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Original Research Article

Epidemiology and injury patterns of musculoskeletal trauma at a rural level II trauma centre: a prospective observational study

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ABSTRACT

Background: Musculoskeletal trauma represents a major cause of morbidity and disability worldwide and places a considerable burden on healthcare systems, particularly in resource-limited settings. Rural and hilly regions may demonstrate distinct injury patterns owing to environmental conditions, occupational exposure, and increasing vehicular traffic. However, prospective epidemiological data describing musculoskeletal trauma in such settings remain limited. This study aimed to evaluate the demographic characteristics, mechanisms of injury, anatomical distribution, treatment modalities, and outcomes of patients presenting with musculoskeletal trauma to a Level II trauma Centre in rural North India.

Methods: A prospective observational study was conducted at a Level II trauma centre serving a predominantly rural and hilly population in North India from April 2023 to March 2024. All consecutive patients presenting with musculoskeletal trauma during the study period were included. Demographic characteristics, mechanisms of injury, anatomical distribution of injuries, treatment modality, and discharge outcomes were recorded. Descriptive statistics were used to summarize injury patterns. The association between the mechanism of injury and the occurrence of fractures was analysed using odds ratios.

Results: A total of 1,657 patients were included in the study. Most patients were men and belonged to the 14–44-year age group. Falls were the most common mechanism of injury, followed by road traffic accidents. Fractures constituted the majority of musculoskeletal injuries, with the upper extremity being the most frequently involved anatomical region. An analytical evaluation demonstrated that road traffic accidents were associated with a higher odd of fractures than fall-related injuries.

Conclusions: These findings provide insights into musculoskeletal trauma patterns in rural trauma settings and may help inform future research and trauma care planning in similar environments.

Keywords: Musculoskeletal trauma, Epidemiology, Fractures, Road traffic accidents, Rural trauma centre

INTRODUCTION

Trauma represents a major global public health problem and is responsible for a substantial proportion of morbidity and mortality worldwide. According to the World Health Organization (WHO), injuries account for millions of deaths annually and result in a significant burden of disability, particularly in low- and middle-income countries, where trauma care systems are often underdeveloped.[1] Musculoskeletal injuries constitute a

large proportion of trauma cases and are an important cause of long-term functional impairment, economic loss, and reduced quality of life.[2] The global burden of injuries has been increasing steadily because of rapid urbanization, industrialization, and motorization.[3] Road traffic injuries, in particular, have emerged as a major public health challenge and are among the leading causes of death and disability worldwide.[4] In developing countries such as India, the rapid increase in motor vehicle use, combined with inadequate road safety infrastructure, has significantly contributed to the rising incidence of trauma.[5] Apart from road traffic accidents, falls are another major cause of musculoskeletal injuries, particularly among children and the elderly. Environmental hazards, occupational exposure, and unsafe living conditions often contribute to such injuries.[6] In rural and hilly regions, uneven terrain, agricultural activities, and limited access to safety measures further increase the risk of trauma.[7] Musculoskeletal trauma places a substantial burden on healthcare systems, especially in resource-limited settings. Injuries frequently require surgical intervention, prolonged hospitalization, and rehabilitation services, thereby increasing healthcare expenditure and affecting the productivity of the affected population.[8] Epidemiological studies of trauma are essential for understanding injury patterns, identifying high-risk populations, and developing effective preventive strategies.[9]

Several studies from India have reported that trauma predominantly affects young and economically productive individuals, with a higher incidence among males.[10] These findings highlight the significant socioeconomic impact of injuries in developing countries. However, epidemiological data on musculoskeletal trauma from rural and hilly regions remain limited, despite the unique environmental and demographic factors that influence injury patterns in these areas. Understanding the epidemiological profile of musculoskeletal trauma is essential for planning preventive strategies and strengthening trauma care services.[11]

Himachal Pradesh, a predominantly hilly state with expanding vehicular traffic and dispersed rural settlements, presents unique challenges for trauma management. Despite the growing recognition of trauma as a public health priority, there remains limited comprehensive prospective data from rural North India integrating epidemiological characteristics, anatomical injury patterns, management strategies, and short-term outcomes.

