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Original Research Article

Study Of Pattern Of Injuries In Road Traffic Accidents In Warangal, Telangana.

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Abstract: ***Background:*** Road traffic accidents are a major public health concern, causing significant injuries and deaths. Understanding injury patterns is important for improving road safety and trauma care. ***Aim:*** To study the pattern of injuries among road traffic accident cases in Warangal, Telangana. ***Materials and Methods:*** A descriptive observational study was conducted among 177 recorded road traffic accident cases in Warangal, Telangana. Data on demographic characteristics, vehicle categories, injury patterns and classification of deaths were analysed using descriptive statistics and percentages. ***Results:*** Among 177 cases, 75.14% were males, and the 41–60-year age group accounted for the largest proportion (41.24%). Motorcycles were the most frequently recorded victim-related vehicle category (41.24%), while lorries were the most common offender-related vehicle category (32.20%). Head injuries were predominant (66.67%). Hospital deaths accounted for 69.49% of the recorded cases. ***Conclusion:*** Head injuries were the predominant injury pattern among the recorded road traffic accident cases. The findings highlight the importance of road safety measures, injury prevention and timely trauma care.

Keywords: Road traffic accidents; injury patterns; head injury; motorcycle.

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INTRODUCTION

Road traffic accidents (RTAs) are a major public health concern worldwide, contributing substantially to premature mortality, disability, and socioeconomic burden. According to the World Health Organization (WHO), approximately 1.19 million people die annually due to road traffic crashes, with pedestrians, cyclists, and motorcyclists accounting for more than half of road traffic fatalities [1]. The burden is particularly high in low- and middle-income countries, where road-user vulnerability, unsafe driving practices, and limitations in post-crash care contribute to adverse outcomes. In India, 461,312 road accidents were reported in 2022, resulting in 168,491 deaths and 443,366 injuries [2]. These figures highlight the need for effective road-safety measures, early trauma management, and systematic investigation of injury patterns to reduce accident-related morbidity and mortality.

The demographic profile and anatomical distribution of injuries vary across study settings and populations, making regional investigations important for understanding local road traffic injury patterns. Previous hospital-based research in India has reported a predominance of male victims and substantial involvement of motorized two-wheelers in road traffic injuries [3,4]. Head injuries are particularly important because they can result in death, long-term disability, and considerable healthcare requirements. The WHO emphasizes that the use of quality helmets can substantially reduce the risk of death and brain injury among motorcyclists [5]. Therefore, examining the age and gender distribution, victim- and offender-related vehicle categories, anatomical injury patterns, and place of death can provide useful information for local road-safety planning and trauma-care preparedness.

The present study, entitled "Study of Pattern of Injuries in Road Traffic Accidents in Warangal, Telangana," was undertaken to describe the demographic characteristics, victim- and offender-related vehicle categories, anatomical distribution of injuries, and classification of deaths among recorded road traffic accident cases. Region-specific information on these

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characteristics is important for understanding the local pattern of road traffic injuries and identifying areas that require greater attention in road-safety planning. A systematic assessment of injury patterns can help inform preventive strategies, promote awareness regarding motorcycle and helmet safety, improve understanding of injuries associated with different vehicle categories, and emphasize the importance of timely emergency trauma care. Therefore, this study aims to provide a descriptive account of road traffic accident cases in Warangal, Telangana, and generate locally relevant information that may support future research and the planning of appropriate road-safety interventions.

METHODOLOGY

Study Design

A descriptive observational study was conducted to study the pattern of injuries among road traffic accident cases in Warangal, Telangana. A total of 177 recorded cases were included in the analysis.

Study Setting and Study Population

The study included 177 recorded road traffic accident cases from Warangal, Telangana. The available records were reviewed to describe the demographic characteristics of the cases and the distribution of vehicle categories, injury patterns, and deaths.

Study Variables

The variables analysed included age group (≤20, 21–40, 41–60, and >60 years), gender (male and female), victim-related vehicle category, offender-related vehicle category, type of injury, and classification of death as hospital death or spot death. Injury patterns included isolated injuries and combinations involving the head, chest, abdomen, and limbs, as well as body-crush injuries.

