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Original Research Article

CLINICAL CHARACTERISTICS AND OUTCOMES OF ROAD TRAFFIC INJURY PATIENTS AT A TERTIARY CARE HOSPITAL

Chirag Dineshbhai Amin[1], Dhruvesh Laljibhai Katara[2], Meet Pravinbhai Prajapati[3], Ashish Chaudhary[4], Bhargav Valangar[5]

[1,3]*Senior Resident, Department of Orthopedics, GMERS Medical College and Hospital, Himatnagar, Gujarat, India.*
[2]*Assistant Professor, Department of Orthopedics, GMERS Medical College and Hospital, Himatnagar, Gujarat, India.*
[4]*Third Year Resident, Department of Orthopedics, GMERS Medical College and Hospital, Himatnagar, Gujarat, India.*
[5]*Second Year Resident, Department of Orthopedics, GMERS Medical College and Hospital, Himatnagar, Gujarat, India.*

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Corresponding Author:
Dr. Chirag Dineshbhai Amin,
Department of Orthopedics, Gmers Medical College and Hospital, Himatnagar, Gujarat, India.
Email: chiragamin158@gmail.com

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ABSTRACT

Background: Road traffic injuries are a major cause of morbidity and mortality worldwide, particularly affecting young adults. **Objective:** To assess the characteristics and outcomes of non-polytraumatized road traffic injury patients presenting to the emergency department.
Materials and Methods: A prospective observational study was conducted on 150 patients with road traffic injuries. Demographic details, injury characteristics, and outcomes were recorded and analyzed.
Results: Males constituted 68.0% of cases, with peak incidence in the 31–40 years age group (22.7%). Commercial vehicles were the most common mode of transportation involved. Head injuries (30.7%) and fractures (20.0%) were the most frequent injury types. Higher admission rates were observed in truck-related injuries (80.0%), while mortality was higher in motorcycle-related cases (12.0%).
Conclusion: Road traffic injuries predominantly affect young adult males and vary in outcome depending on vehicle type and injury pattern. Early intervention and preventive strategies are essential to improve outcomes.
Keywords: Road traffic injury, Emergency department, Trauma, Outcome analysis.

INTRODUCTION

Road traffic injuries (RTIs) are a major global public health concern and represent one of the leading causes of morbidity and mortality worldwide. According to recent global estimates, RTIs account for approximately 1.19 million deaths annually and are a leading cause of death among individuals aged 5–29 years, highlighting their significant impact on economically productive populations.[1] In addition to mortality, RTIs contribute substantially to disability-adjusted life years (DALYs), imposing a heavy socioeconomic burden on healthcare systems, especially in low- and middle-income countries.[2]
Emergency departments (EDs) serve as the primary point of care for patients sustaining road traffic injuries, making them critical settings for assessing injury patterns, severity, and outcomes. The majority of RTI cases presenting to EDs are non-polytraumatized patients, who, despite having less severe injuries compared to polytrauma cases, still require prompt evaluation and management to prevent complications and ensure optimal outcomes.[3] Understanding the clinical characteristics and outcomes of such patients is essential for improving triage systems, resource allocation, and patient care strategies.
The epidemiology of RTIs varies widely depending on geographic, socioeconomic, and infrastructural factors. Recent studies have shown that young adult males are disproportionately affected, primarily due to increased exposure to high-risk behaviors such as speeding, alcohol consumption, and non-compliance with traffic regulations.[4] Additionally, the type of road user, including pedestrians, motorcyclists, and vehicle occupants, significantly influences injury patterns and outcomes.[5]

The nature and severity of injuries sustained in road traffic accidents depend on multiple factors, including mechanism of injury, use of safety devices, and pre-hospital care. Common injuries include fractures, soft tissue injuries, and head trauma, with varying degrees of severity that influence hospital admission rates and clinical outcomes.[6] Early identification of injury patterns and associated risk factors is crucial in determining prognosis and guiding management decisions in the emergency setting.

Recent research has also emphasized the importance of outcome assessment in RTI patients, including parameters such as hospital stay, need for surgical intervention, complications, and mortality. Studies have demonstrated that even non-polytraumatized patients may experience significant morbidity if not managed appropriately, underscoring the need for systematic evaluation and follow-up.[7] Furthermore, factors such as delay in presentation, inadequate pre-hospital care, and limited access to trauma facilities can adversely affect patient outcomes.[8]

In tertiary care hospitals, where advanced diagnostic and therapeutic facilities are available, comprehensive evaluation of RTI patients provides valuable insights into injury characteristics and treatment outcomes. Such studies are essential for developing evidence-based protocols aimed at improving patient care and reducing the burden of RTIs.[9] Moreover, analysis of local data helps in identifying region-specific risk factors and tailoring preventive strategies accordingly.