Therefore, the present study was conducted to comprehensively evaluate the demographic profile, mechanism of injury, anatomical distribution, treatment modalities, and discharge outcomes of patients with musculoskeletal trauma presenting to a Level II trauma centre in rural North India. Understanding these patterns is essential for strengthening trauma systems, optimizing resource allocation, and developing targeted preventive strategies in resource-constrained settings.

METHODS

Study design and setting

This prospective observational study was conducted at a Level II trauma centre in Northern India, which serves as a referral centre for a predominantly rural and hilly population across multiple adjoining districts and provides both emergency and definitive musculoskeletal trauma care. The study was conducted over a one-year period from April 2023 to March 2024. All consecutive patients presenting with musculoskeletal trauma during this period were screened for eligibility. After applying the predefined inclusion and exclusion criteria, a total of 1,657 patients were enrolled and included in the final analysis (Figure 1).

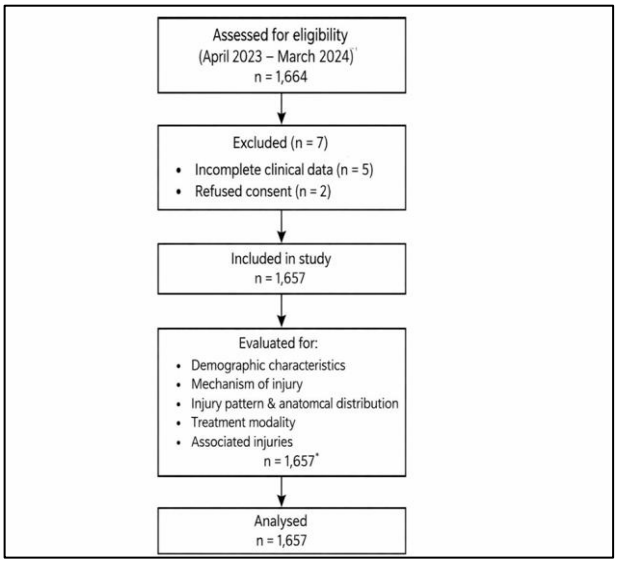

Figure 1: Study flow diagram showing patient selection.

Inclusion and exclusion criteria

Patients of all age groups and both sexes presenting with fractures, dislocations, sprains, strains, crush injuries, or significant soft tissue injuries associated with functional impairment were included in this study. Patients who were admitted directly or referred from peripheral healthcare facilities were also included. Patients with pathological fractures, non-traumatic vertebral collapse, stress or overuse injuries, isolated head injuries without musculoskeletal involvement, non-traumatic back pain, or those who refused to provide consent were excluded from the study.

Data collection

Data were collected at the time of admission using a structured proforma. Demographic details, including age and sex, were recorded. The mechanism of injury was categorized as road traffic accident, fall, domestic accident, occupational injury, or other causes. The nature of the injury was classified as fracture, dislocation, sprain,

strain, crush injury, or soft tissue injury. Anatomical distribution was documented as upper limb, lower limb, or axial skeletal involvement. Associated injuries involving the head, chest, abdomen, pelvis, or multiple systems were also noted. All patients underwent detailed clinical examination and appropriate radiological evaluation. Standard radiographs were obtained in all fracture cases, whereas computed tomography or magnetic resonance imaging was performed when clinically indicated.

Treatment modalities

Treatment was categorized as either conservative or surgical. Conservative management includes plaster immobilization, splints, traction, and closed reduction techniques. Operative management included open reduction and internal fixation, intramedullary nailing, external fixation, and surgical joint reduction based on fracture configuration, stability, and patient condition.