Statistical Analysis

The recorded data were summarized using descriptive statistics. Percentages were calculated for each category using the total of 177 cases using the formula:

$$Percentage = \frac{Number\ of\ cases\ in\ a\ category}{177} x100$$

RESULTS

Table 1 presents the gender-wise distribution of the 177 road traffic accident cases. Of the total cases, 133 (75.14%) were males, whereas 44 (24.86%) were females. Male cases constituted approximately three-quarters of the study population, indicating a higher representation of males than females among the recorded cases.

Table 1 Gender

Gender	No. of Cases (%)
Male	133 (75.14%)
Female	44 (24.86%)
Total	**177 (100.00%)**

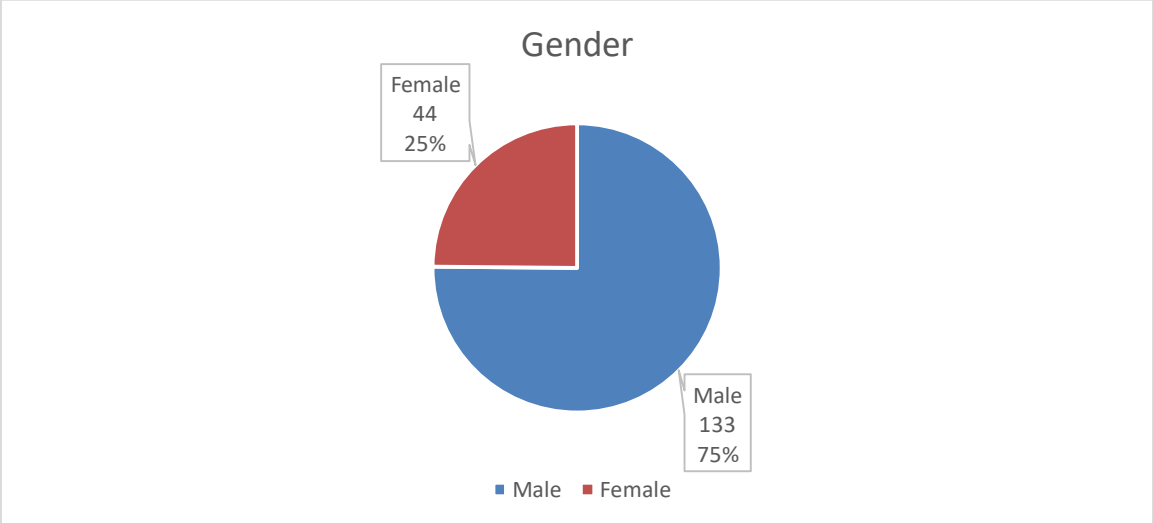


Table 2 shows the distribution of road traffic accident cases according to age group. The highest number of cases was observed in the 41–60-year age group, comprising 73 cases (41.24%). This was followed by the 21–40-year age group, with 59 cases (33.33%). Individuals aged above 60 years accounted for 29 cases (16.38%), while those aged 20 years or younger represented 16 cases (9.04%). Thus, the 41–60-year age group was the most frequently represented among the recorded cases.

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Table 2 Age

Age Group	No. of Cases (%)
≤ 20 years	16 (9.04%)
21 - 40 years	59 (33.33%)
41 - 60 years	73 (41.24%)
> 60 years	29 (16.38%)
Total	**177 (100.00%)**

