from: https://morth.nic.in/sites/default/files/ra_2020.pdf [Last accessed on 2022 Jul 22].
5. Qureshi M and Yousuf AM. Epidemiological study of road traffic accident cases attending tertiary care hospital of Kashmir: A cross sectional study. *J Adv Med Med Res.* 2020;32(2):79-84. <https://doi.org/10.9734/jammr/2020/v32i230370>
6. Lalchand D, Rathore MS, Chaudhary RC, Laxman S and Pankaj JP. A cross-sectional study of road traffic accidents at a tertiary care hospital in Jaipur city, Rajasthan. *J Med Sci Clin Res.* 2018; 6(4): 121-127. <https://doi.org/10.18535/jmscr/v6i4.21>
7. Pathak AK, Dev R, Awasthi PM, Verma S and Kumar A. Study of injuries among road traffic accident victim at LLR hospital, GSVM medical college, Kanpur UP. *Galore Int J Health Sci Res.* 2020;5(1):80-83.
8. Muthukumar T, Singh Z, Prasad RV, Samuel AK and Raja TK. An epidemiological study of road traffic accidents among patients admitted in a tertiary care hospital in Puducherry. *Int J Community Med Public Health.* 2018;5(8):3362-3367. <https://doi.org/10.18203/2394-6040.ijcmph20183062>
9. Singh J, Sahni MK, Bilquees S, Khan SM and Haq I. Reasons for road traffic accidents-victims' perspective. *Int J Med Sci Public Health.* 2016;5(4):814-818. <https://doi.org/10.5455/ijmsph.2016.07112015357>
10. Kumar S, Jaiswal K, Rani V, Singh NP, Shukla SK and Bardhan H. An epidemiological study of road traffic accident cases in tertiary care hospital of Central Uttar Pradesh. *Int J Health Sci Res.* 2015;5(5):49-53. <https://doi.org/10.5455/ijmsph.2019.0408015042019>
11. Chauhan A, Ahmed N, Singh JV, Singh VK, Singh A and Kumar S. Epidemiology of road traffic injuries in a tertiary care centre of Lucknow. *Indian J Community Health.* 2014;26(2):181-186. <https://doi.org/10.18203/2394-6040.ijcmph20175356>
12. Shaira H, Naik PR, Pracheth R, Nirgude AS, Nandy S, Hiba MM, et al. Epidemiological profile and mapping geographical distribution of road traffic accidents reported to a tertiary care hospital, Mangaluru using quantum geographic information system (QGIS). *J Family Med Prim Care.* 2020;9(7):3652-3656. https://doi.org/10.4103/jfmppc.jfmppc_190_20
13. Prasad RV, Nandanwar CY and Ebenezer BI. A demographic study on type of accidents, injuries and associated factors, patients attending emergency trauma care at tertiary care teaching hospital. *Int J Community Med Public Health.* 2017;4(7):2457-2462. <https://doi.org/10.18203/2394-6040.ijcmph20172840>
14. Dutta R, Raja JD, Dc L, Anuradha R, Jain T and Sivaprakasan P. Profile of RTA cases attending a attending a tertiary care centre in Kanchipuram district of Tamil Nadu. *Int J Recent Trends Sci Technol.* 2015;14(1):1-3.
15. Srivastava DK, Gour N, Jain PK, Bansal M, Srivastava M and Mishra S. A study to assess the factors and out of pocket expenditures in the patients of road traffic accidents admitted in a tertiary care hospital in a Central India district. *Online J Health Allied Sci.* 2014;13(4):5.
16. Mitra S, Saha I, Haldar D, Sarkar AP and Sarkar GN. Pattern of epidemiological correlates among road traffic accident in-patients of a tertiary care hospital of West Bengal, India. *Int J Community Med Public Health.* 2018;5(5):1933-1937. <https://doi.org/10.18203/2394-6040.ijcmph20181701>
17. Manna N, Mallik S, Mandal PK, Chakraborty D, Sardar JC, Pritibikash H, et al. Epidemiological factors of road traffic accidents: A study in a tertiary care setting in India. *J Pak Med Stud.* 2013;3(1):48-53.
18. Jha R, Pathak P, Koirala P, Maharjan B and Panthi S. Road traffic accidents presenting to the emergency department of a tertiary care center: A descriptive cross-sectional study. *JNMA J Nepal Med Assoc.* 2021;59(243):1081-1085.

- <https://doi.org/10.31729/jnma.6660>
19. Vinish V, Chakrabarty J, Vijayan S, Nayak BS, Shashidhara YN, Kulkarni M, et al. Prevalence of road traffic injuries in South East and South Asian region-a systematic review. *J Neurosci Rural Pract.* 2023;14(2):214-223.
https://doi.org/10.25259/JNRP_25_2022
20. Bicholkar A and Cacodcar JA. A study of road traffic injury victims at a tertiary care hospital in Goa, India. *J Family Med Prim Care.* 2022;11(9):5490-5494.
- https://doi.org/10.4103/jfmpc.jfmpc_693_21
21. Anantharaman VV and Logaraj M. Epidemiology of road traffic accidents (RTA) reported at a tertiary care hospital in Chennai. *Natl J Res Community Med.* 2015;4(1):101-105.
22. Sharad S, Agarwal K and Agarwal P. A retrospective study of road traffic accidents-injury characteristics, management and outcome at Rohilkhand medical college and hospital, Bareilly. *Int J Med Sci Res Pract.* 2015;2(2):73-76.

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GK, AKN, RV, SA- Contributed to the patient management, data collection, literature review, and preparation of the draft manuscript; **RT-** Contributed to the Concept and design of the study, Protocol development, supervising conduct of the study, clinician-in-charge of patient management and final approval of the manuscript; **DS-** contributed to the data analysis, interpretation of results, supervision of the study, editing and final approval of the manuscript. All authors critically revised the manuscript, agree to be fully accountable for ensuring the integrity and accuracy of the work and read and approved the final manuscript.

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