Outcome measures

The primary outcome measures were the distribution and anatomical pattern of musculoskeletal injuries. Secondary outcome measures included the proportion of operative versus conservative management, in-hospital complications, referral to higher centres, and mortality at discharge.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee (IEC No. DRPGMC/ETHICS/2023/021, dated 06-04-2023). Written informed consent was obtained from all adult participants and from parents or legal guardians in the case of minors. The study was conducted in accordance with the ethical standards of the institutional research committee and the principles of the Declaration of Helsinki.

Statistical analysis

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA). Categorical variables are expressed as frequencies and percentages. Associations between categorical variables were assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Study population

During the study period, a total of 1,657 patients presenting with musculoskeletal trauma were included in the analysis. Among these, 1,074 (64.8%) were males and 583 (35.2%) were females, resulting in a male-to-female ratio of 1.84:1. Fractures were the most common type of musculoskeletal injury observed in patients who presented to the trauma centre.

Demographic and socioeconomic characteristics

Most patients belonged to the 14–44 years age group, followed by those aged 45 years and above, whereas children younger than 14 years constituted a smaller proportion of cases. Musculoskeletal trauma was more frequently observed in males than in females. Regarding family structure, slightly more than half of the patients belonged to nuclear families, whereas the remaining patients belonged to joint families. In terms of socioeconomic status, the majority of patients belonged to the non-IRDP category, with a smaller proportion belonging to the IRDP/BPL group. An analysis of occupational status showed that students formed the largest proportion of trauma patients, followed by homemakers and individuals employed in the private or government sectors. The baseline demographic and socioeconomic characteristics of the study population are summarized in Table 1.

Table 1: Baseline demographic characteristics and injury profile of musculoskeletal trauma patients presenting to the level II trauma centre during the study period.

Variables	Category	Number (N)	Percentage (%)
Age group (in years)	<14	214	12.9
	14–44	776	46.8
	≥45	667	40.3
Gender	Male	1074	64.8
	Female	583	35.2
Type of family	Nuclear	892	53.8
	Joint	764	46.2
Economic status	Non-IRDP	1326	80
	IRDP/BPL	331	20
Occupation	Student	392	23.7
	Homemaker	347	20.9
	Private job	237	14.3
	Government job	222	13.4

Continued.

Variables	Category	Number (N)	Percentage (%)
	Farmer	155	9.4
	Self-employed	143	8.6
	Labourer/daily wager	77	4.6
	Others	84	5.1
Mechanism of injury	Fall (all types)	1185	71.5
	Road traffic accident	385	23.2
	Other mechanisms*	87	5.3
Type of injury	Fracture	1111	67
	Soft tissue injury	350	21.1
	Dislocation	88	5.3
	Sprain/strain	39	2.4
	Crush or sharp injury	62	3.7
	Others	7	0.4

Values are expressed as frequency (n) and percentage (%) of the total study population (n=1,657). IRDP: Integrated Rural Development Programme; BPL: Below Poverty Line. *Other mechanisms include machinery injuries, assault, and miscellaneous causes.

Table 2: Distribution of mechanism of injury among musculoskeletal trauma patients according to age group.

Mechanism of injury	<14 years N (%)	14–44 years N (%)	≥45 years N (%)	Total N (%)
Fall from height	56 (3.4)	154 (9.3)	159 (9.6)	369 (22.3)
Fall while walking	75 (4.5)	216 (13.0)	283 (17.1)	574 (34.6)
Fall while playing	51 (3.1)	43 (2.6)	18 (1.1)	112 (6.8)
Fall from stairs	10 (0.6)	56 (3.4)	64 (3.9)	130 (7.8)
RTA – two-wheeler	16 (1.0)	183 (11.0)	85 (5.1)	284 (17.1)
RTA – four-wheeler	6 (0.4)	70 (4.2)	25 (1.5)	101 (6.1)
Pedestrian injury	5 (0.3)	13 (0.8)	7 (0.4)	25 (1.5)
Machinery injury	2 (0.1)	18 (1.1)	8 (0.5)	28 (1.7)
Cut injury	3 (0.2)	12 (0.7)	4 (0.2)	19 (1.1)
Assault	1 (0.1)	3 (0.2)	2 (0.1)	6 (0.4)
Others	1 (0.1)	8 (0.5)	0 (0.0)	9 (0.5)
Total	214 (12.9)	776 (46.8)	667 (40.3)	1657 (100)

Values are presented as frequency (n) and percentage (%) of the total study population. Statistical significance was assessed using the Chi-square test.

