

Road Traffic Accidents and Associated Factors among Victims Attending a Tertiary Care Hospital in Rajnandgaon: A Cross-Sectional Study

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Abstract:

Background: Road traffic accidents (RTAs) remain a major public health problem in India, contributing significantly to morbidity and mortality. Chhattisgarh has similarly experienced rising RTA cases, largely due to inadequate awareness, poor compliance with traffic rules and environmental and vehicular risk factors. This study aimed to assess the role of traffic rules in preventing RTAs among victims attending a tertiary care hospital in Rajnandgaon city. **Material and Methods:** A hospital-based cross-sectional study was conducted over six months among 190 RTA victims attending BRLSABVMC, Rajnandgaon. Data was collected using a semi-structured questionnaire and medical records. Socio-demographic variables, knowledge, attitude and practice (KAP) toward traffic rules and contributory factors were assessed. Statistical analysis included descriptive statistics and logistic regression, with $p < 0.05$ considered significant. **Results:** Most participants were males (87.5%) and belonged to the 20-40-year age group (55.1%). Among the accidents, 92.6% were non-fatal, and 7.4% were fatal. Adequate knowledge, attitude and practice regarding traffic rules were observed in 57.0%, 52.0% and 49.0% of participants respectively, indicating a gap between awareness and actual compliance. Logistic regression showed significant associations between injury severity and human factors such as role of victim ($p = 0.002$), alcohol consumption ($p = 0.003$), and medical illness ($p = 0.003$). Vehicle-related factors including condition of the vehicle ($p = 0.038$) and involvement of opposite vehicle ($p = 0.016$) were also significant. Environmental factors-poor road conditions ($p = 0.004$), and unusual animal behaviour ($p = 0.001$)-were strongly associated with RTA outcomes. **Conclusion:** The study highlighted that inadequate compliance with traffic rules, risky human behaviour, poor vehicle maintenance and adverse environmental conditions collectively contributed to RTAs. Strengthening traffic rule enforcement, improving road infrastructure, promoting safety gear use and implementing targeted awareness programs are essential for reducing RTAs in Rajnandgaon.

Keywords: Road Traffic Accidents, Traffic Rules, Knowledge Attitude Practice, Human Factors, Vehicle Factors, Environmental Factors.

Introduction:

Road traffic accidents (RTAs) are a major public health and safety issue in India, causing a large number of deaths and injuries every year. Rapid urban growth, rising vehicle ownership, and insufficient traffic regulation have placed India among the countries with the highest incidence of road accidents worldwide. Data from the National Crime Records Bureau (NCRB) shows that in 2021 alone, the country registered more than 4.12 lakh road accidents, which resulted in nearly 1.55 lakh deaths and over 3.8 lakh injuries. The

leading factors behind these accidents include excessive speeding, careless driving, non-adherence to traffic regulations, and inadequate road infrastructure

Chhattisgarh, one of the developing states in India, has also experienced a notable increase in RTAs in recent years. According to NCRB statistics, the state recorded around 12,000 road accidents in 2021, causing over 4,000 fatalities and numerous injuries. Poor road conditions, weak enforcement of traffic laws, limited driver awareness, and the growing number of vehicles are the main contributors to

accidents in the region. Accident-prone areas such as national highways, busy urban junctions, and rural stretches witness a higher frequency of incidents due to heavy traffic movement and low visibility.[1]

The government has implemented several strategies to address this issue, including upgrading road networks, enforcing stricter traffic regulations, and conducting awareness programs. Policies such as the Motor Vehicles (Amendment) Act, 2019, aim to improve road safety by increasing penalties for violations, mandating safety features in vehicles, and strengthening driver training standards. In Chhattisgarh, authorities have introduced road safety initiatives and installed automated surveillance systems to monitor traffic and reduce violations. However, road safety continues to be a pressing concern despite these efforts.[2]

A review of existing literature indicates that no research has specifically examined the role of traffic rules in preventing RTAs in Rajnandgaon city. Therefore, this study was done to evaluate how traffic regulations influence the prevention of road traffic accidents among victims attending Tertiary care hospital in Rajnandgaon city, Chhattisgarh and to offer appropriate recommendations based on the findings.

Materials And Methods:

The present study was a hospital based analytical cross sectional study carried out among patients attending BRLSABVMC hospital, Rajnandgaon, Chhattisgarh with the history of Road traffic accident between April to June 2025.