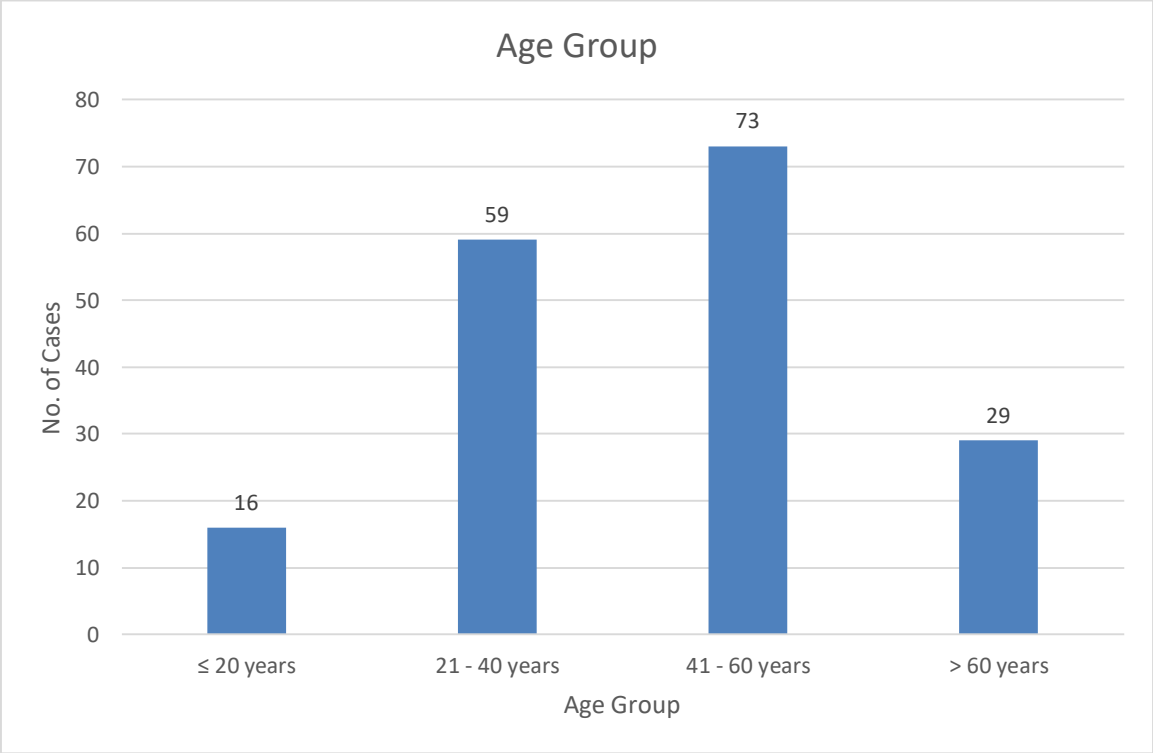


Table 3 illustrates the distribution of cases according to the recorded victim-related vehicle category. Motorcycles accounted for the highest number of cases, with 73 (41.24%), followed by road-crossing cases, which accounted for 21 (11.86%). Autos and cars each represented 17 cases (9.60%), while bicycles accounted for 16 (9.04%). Tractor-related cases constituted 12 (6.78%), pedestrians accounted for 11 (6.21%), and on-road cases represented 9 (5.08%). Tippers accounted for the lowest number, with one case (0.56%). These findings indicate that motorcycles were the most frequently recorded victim-related vehicle category.

Table 3 Type of Vehicle – Victim

Type of Vehicle	No. of Cases (%)
On Road	9 (5.08%)
Pedestrian	11 (6.21%)
Crossing Road	21 (11.86%)
Cycle	16 (9.04%)
Bike	73 (41.24%)
Auto	17 (9.60%)
Car	17 (9.60%)
Tractor	12 (6.78%)
Tipper	1 (0.56%)
Total	**177 (100.00%)**