Mechanism of injury

The evaluation of the mechanisms of injury revealed that falls were the most common cause of musculoskeletal trauma in the study population. Among fall-related injuries, falls while walking and falls from heights accounted for the largest proportion of cases. Road traffic accidents represented the second most common mechanism of injury, with accidents involving two-wheeler vehicles contributing the majority of these cases. Other mechanisms, such as pedestrian injuries, machinery injuries, assault, and sharp injuries, accounted for a smaller proportion of cases.

Age-wise distribution of mechanism of injury

When the mechanisms of injury were analysed according to age group, fall-related injuries were observed across all age categories; however, they were particularly common among individuals aged ≥ 45 years, especially falls while walking. In contrast, road traffic accidents were more frequently observed among patients aged 14–44 years, reflecting increased exposure to vehicular traffic among the economically productive population (Table 2).

Pattern of musculoskeletal injuries

Fractures constituted the most common type of musculoskeletal injury, accounting for approximately two-thirds of all trauma cases. Soft tissue injuries represented the second most common injury category, followed by dislocations. Other injury types, such as sprains, strains, crush injuries, and sharp injuries, were observed less frequently (Table 3).

Anatomical distribution of injuries

The anatomical distribution analysis showed that upper extremity injuries were commonly represented by fractures of the distal radius, followed by fractures of both bones of the forearm and supracondylar fractures of the humerus.

Table 3: Distribution of types of musculoskeletal injuries among patients presenting to the level II trauma centre.

Type of injury	Number (N)	Percentage (%)
Fracture	1111	67
Soft tissue injury	350	21.1
Dislocation	88	5.3
Sprain	31	1.9
Strain	8	0.5
Crush injury	30	1.8
Sharp injury	32	1.9
Others	7	0.4
Total	1657	100

Values are expressed as frequency (n) and percentage (%) of the total study population.

Among lower extremity injuries, fractures of both bones of the leg, metatarsal fractures, and femoral fractures were frequently encountered. Soft tissue injuries were observed in both the upper and lower extremities, with a slightly higher proportion involving the lower limbs. Dislocations involving joints such as the shoulder, elbow, hip, and ankle were less common, but represented an important component of the musculoskeletal trauma spectrum (Table 4).

Treatment modalities and clinical outcomes

Most patients with musculoskeletal trauma were managed conservatively, while approximately one-third required surgical intervention. Among the surgical procedures, open reduction and internal fixation was the most common operative method, followed by closed reduction with percutaneous fixation and external fixation. Most patients showed clinical improvement or a stable condition at discharge, indicating favourable short-term outcomes following treatment. A small proportion of patients required referral to higher centres for specialized care, while a few patients were left against medical advice or experienced in-hospital mortality (Table 5).

Table 4: Anatomical distribution of musculoskeletal injuries among patients presenting to the level II trauma centre.

Anatomical regions	Injury category	Number (N)	Percentage (%)
Upper limb injuries		900	54.3
	Shoulder region (clavicle, scapula, proximal humerus, shoulder dislocation)	78	4.7
	Arm (shaft/distal humerus, supracondylar fractures)	80	4.8
	Forearm (radius, ulna, both bone forearm fractures)	325	19.6
	Wrist and hand (carpal, metacarpal, phalanges, hand soft tissue injuries)	417	25.2
Lower limb injuries		724	43.7
	Hip and proximal femur	79	4.8
	Femoral shaft/distal femur	59	3.6
	Knee and patella	68	4.1
	Leg (tibia, fibula, both bones leg)	99	6
	Ankle and foot (malleoli, calcaneum, metatarsals, foot soft tissue injuries)	419	25.3
Axial skeleton	Pelvis and spine injuries	33	2

Values are presented as frequency (n) and percentage (%) of the total study population. Only the most frequently encountered fracture types are shown individually, while less common injuries are grouped as “other injuries” for clarity.