Inclusion Criteria comprised of a) Patient with the history of RTA in the time period between April to June 2025 b) Age group of ≥ 18 years c) those who gave informed and written consent. Those cases where no reliable source of information was available (i.e. where patient could not speak, or no eyewitnesses of an accident or no complete information was available from police records) were excluded[3]

Study case definitions:

Road Traffic Accident: An accident involving at least one vehicle in motion on-road that results in at least one person being injured or killed.

Fatal Road Accident: A type of a road traffic accident in which death occurred on the way to hospital or died during treatment [4].

Non-fatal Road Accident: A road accident in which death of the patient has not occurred.

Sample size: The sample size was calculated on the basis of prevalence of RTA 13% from the previous study³ by using the formula $N = Z^2 PQ/d^2$. Taking absolute error as 5%. The sample size came out to be 173. $N = Z^2 pq/d^2 = 3.84 * 13 * 87/5^2 = 173$. Taking 10% as non- response rate, the final sample size was

adjusted to 190.

Sampling technique: Convenience non- probability sampling was used

Study tools: comprised a Semi- structured questionnaire with both open and close ended questions (in English and Hindi language). Medical records were also reviewed.

Study technique : Patients were interviewed face to face using semi-structured questionnaire by the investigator

Study variables: Input variables comprised a) Socio-demographic characteristics, b) Factors involved in Pre- event phase of accident c). Factors involved during event and post event phase of accident. Output variables comprised a). Awareness among patients regarding traffic rules and regulations, b). Behaviour during driving and c). Treatment provided in the hospital

Ethical consideration: Ethical approval was obtained from the Institutional Ethics Committee (Letter Ref. No 70/IECGMCRJN/2025) Dated 19-04-2025. Participants were briefed about purpose of study and informed and written consent was obtained from them prior to the study.

Statistical analysis: Data were entered into Microsoft excel spread sheet and subjected for appropriate statistical analysis. Qualitative or categorical data were analyzed in frequency or percentage. Appropriate statistical test was used and p value < 0.05 was considered statistically significant.

Results:

A cross sectional study was conducted among 190 participants who attended Tertiary care hospital in Rajnandgaon city with the history of Road Traffic Accidents. The socio-demographic profile of the study participants revealed that a majority (55.1%) were in the age group of 20-40 years, followed by 30.1% who were above 40 years and 14.8% who were below 20 years of age. Males constituted a significantly higher proportion of the study population (87.5%) compared to females (12.5%). Most of the participants were literate (92%), with only a small fraction being illiterate (8%). Regarding Socio-economic status as per Modified Kuppuswamy Scale 2025, majority (29.0%) of participants belonged to Lower Middle Class followed by 27.8% of Upper Lower class, 16.8% of Upper Middle Class, 14.2% of Lower class and 12.1% of Upper Class. (Figure 1)

The data presented in Figure 2 showed the distribution of road traffic accidents (RTA) based on the outcome of injuries among 190 reported cases. Out of the total, 14 cases (7.4%) were fatal, while the remaining 176 cases (92.6%) were non-fatal. This indicates that the majority of RTAs resulted in non-fatal injuries, whereas only a small proportion led to loss of life. (Figure 2)

The data presented in Figure 3 illustrated the level of awareness regarding traffic rules and regulations among 176

respondents, assessed in terms of knowledge, attitude, and practice. The findings revealed that 57% of participants demonstrated adequate knowledge, while 43% had inadequate knowledge, indicating that although more than half of the respondents are well-informed about traffic rules, a substantial proportion still lack sufficient understanding. In terms of attitude, 52% of respondents exhibited an adequate attitude toward traffic rules, whereas 48% displayed an inadequate attitude, suggesting that positive perceptions toward adherence are only marginally higher than negative or indifferent ones. Regarding practice, only 49% of participants reported adequate practice compared to 51% who had inadequate practice, highlighting a concerning gap between awareness and actual compliance with traffic regulations. (Figure 3)

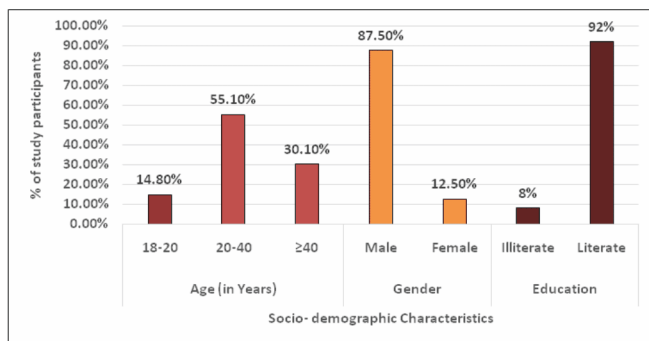


Figure 1: Distribution of study participants based on Socio-demographic characteristics (N=190)