Despite numerous studies on road traffic injuries, there remains a need for focused research on non-polytraumatized patients presenting to emergency departments, as they constitute a significant proportion of RTI cases but are often underrepresented in trauma research. Evaluating their clinical profile and outcomes can aid in optimizing management strategies and improving overall healthcare delivery.[10]

Therefore, the present study aims to assess the characteristics and outcomes of non-polytraumatized road traffic injury-related emergency department admissions in a tertiary care hospital, with a focus on demographic distribution, injury patterns, and clinical outcomes.

MATERIALS AND METHODS

This prospective observational study was conducted in the Emergency Department of a tertiary care hospital over a period of one year. The study included 150 patients presenting with road traffic injuries who were non-polytraumatized and required emergency care.

All patients presenting to the emergency department with a history of road traffic injury and fulfilling the inclusion criteria were enrolled in the study after obtaining informed consent. Demographic details such as age, sex, and mode of injury were recorded. Clinical parameters including type of road user, mechanism of injury, time of presentation, and nature of injuries were documented. Injury characteristics such as site of injury, type of injury (fracture, soft tissue injury, head injury, etc.), and severity were assessed through clinical examination and relevant investigations.

Patients with polytrauma, defined as involvement of multiple organ systems with life-threatening injuries, were excluded from the study. Patients who were unwilling to participate or did not provide consent were also excluded.

All patients underwent appropriate clinical evaluation and management as per institutional protocols. Outcomes were assessed in terms of need for admission, duration of hospital stay, requirement of surgical intervention, complications, and final disposition (discharge or referral).

The collected data were entered into a structured proforma and systematically tabulated. Statistical analysis was performed using Microsoft Excel and appropriate statistical software. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize the data. Inferential statistical tests such as the Chi-square test were applied to assess associations between categorical variables. A p-value of less than 0.05 was considered statistically significant.

Ethical clearance for the study was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants. Confidentiality of patient information was strictly maintained, and all procedures were conducted in accordance with ethical guidelines.

RESULTS

In the present study comprising 150 patients, Table 1 shows that the highest number of cases were observed in the 31–40 years age group (34 cases, 22.7%), followed by 21–30 years (30 cases, 20.0%) and 41–50 years (24 cases, 16.0%). The least number of cases were seen in the ≤5 years age group (6 cases, 4.0%), while 10 cases (6.7%) had undocumented age. In terms of sex distribution, males constituted 102 cases (68.0%) and females 48 cases (32.0%), indicating clear male predominance.

As shown in Table 2, commercial vehicles were predominantly involved across all age groups, with the highest involvement in 21–30 years (26 cases, 86.7%) and 31–40 years (29 cases, 85.3%). Private vehicle involvement was relatively higher in the >60 years group (5 cases, 45.5%) and in children aged 6–10 years (2 cases, 40.0%), suggesting variation in exposure patterns across age groups.

Table 3 demonstrates that head injuries were the most common injury type (46 cases, 30.7%), followed by fractures (30 cases, 20.0%), both predominantly affecting males (69.6% and 70.0% respectively). Soft tissue injuries such as bruises (14 cases, 9.3%) and

lacerations (12 cases, 8.0%) showed more balanced sex distribution. Avulsion injuries and burns were relatively more frequent in females, while crush injuries were exclusively seen in males (4 cases, 100%).

As shown in Table 4, outcome analysis revealed that truck-related injuries had the highest admission rate (80.0%), followed by minibus (55.0%) and cars (48.0%). Discharge rates were highest in motorized tricycle injuries (50.0%), while mortality was higher in motorcycle (12.0%) and motorized tricycle (10.0%) cases. DAMA rates ranged between 10–16% across different vehicle categories.

Table 1: Demographic data

Age group (years)	Frequency	Percent (%)
≤5	6	4.0
6–10	5	3.3
11–20	14	9.3
21–30	30	20.0
31–40	34	22.7
41–50	24	16.0
51–60	16	10.7
>60	11	7.3
Not documented	10	6.7
Total	150	100.0
Sex	**Frequency**	**Percent (%)**
Male	102	68.0
Female	48	32.0
Total	150	100.0

Table 2: Mode of transportation by age group

Age group (years)	Commercial	Private	Total
≤5	4 (66.7)	2 (33.3)	6
6–10	3 (60.0)	2 (40.0)	5
11–20	11 (78.6)	3 (21.4)	14
21–30	26 (86.7)	4 (13.3)	30
31–40	29 (85.3)	5 (14.7)	34
41–50	20 (83.3)	4 (16.7)	24
51–60	12 (75.0)	4 (25.0)	16
>60	6 (54.5)	5 (45.5)	11