Table 5: Treatment modalities and clinical outcomes among musculoskeletal trauma patients presenting to the level II trauma centre.

Variables	Category	Number (N)	Percentage (%)
Treatment modality	Conservative management	1045	63.1
	Surgical management	612	36.9
Type of surgical intervention*	Open reduction and internal fixation	398	24
	External fixation	92	5.6
	Closed reduction / pinning	122	7.4
Outcome at discharge	Improved/stable	1542	93.1
	Referred for higher care	71	4.3
	Left against medical advice	32	1.9
	Mortality	12	0.7

Values are presented as frequency (n) and percentage (%) of the total study population. *Type of surgical intervention is expressed as a proportion of all surgically managed cases.

Table 6: Association between selected demographic and injury-related variables and occurrence of fractures among musculoskeletal trauma patients.

Variables	Category	Fracture N (%)	Non-fracture N (%)	Odds ratio (95% CI)	P value
Gender	Male	709 (66.0)	365 (34.0)	0.87 (0.69–1.08)	0.02
	Female	402 (69.0)	181 (31.0)	1.00 (reference)	
Mechanism of injury	Road traffic accident	300 (77.9)	85 (22.1)	1.82 (1.41–2.34)	<0.001
	Fall	780 (65.8)	405 (34.2)	1.00 (reference)	
Place of injury	Outside home	687 (66.8)	342 (33.2)	1.05 (0.87–1.27)	0.72
	Home / workplace	424 (67.5)	204 (32.5)	1.00 (reference)	
Economic status	Non-IRDP	890 (67.1)	436 (32.9)	1.01 (0.76–1.34)	0.19
	IRDP/BPL	217 (65.6)	114 (34.4)	1.00 (reference)	

Odds ratios (OR) with 95% confidence intervals (CI) were calculated to evaluate the strength of association between variables and fracture occurrence. Statistical significance was assessed using the Chi-square test, with p <0.05 considered statistically significant. The reference category for each variable was assigned an OR of 1.00.Values are presented as frequency (n) and percentage (%) of the total study population (n=1,657).IRDP: Integrated Rural Development Programme; BPL: Below Poverty Line.