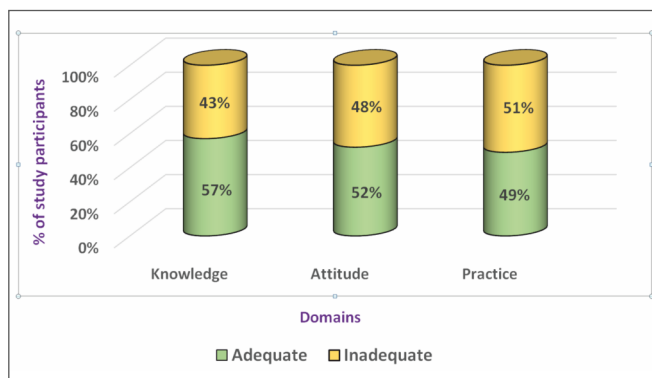


Figure 3: Knowledge, Attitude and Practice regarding traffic rules and regulations

Knowledge score: Adequate (≥ 10), Inadequate (< 10)

Attitude score: Adequate (≥ 6), Inadequate (< 6)

Practice score: Adequate (≥ 5), Inadequate (< 5)

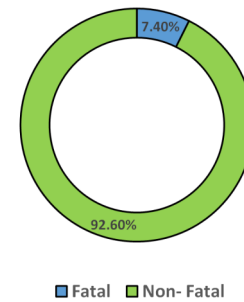


Figure 2: Proportion of Fatal and Non-fatal Road Traffic Accidents

The assessment of factors associated with road traffic accidents (RTAs) based on the epidemiological triad revealed the multifactorial nature of such incidents. In the pre-event phase, host factors such as age, gender and alcohol use, along with agent factors like vehicle condition, overloading, and speed, significantly increase the likelihood of accidents. Environmental elements, including weather, time, traffic density, and poor lighting, further exacerbated the risk. During the event phase, non-compliance with helmet use, driver behaviour and collision type emerged as immediate determinants of injury severity. Additional contributors include road design issues such as Y or T junctions, blind spots and the presence of animals. The availability of first aid services at accident-prone areas can mitigate outcomes during this phase. In the post-event phase, access to timely medical help and mode of transport to the hospital critically influence survival. Delays in reaching healthcare facilities often worsen injury outcomes. (Table 1)

Table 1: Univariate logistic regression analysis of factors associated with RTA outcomes

Predictor Variable	Injury Severity OR (95% CI)	p value	Patient Condition OR (95% CI)	p value	Intervention OR (95% CI)	p value
Role of victim	0.203	0.002*	4.378	0.022*	1.209	0.689
Medical illness	0.649	0.444	0.218	0.003*	1.417	0.579
Alcohol use	0.323	0.003*	3.919	0.010*	1.847	0.160
Vehicle Condition	0.396	0.038*	4.514	0.038*	1.658	0.000*
Road condition	3.20	0.004*	0.567	0.094	3.191	0.009*
Animal interference	4.616	0.001*	0.806	0.579	3.093	0.04*

*p value < 0.05 is considered statistically significant

The analysis of associated variables revealed that several human, vehicle and environmental factors significantly influenced RTA outcomes. Among human factors, the role of the victim ($p = 0.002$, OR = 0.203) and alcohol consumption ($p = 0.003$, OR = 0.323) showed significant associations with the type of injury, indicating that driver behaviour and intoxication are critical determinants of injury severity. The condition of the patient was significantly related to the role of the victim ($p = 0.022$, OR = 4.378), medical illness ($p = 0.003$, OR = 0.218) and

alcohol use ($p = 0.010$, $OR = 3.919$), suggesting that pre-existing health conditions and risky behaviours exacerbate post-accident outcomes.

Among vehicle factors, involvement of the opposite vehicle ($p = 0.016$, $OR = 0.557$) and vehicle condition ($p = 0.038$, $OR = 0.396$) were significant predictors of injury type and patient condition, highlighting the mechanical and operational roles in crash impact. Environmental factors such as poor road conditions ($p = 0.004$, $OR = 3.20$) and animal interference ($p = 0.001$, $OR = 4.616$) were also found to be strongly associated with injury outcomes. Moreover, road condition ($p = 0.009$, $OR = 3.191$) and animal behaviour ($p = 0.045$, $OR = 3.093$) significantly influenced the need for medical interventions. Overall, the findings underscore that human negligence, vehicular inadequacies and unfavourable environmental conditions collectively determine the severity and management of RTAs. (Table 2).