Table 3: Distribution of nature of injury sustained and sex

Nature of injury	Male	Female	Total
Head injuries	32 (69.6)	14 (30.4)	46
Fractures	21 (70.0)	9 (30.0)	30
Burn	2 (40.0)	3 (60.0)	5
Scald	2 (50.0)	2 (50.0)	4
Laceration	8 (66.7)	4 (33.3)	12
Bruises	8 (57.1)	6 (42.9)	14
Abrasion injuries	5 (62.5)	3 (37.5)	8
Blunt chest trauma	6 (66.7)	3 (33.3)	9
Avulsion injuries	3 (42.9)	4 (57.1)	7
Spinal cord injuries	7 (63.6)	4 (36.4)	11
Dislocation	4 (66.7)	2 (33.3)	6
Crush injuries	4 (100.0)	0	4
Blunt abdominal injury	2 (40.0)	3 (60.0)	5
Others	18 (60.0)	12 (40.0)	30

Table 4: Comparison of the exit mode from the emergency department

Vehicle type	Admitted to ward (%)	Discharged (%)	DAMA (%)	Death (%)
Motorcycle	42.0	30.0	16.0	12.0
Cars	48.0	28.0	14.0	10.0
Minibus	55.0	25.0	12.0	8.0
Motorized tricycle	30.0	50.0	10.0	10.0
Truck	80.0	10.0	5.0	5.0

DISCUSSION

The present study evaluated the characteristics and outcomes of non-polytraumatized road traffic injury patients presenting to the emergency department of a tertiary care hospital. A clear male predominance (68.0%) was observed, which is consistent with findings reported by Haider et al,[11] who demonstrated that males are disproportionately affected due to greater exposure to outdoor activities, occupational travel, and high-risk behaviors such as speeding and alcohol consumption. The predominance of young adults, particularly in the 31–40 years (22.7%) and 21–30 years (20.0%) age

groups, further supports the established epidemiological trend that RTIs commonly affect the most economically productive age group.[12] This has significant socioeconomic implications, as injuries in this age group can lead to loss of productivity and increased healthcare burden.

The analysis of mode of transportation revealed that commercial vehicles were involved in the majority of cases across all age groups, particularly among individuals aged 21–30 years (86.7%) and 31–40 years (85.3%). This may be attributed to increased occupational exposure and reliance on commercial transport systems. Similar findings have been reported by Peden et al,[13] who emphasized that exposure patterns and type of road usage significantly influence injury risk. The relatively higher involvement of private vehicles in older age groups (>60 years, 45.5%) suggests age-related differences in mobility and travel preferences.

In terms of injury patterns, head injuries were the most common (30.7%), followed by fractures (20.0%), with both types predominantly affecting males. This is in agreement with findings by Dewan et al,[14] who reported that head injuries are the leading cause of morbidity in road traffic accidents, often resulting from lack of protective measures such as helmet use. The significant proportion of soft tissue injuries, including bruises (9.3%) and lacerations (8.0%), reflects the relatively less severe nature of injuries in non-polytraumatized patients. However, the presence of spinal cord injuries (7.3%) and blunt abdominal injuries (3.3%) indicates that even non-polytrauma cases may have potentially serious consequences if not promptly managed.

Outcome analysis showed that admission rates were highest among truck-related injuries (80.0%) and minibus-related injuries (55.0%), indicating greater severity associated with these vehicle types. Motorcycle-related injuries demonstrated a relatively higher mortality rate (12.0%), which is consistent with observations by Ameratunga et al,[15] who highlighted the vulnerability of motorcyclists due to minimal physical protection. The high discharge rate in motorized tricycle cases (50.0%) suggests that injuries associated with these vehicles may be comparatively less severe. The presence of DAMA cases (10–16%) across all vehicle categories may reflect socioeconomic factors, patient perception of illness severity, or financial constraints influencing treatment continuation.

Overall, the findings of this study align with existing literature and emphasize that demographic factors, mode of transportation, and injury patterns play a crucial role in determining clinical outcomes in RTI patients. The study highlights the importance of targeted preventive strategies, improved road safety measures, and efficient emergency care systems to reduce morbidity and mortality associated with road traffic injuries.

CONCLUSION

The present study concludes that road traffic injuries predominantly affect young adult males, with commercial vehicle involvement being the most common. Head injuries and fractures constitute the major injury patterns among non-polytraumatized patients. Outcomes vary depending on the type of vehicle involved, with higher admission and mortality rates observed in heavy vehicle and motorcycle-related injuries. The study underscores the need for effective road safety interventions, early diagnosis, and prompt management to improve patient outcomes and reduce the burden of RTIs.

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