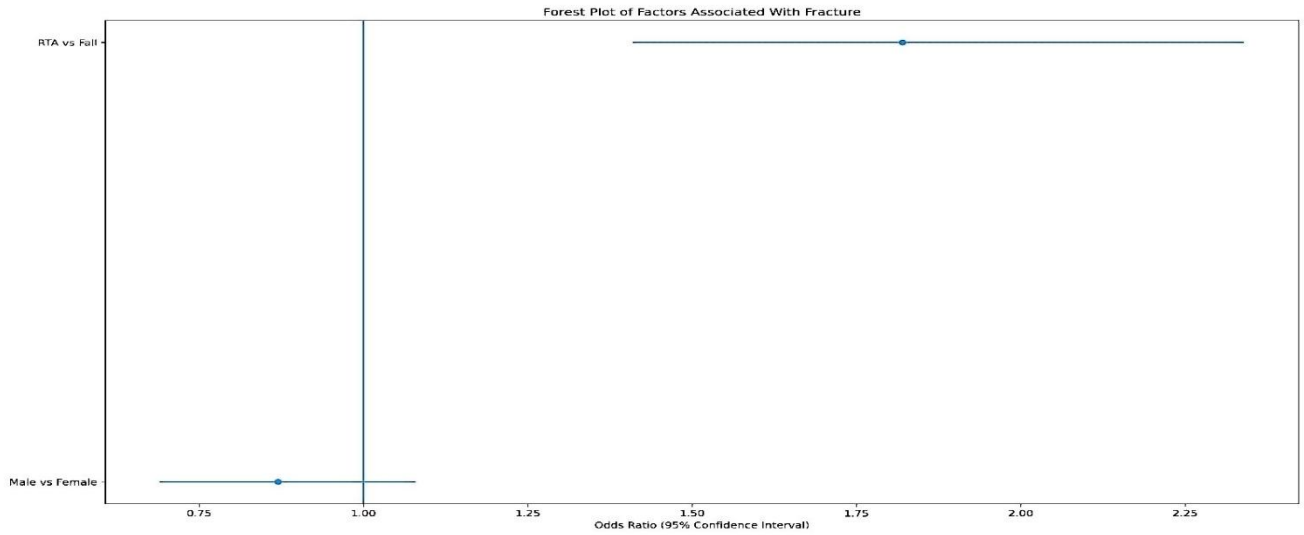

Figure 2: Forest plot showing odds ratios for fracture risk according to mechanism of injury.

Odds ratios with 95% confidence intervals are shown, comparing road traffic accidents with fall-related injuries (reference category). Values greater than 1 indicate a higher odd of fractures.

Analytical factors associated with fracture

An analytical assessment was performed to identify factors associated with fractures in patients with musculoskeletal trauma. Selected demographic and injury-related variables were evaluated using odds ratios with 95% confidence intervals, and statistical significance was assessed using the chi-square test. Road traffic accidents were significantly associated with fractures than fall-related injuries. Patients who sustained injuries due to road traffic accidents had approximately 1.82 times the odds of sustaining fractures than those injured due to falls (odds ratio (OR), 1.82; 95% confidence interval (CI), 1.41–2.34; p <0.001). Sex showed only a modest association with fracture occurrence, with men demonstrating slightly lower odds of fracture than women (OR 0.87; 95% CI 0.69–1.08). Similarly, variables such as place of injury and economic status did not show statistically significant associations with fracture occurrence. The analytical associations between the selected variables and fracture occurrence are summarized in Table 6, and the corresponding odds ratios with confidence intervals are illustrated in Figure 2 (forest plot).

DISCUSSION

This prospective observational study evaluated the epidemiological profile of patients with musculoskeletal trauma presenting to a Level II trauma centre serving a predominantly rural and hilly population in North India. The key findings of the study demonstrate that musculoskeletal trauma in this setting predominantly affects young and economically productive individuals,

with a clear male predominance. Fractures constituted the most common type of injury, and falls were identified as the leading mechanism of injury, followed by road traffic accidents. An analytical evaluation further demonstrated that road traffic accidents were associated with a higher odd of fractures compared to fall-related injuries.

In the present study, the majority of trauma patients belonged to the 14–44-year age group, representing the economically productive segment of the population. Similar observations have been reported in previous epidemiological studies of trauma. Kashid et al reported that trauma victims admitted to tertiary care trauma centres were predominantly young adults, highlighting the disproportionate burden of trauma among individuals in their most productive years.[10] The higher incidence of trauma in this age group may be attributed to increased mobility, occupational exposure, and participation in outdoor and high-risk activities. A clear male predominance was observed in the present study, with males accounting for nearly two-thirds of the cases. This finding is consistent with reports from other studies conducted in developing countries, where males are more frequently involved in high-risk activities and occupations. Studies from trauma centres in North India have reported a higher injury incidence among males due to greater occupational exposure and outdoor activities.[11] The higher incidence among males may also be explained by increased involvement in vehicular travel and physically demanding occupations.