Discussion:

The present hospital-based analytical cross-sectional study assessed knowledge, attitude and practice (KAP) regarding traffic rules and identified factors associated with road traffic accidents (RTAs) among victims attending a tertiary care hospital in Rajnandgaon, Chhattisgarh. The findings revealed that RTAs are influenced by a complex interaction of behavioural, vehicular and environmental determinants. Despite moderate awareness regarding traffic regulations, a substantial gap existed between knowledge and actual compliance, highlighting the multifactorial nature of road safety.

In the present study, non-fatal RTAs constituted 92.6% of all reported accidents, whereas fatal accidents accounted for 7.4%. This finding is comparable with the study conducted by Hadayeet al.³, although the proportion of fatal injuries varied across settings. Differences in accident severity may be attributed to variations in road infrastructure, traffic density, availability of emergency medical services and timeliness of transportation to healthcare facilities. The relatively lower proportion of fatal injuries observed in the current study may reflect improved access to tertiary healthcare and emergency trauma services in the study area.

Assessment of KAP revealed that 57% of participants had adequate knowledge, 52% had a positive attitude and only 49% demonstrated adequate safety practices. Although awareness regarding traffic regulations was reasonably satisfactory, actual adherence to safe road-use behaviours remained inadequate. Similar findings were reported by Jothula and Sreeharshika⁴ among college students and by Sharma et al.⁵ among young drivers, where knowledge levels were relatively high but compliance with road safety measures

was considerably lower.

This discrepancy between knowledge and practice suggests that awareness alone may not be sufficient to promote behavioural change. Several behavioural factors such as perceived invulnerability, overconfidence while driving, peer influence, risk-taking tendencies and weak enforcement of traffic regulations may contribute to poor compliance. The findings indicate that road safety interventions should move beyond information dissemination and incorporate behaviour-change communication strategies, social marketing approaches and stricter enforcement mechanisms to achieve sustainable improvements in road-user behaviour.

Human factors emerged as important determinants of accident outcomes. Drivers constituted the majority of victims and driver-related variables showed significant associations with injury severity and patient condition. Alcohol consumption was significantly associated with adverse outcomes, reinforcing evidence from previous studies conducted by Hadayeet al.³ and Sune et al.⁶. Alcohol impairs judgment, reaction time, visual perception and motor coordination, thereby increasing the likelihood of crashes and severe injuries. Although only a small proportion of participants reported alcohol use, its significant association with injury severity highlights the need for stronger enforcement of drunk-driving laws, random breath testing and public awareness campaigns addressing alcohol-related road risks.

Pre-existing medical illnesses were also associated with poorer patient outcomes. Medical conditions may reduce alertness, physical functioning and the ability to respond appropriately to sudden traffic situations. This finding underscores the importance of periodic health assessment of drivers, especially among individuals with chronic diseases, visual impairment or neurological disorders.

Vehicle-related factors significantly influenced accident outcomes. Poor vehicle condition and involvement of another vehicle were associated with increased injury severity and poorer patient condition. These findings emphasize the importance of vehicle fitness and regular maintenance in preventing crashes and reducing injury burden. Similar observations were reported by Suneet al.⁶ and Muthukumar et al.⁸, who identified two-wheelers and poorly maintained vehicles as major contributors to RTAs. The predominance of two-wheelers in Indian traffic conditions further amplifies the vulnerability of riders, particularly when protective measures such as helmet use are inadequate.

Environmental determinants also played a significant role. Poor road conditions and unusual animal behaviour demonstrated strong associations with accident severity and the need for medical intervention. In many semi-urban and

rural regions, damaged roads, inadequate lighting, poorly designed junctions and the presence of stray animals create hazardous driving environments. Similar findings have been reported by Awasthi et al.⁹ and Mishra et al.⁷, highlighting the influence of environmental hazards on road traffic injuries. These findings suggest that road safety should not be viewed solely as an issue of individual responsibility but also as a consequence of infrastructural and environmental shortcomings.