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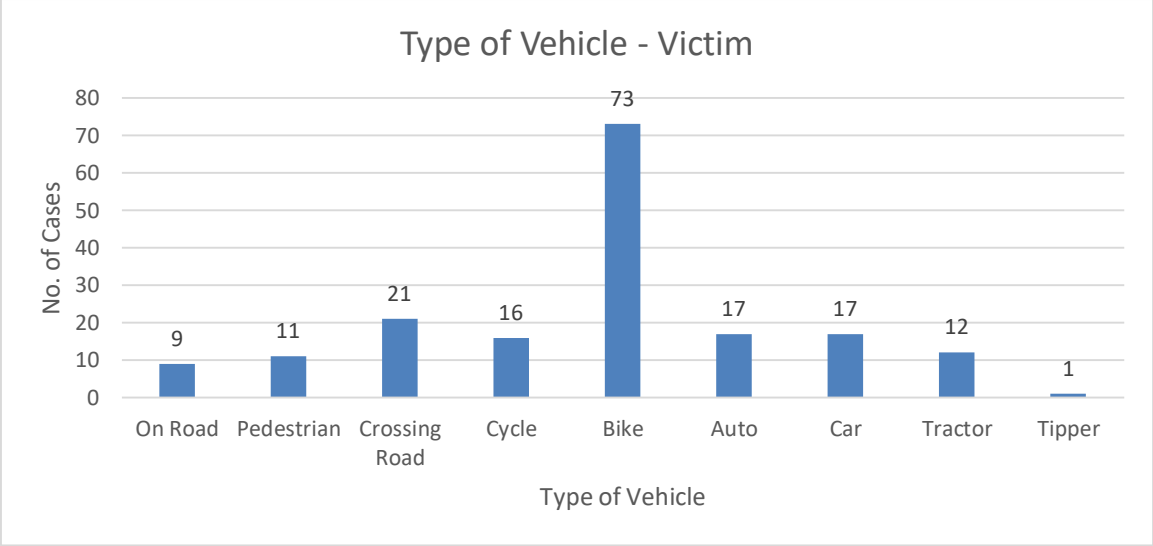
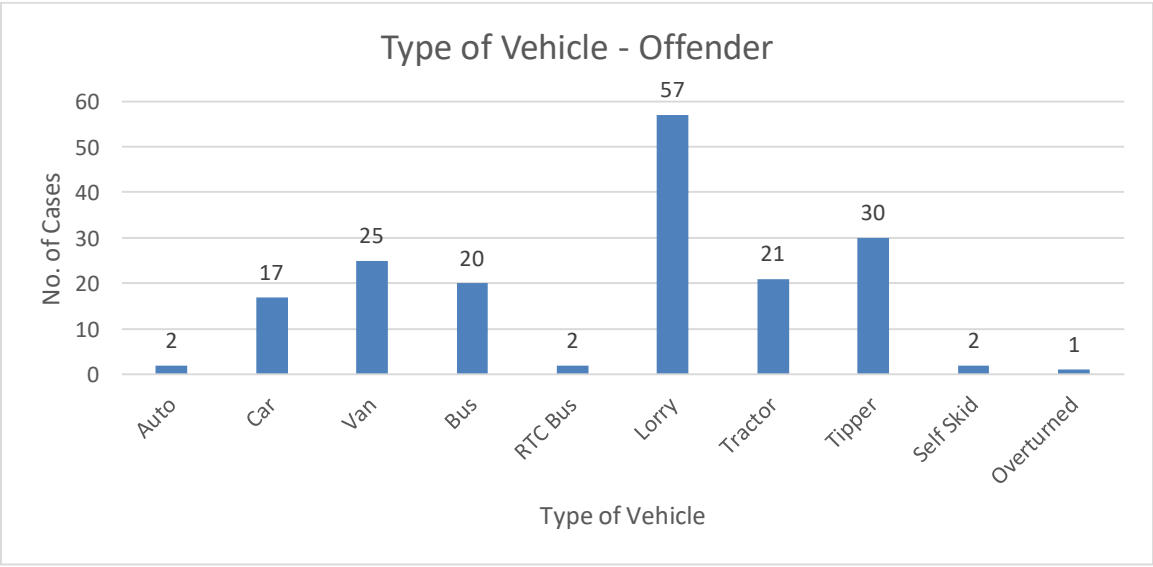


Table 4 presents the distribution of cases according to the recorded offender-related vehicle category. Lorries accounted for the highest number of cases, with 57 (32.20%), followed by tippers, with 30 (16.95%), and vans, with 25 (14.12%). Tractors accounted for 21 cases (11.86%), while buses represented 20 (11.30%). Cars accounted for 17 cases (9.60%). Autos, RTC buses, and self-skid cases each accounted for 2 cases (1.13%), while one case (0.56%) was recorded under the overturned category. Lorries were therefore the most frequently recorded offender-related vehicle category in the present study.