Falls were identified as the most common mechanism of injury in the present study. Falls while walking and falls from heights were particularly common among older individuals. Similar findings have been reported in studies conducted in rural populations. Kalaiselvan et al reported that injuries in rural communities are frequently associated with falls related to environmental and occupational hazards.[12] Gulati et al also described skeletal injuries following falls from height as a significant contributor to trauma admissions.[13] Jagnoor et al further highlighted that fall-related injuries represent an important component of trauma burden in North India.[14] Environmental factors, such as uneven terrain, poorly maintained roads, and occupational hazards related to agricultural activities, may contribute to an increased risk of falls in rural and hilly regions. Road traffic accidents were the second most common cause of musculoskeletal trauma, and two-wheeler accidents accounted for a substantial proportion of cases. This observation is consistent with reports from several Indian studies. Gururaj highlighted that road traffic injuries represent a major public health problem in India, predominantly affecting young adults.[5] Rapid motorization, inadequate road safety infrastructure, and poor compliance with traffic regulations are important contributing factors to the increasing burden of road traffic injuries.

Fractures constituted the predominant type of musculoskeletal injury, accounting for approximately two-thirds of all injuries in the present study. Soft tissue injuries and dislocations were less common but still represented an important component of the trauma spectrum. Similar patterns have been described in other hospital-based trauma studies.[10] These findings highlight the substantial burden of skeletal injuries on trauma care services and emphasize the need for adequate orthopaedic trauma infrastructure in secondary and tertiary care centres. The anatomical distribution of injuries observed in the present study demonstrated that upper extremity fractures, particularly distal radius fractures, were frequently encountered. Lower extremity injuries, including fractures of the tibia and femur, were also common. These injury patterns are consistent with the mechanisms of trauma observed in the study population, particularly in falls and road traffic accidents. The analytical evaluation in the present study demonstrated that road traffic accidents were associated with significantly higher odds of fractures than fall-related injuries. High-energy mechanisms, such as vehicular collisions, are more likely to produce severe skeletal injuries than low-energy mechanisms, such as simple falls. This finding highlights the importance of implementing effective road safety measures, including stricter enforcement of traffic regulations, improved road infrastructure, and public awareness programs, to reduce the burden of trauma.

The findings of the present study emphasize the considerable burden of musculoskeletal trauma in rural healthcare settings. The predominance of injuries among young and economically productive individuals has important socioeconomic implications. Strengthening trauma care systems and implementing targeted injury prevention strategies, such as road safety interventions and fall prevention programs, may help reduce the incidence and severity of musculoskeletal injuries. Recent analyses of trauma systems in India have also emphasized the need for improved trauma infrastructure, injury surveillance systems, and coordinated trauma care networks to address the growing burden of injuries in the country.[18] The present study has several strengths. First, it was conducted as a prospective observational study, allowing for systematic and real-time data collection and minimizing recall bias. Second, the study included a large cohort of patients with musculoskeletal trauma over one year, providing a comprehensive overview of injury patterns in a rural trauma centre setting. Third, the study integrated demographic characteristics, mechanisms of injury, anatomical distribution, treatment modalities, and short-term outcomes, offering a holistic understanding of musculoskeletal trauma in this population. Finally, the inclusion of an analytical component examining factors associated with fractures adds further value by identifying potential risk factors that may inform preventive strategies.

The present study has certain limitations. First, it was conducted at a single tertiary care trauma centre; therefore, the findings may not fully represent the epidemiological profile of musculoskeletal trauma in the broader community. Injuries that did not present to the hospital or

were managed at peripheral healthcare facilities were not captured in the study. Second, the study primarily focused on the initial presentation and management of trauma patients, and long-term functional outcomes or rehabilitation data were not assessed. Despite these limitations, the study provides valuable prospective data on the epidemiology of musculoskeletal trauma in a rural trauma centre and highlights important areas for injury prevention and healthcare planning.

CONCLUSION

This prospective observational study provides important insights into the epidemiology of musculoskeletal trauma in a rural Level II trauma centre serving a predominantly hilly population in North India. The findings indicate that musculoskeletal trauma disproportionately affects young and economically productive individuals, with fractures representing the most common injury pattern. Falls and road traffic accidents were the principal mechanisms of injury, reflecting the combined influence of environmental conditions and increasing motorization in rural regions. This study underscores the need to strengthen trauma care services in rural settings and highlights the importance of integrating injury prevention strategies with regional health planning. Targeted interventions focusing on road safety, fall prevention, and improved trauma system preparedness may help reduce the burden of musculoskeletal injuries. Future multicentre studies incorporating long-term functional outcomes and injury surveillance systems are needed to better inform trauma prevention and management strategies in resource-limited regions.