From a public health perspective, the findings reinforce the need for a comprehensive road safety approach that integrates behavioural, engineering and enforcement strategies. Road traffic injuries remain a leading cause of mortality and disability among economically productive age groups, resulting in substantial social and economic consequences. Interventions should therefore focus on strengthening traffic law enforcement, promoting consistent helmet and seat-belt use, implementing periodic vehicle fitness assessments, improving road infrastructure and enhancing emergency trauma care systems. Community-based awareness programmes targeting young male drivers, who constituted the majority of victims in the present study, may further contribute to reducing the burden of RTAs.

The findings of this study support the principles of the Safe System Approach, which recognizes that road traffic injuries arise from interactions among road users, vehicles and the environment. Effective prevention requires coordinated action involving health authorities, transport departments, law enforcement agencies and community stakeholders. Such a multidisciplinary approach is essential for achieving sustained reductions in road traffic injuries and improving road safety outcomes.

Conclusion:

The present study demonstrated that RTAs in Rajnandgaon are primarily driven by modifiable human, vehicular and environmental factors. The findings revealed considerable gaps in knowledge, attitude and especially practice regarding traffic rules, with only about half of the victims adhering adequately to safety regulations.

Although awareness about traffic rules exists among many participants, the low level of compliance indicated the need for robust behaviour-change interventions. Strengthening enforcement of traffic laws, ensuring regular vehicle inspection, improving road design and illumination and establishing emergency-response systems at accident-prone areas can play a crucial role in reducing both the incidence and severity of RTAs. Comprehensive road safety education, particularly targeting young male drivers, is essential.

Overall, improving adherence to traffic rules combined with

systemic infrastructural and policy measures can substantially prevent RTAs and enhance public safety in Rajnandgaon city.

Strengths: The study is one of the first in Rajnandgaon to comprehensively assess the role of traffic rules in preventing RTAs, filling an important regional evidence gap. It uses a structured KAP framework along with Haddon's Matrix to holistically evaluate human, vehicle and environmental factors. Primary data were collected using a validated semi-structured questionnaire supported by medical records, ensuring reliability. Use of logistic regression strengthened the identification of significant predictors of injury severity.

Limitations: Being a hospital-based study with convenience sampling, the findings may not be generalizable to all RTA victims in the community, especially those not seeking hospital care. Self-reported information on alcohol use and driving behaviours may introduce recall and social desirability bias. Exclusion of victims without reliable informants may underestimate severe or fatal cases. The short study duration may not capture seasonal variations in accident trends.

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Conflict of interest: No Conflict of interest

References:

1. National Crime Records Bureau. Accidental deaths and suicides in India 2021. New Delhi: Ministry of Home Affairs, Government of India; 2022. Available from: [https://www.data.gov.in/ministrydepartment/National%20Crime%20Records%20Bureau%20\(NCRB\)](https://www.data.gov.in/ministrydepartment/National%20Crime%20Records%20Bureau%20(NCRB)) [Accessed 2026 May 31].
2. Farooqui JM, Chavan KD, Bangal RS, Syed MA, Thacker PJ, Alam S, et al. Pattern of injury in fatal road traffic accidents in a rural area of western Maharashtra, India. *Australas Med J*. 2013;6(9):476-82.
3. Hadaye RS, Rathod S, Shastri S. A cross-sectional study of epidemiological factors related to road traffic accidents in a metropolitan city. *J Family Med Prim Care*. 2020;9(1):168-72.
4. Jothula KY, Sreeharshika D. Knowledge, attitude, and practice toward road safety regulations among college students in Telangana State. *J Educ Health Promot*. 2021;10:25.
5. Sharma S, Patnaik L, Mohanty S, Sahu T. An epidemiological study on road traffic accidents at a tertiary care hospital of Eastern India. *J DattaMeghelnst Med Sci Univ*. 2021;16(2):319-24.
6. Sune PS, Bhelkar SM, Narlawar UW, Chaudhary SM. Pattern of road traffic accident patients admitted in Government Medical College and Hospital Nagpur: a cross-sectional study. *Int J Community Med Public Health*. 2020;7(6):2170-76.
7. Mishra B, Sinha ND, Shukla SK, Sinha AK. Epidemiological study of road traffic accident cases from Western Nepal. *Indian J Community Med*. 2010;35(1):115-21.
8. Muthukumar T, Singh Z, Prasad RV, Samuel AK, 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):3362-67.
9. Awasthi B, Raina SK, Verma L. Epidemiological determinants of road traffic accidents in a largely rural hilly population. *J Sci Soc*. 2019;46(3):79-85.