Table 4 Type of Vehicle – Offender

Type of Vehicle	**No. of Cases (%)**
Auto	2 (1.13%)
Car	17 (9.60%)
Van	25 (14.12%)
Bus	20 (11.30%)
RTC Bus	2 (1.13%)
Lorry	57 (32.20%)
Tractor	21 (11.86%)
Tipper	30 (16.95%)
Self Skid	2 (1.13%)
Overturned	1 (0.56%)
Total	**177 (100.00%)**



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Table 5 describes the distribution of cases according to the recorded type of injury. Head injury was the predominant category, accounting for 118 cases (66.67%). Head and limb injuries were recorded in 17 cases (9.60%), followed by head and chest injuries in 13 cases (7.34%). Head-crush injuries accounted for 11 cases (6.21%). Chest injuries and chest and abdominal injuries each accounted for 4 cases (2.26%). Head and abdominal injuries and body-crush injuries each represented 2 cases (1.13%). Head and lower-limb injuries, head, chest and limb injuries, abdominal injuries, head and chest crush injuries, chest and limb injuries, and abdominal and limb injuries each accounted for one case (0.56%). Overall, injuries involving the head constituted the most frequently recorded injury category.

Table 5 Type of Injury

Type of Injury	**No. of Cases (%)**
Head Injury	118 (66.67%)
Head and Limbs Injuries	17 (9.60%)
Head and Chest Injuries	13 (7.34%)
Head Crushed	11 (6.21%)
Chest Injury	4 (2.26%)
Chest and Abdomen Injuries	4 (2.26%)
Head and Abdomen Injuries	2 (1.13%)
Body Crushed	2 (1.13%)
Head and Lower Limbs Injuries	1 (0.56%)
Head, Chest and Limbs Injuries	1 (0.56%)
Abdomen Injury	1 (0.56%)
Head and Chest Crushed	1 (0.56%)
Chest and Limbs Injuries	1 (0.56%)
Abdomen and Limbs Injuries	1 (0.56%)
Total	**177 (100.00%)**