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REFERENCES

1. Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. Geneva: World Health Organization. 2002. Available at: https://iris.who.int/handle/10665/42495?. Accessed on 20 February 2026.
2. Mock C, Cherian MN. The global burden of musculoskeletal injuries: challenges and solutions. Clin Orthop Relat Res. 2008;466(10):2306-16.
3. Murray CJL, Lopez AD. The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors. Boston: Harvard School of Public Health. 1996.
4. Peden M, McGee K, Sharma G. The injury chart book: a graphical overview of the global burden of injuries. Geneva: World Health Organization. 2002. Available at: https://apps.who.int/iris/handle/10665/42566?. Accessed on 20 February 2026.
5. Gururaj G. Road traffic injury prevention in India. Natl Med J India. 2006;19(1):1-3.
6. Chandran A, Hyder AA, Peek-Asa C. The global burden of unintentional injuries and an agenda for progress. Epidemiol Rev. 2010;32(1):110-20.
7. Cardona M, Joshi R, Ivers RQ, Iyengar S, Chow CK, Colman S, et al. The burden of fatal and non-fatal injury in rural India. Inj Prev. 2008;14(4):232-7.
8. Mock C, Lormand JD, Goosen J, Joshipura M, Peden M. Guidelines for essential trauma care. Geneva: World Health Organization. 2004. Available at: https://iris.who.int/handle/10665/42565?. Accessed on 20 February 2026.
9. Krug EG, Sharma GK, Lozano R. The global burden of injuries. Am J Public Health. 2000;90(4):523-6.
10. Kashid M, Rai SK, Nath SK, Gupta TP, Shaki O, Mahender P, et al. Epidemiology and outcome of trauma victims admitted in trauma centers of tertiary care hospitals - A multicentric study in India. Int J Crit Illn Inj Sci. 2020;10(1):9-15.
11. Singh R, Sachdeva MK, Koushal V. Injury pattern of road traffic accident cases attending trauma centre of tertiary care hospital of North India. J Family Med Prim Care. 2023;12(10):2434-9.
12. Kalaiselvan G, Dongre AR, Mahalakshmy T. Epidemiology of injury in rural Pondicherry, India. J Inj Violence Res. 2011;3(2):62-7.
13. Gulati D, Aggarwal AN, Kumar S, Agarwal A. Skeletal injuries following unintentional fall from height. Ulus Travma Acil Cerrahi Derg. 2012;18(2):141-6.
14. Jagnoor J, Keay L, Ganguli A, Suraweera W, Ivers RQ. Fall related injuries: a retrospective medical review study in North India. Injury. 2012;43(12):1996-2000.
15. Jagnoor J, Ponnaiah M, Varghese M, Ivers RQ, Gururaj G, Hyder AA. Potential for establishing an injury surveillance system in India: a review of data sources and reporting systems. BMC Public Health. 2020;20(1):1909.
16. James SL, Castle CD, Dingels ZV, Fox JT, Hamilton EB, Liu Z, et al. Global injury morbidity and mortality from 1990 to 2017: results from the Global Burden of Disease Study 2017. Inj Prev. 2020;26(1):i96-114.

17. WHO. Global status report on road safety 2023. Geneva: World Health Organization. 2023. Available at: https://www.who.int/publications/i/item/9789240086517?. Accessed on 20 February 2026.
18. Dany James J, Sharma SL, Agrawal D, Rao R, Bhoi S, Sinha TP, et al. Trauma in India: current status and the path forward. Trauma Surgery Acute Care Open. 2025;10:e001803.

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