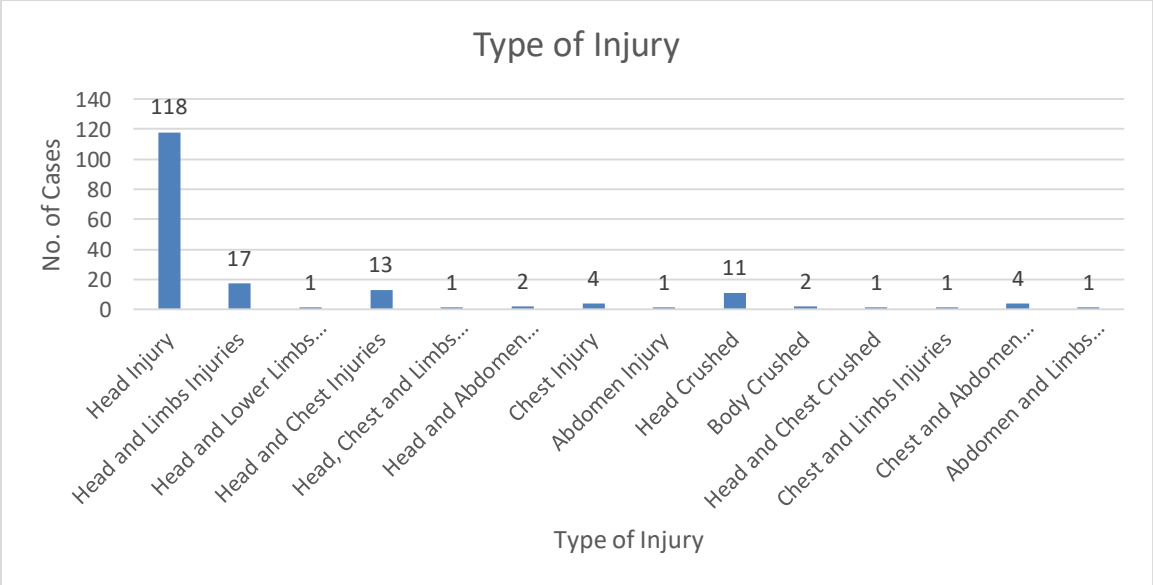
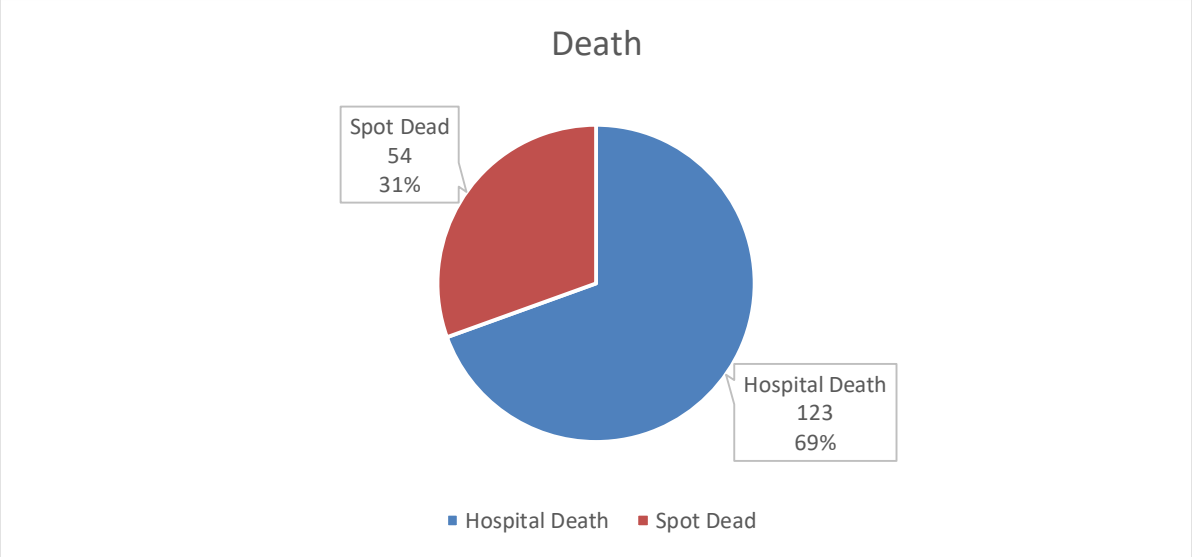


Table 6 presents the classification of deaths among the 177 recorded cases. Hospital deaths accounted for 123 cases (69.49%), whereas 54 cases (30.51%) were classified as spot deaths. Thus, hospital deaths constituted the larger proportion of the recorded cases. These findings describe the distribution of death classifications within the study population and should not be interpreted as the overall mortality rate among all road traffic accident victims.

Table 6 Death

Death	**No. of Cases (%)**
Hospital Death	123 (69.49%)
Spot Dead	54 (30.51%)
Total	**177 (100.00%)**

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DISCUSSION

The present study describes the pattern of road traffic accident (RTA)-related injuries among 177 recorded cases in Warangal, Telangana. The findings highlight differences in the distribution of cases by sex and age, victim-related vehicle category, offender-related vehicle category, injury pattern, and place of death. These findings are relevant to understanding local injury patterns and identifying areas for road safety and injury-prevention efforts. Previous research has highlighted the substantial public health burden of road traffic injuries in India and the importance of strengthening prevention and injury surveillance. [1–4]

In the present study, males accounted for 133 cases (75.14%), while females accounted for 44 cases (24.86%). This male predominance is consistent with findings from hospital-based road traffic injury studies in India, including research conducted in Hyderabad. [5,6] Greater exposure to road travel and differences in travel patterns may contribute to such differences; however, these factors were not directly assessed in the present study. Therefore, the gender distribution should be interpreted as a description of the recorded cases rather than proof of the causes underlying the observed difference.

The largest proportion of cases occurred among individuals aged 41–60 years (41.24%), followed by those aged 21–40 years (33.33%). Together, these groups represented 74.57% of the cases. This distribution indicates that adults in these age groups constituted the majority of the recorded cases. Road traffic injury studies in India have also reported substantial involvement of adults and working-age populations. [3,5,6] Nevertheless, differences in study settings, sampling methods, and age-group classifications should be considered when comparing these findings with other studies.

Motorcycles accounted for the largest victim-related vehicle category, representing 73 cases (41.24%). Pedestrians crossing the road accounted for 21 cases (11.86%), while auto-rickshaws and cars each accounted for 17 cases (9.60%). The prominent representation of motorcycles is consistent with findings from studies in India that have reported a substantial burden of road traffic injuries among users of motorised two-wheelers. [5,7] These findings support the importance of measures such as helmet use, appropriate speed management, safe road design, and enforcement of traffic regulations. However, helmet use, crash circumstances, and compliance with traffic laws were not provided in the present results, so their individual contributions cannot be determined.

Lorries accounted for the largest offender-related vehicle category, with 57 cases (32.20%), followed by tippers (30; 16.95%), vans (25; 14.12%), and tractors (21; 11.86%). These findings show that heavy and commercial vehicle categories were frequently recorded in this study's offender-related classification. The results may help identify vehicle categories for further investigation in local road safety assessments. However, the recorded categories alone do not establish fault, the mechanism of collision, or the relative risk associated with each vehicle type. Interpretation would be strengthened by information on traffic volume, road type, time of crash, collision mechanism, and the operational circumstances of the vehicles.

Head injury was the most frequently recorded injury category, occurring in 118 cases (66.67%). Head and limb injuries were reported in 17 cases (9.60%), while head and chest injuries were reported in 13 cases (7.34%). The prominence of head injuries is consistent with research describing injury patterns among road traffic accident patients, including motorised two-wheeler users in urban India. [6,7] The findings

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reinforce the importance of measures intended to prevent head trauma, including appropriate helmet use and effective enforcement of helmet-related regulations. Nevertheless, the present study's injury categories do not provide sufficient detail to establish injury severity, intracranial involvement, helmet status, or the precise mechanism of injury. These factors should be included in future studies where records permit.

Hospital deaths accounted for 123 cases (69.49%), while 54 cases (30.51%) were classified as spot deaths. These figures describe the distribution of deaths by recorded location or circumstance among the 177 cases included in the study. They should not be interpreted as the hospital case-fatality rate or the overall mortality rate for road traffic accidents in Warangal unless the sampling frame and inclusion criteria confirm that interpretation. Studies of road traffic injury surveillance have highlighted the importance of clear definitions, standardised recording, and complete outcome information when interpreting injury-related deaths. [8] Further information about time to hospital arrival, treatment received, injury severity, and cause of death would be required to explain the observed distribution.

The findings identify several areas relevant to local road safety planning, particularly the representation of male victims, adults aged 21–60 years, motorcycle-related cases, head injuries, and cases involving lorries and tippers in the offender-related classification. These observations can inform further investigation and targeted prevention strategies, but they should not be taken as evidence of causal relationships. The study is also limited by the information available in the recorded categories. Details such as helmet use, seat-belt use, alcohol involvement, road conditions, time of accident, injury severity, and pre-hospital care were not presented in the results. In addition, the interpretation of hospital and spot deaths depends on confirmation of the study population and case-selection process. Strengthening standardised injury documentation and surveillance could improve the quality of future analyses and support locally appropriate road safety interventions. [1,2,8].

CONCLUSION

Road traffic accidents remain an important public health concern, requiring coordinated efforts to improve road safety and reduce injury-related consequences. A better understanding of injury patterns and the circumstances surrounding road traffic accidents can support the development of effective preventive strategies. Strengthening road safety education, enforcing traffic regulations, promoting the use of protective equipment, improving road infrastructure, and ensuring timely emergency and trauma care are essential measures. Continued injury surveillance and further research are also necessary to guide evidence-based interventions and support the development of effective road traffic injury prevention policies.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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