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International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Patterns and Referral Burden of Injuries at a Secondary-Care Referral Hospital in Eastern Sri Lanka: A Retrospective Study

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DOI : https://doi.org/10.55248/gengpi.07.1026.3118

ABSTRACT :

Background: Injuries are a major cause of morbidity and health-service utilization worldwide and remain the leading cause of hospital admission in Sri Lanka. Objective: To describe the pattern, sex distribution, quarterly variation, and referral burden of injuries managed at Base Hospital Muthur during 2025. Methods: A retrospective descriptive study was conducted using aggregate data from four quarterly institutional injury returns covering January to December 2025. Quarterly totals, sex, injury category, transfers, and recorded deaths were extracted. Frequencies, proportions, male-to-female distribution, quarterly transfer proportions, and category distributions were calculated. Results: A total of 3,227 injury cases were recorded during 2025; 1,988 (61.6%) were male and 1,239 (38.4%) were female. Falls were the largest injury category (1,144; 35.5%), followed by struck/hit by person (330; 10.2%), animal bites (328; 10.2%), poisoning (304; 9.4%), transport injuries (300; 9.3%), stab/cut injuries (261; 8.1%), and struck/hit by object injuries (245; 7.6%). These seven categories accounted for 90.2% of the annual injury burden. The highest quarterly caseload was recorded in Q3 (886; 27.5%). Overall, 517 patients were transferred, representing 16.0% of recorded injury cases; the quarterly transfer proportion was highest in Q2 (24.9%). Two deaths were recorded in the quarterly returns. Conclusion: Injuries created a substantial service burden at this secondary-care referral hospital, with falls contributing more than one-third of recorded cases. Male predominance was evident overall, while poisoning showed a female predominance. The findings support locally targeted fall prevention, violence and cut-injury prevention, animal-bite prevention, poisoning prevention, and strengthening of referral pathways and trauma-care capacity.

Keywords: injuries; falls; referral; trauma; secondary care; Sri Lanka

1. Introduction

Injuries are a major global public-health problem. The World Health Organization (WHO) estimates that injuries and violence cause approximately 4.4 million deaths each year and account for nearly 8% of all deaths worldwide. In addition to mortality, tens of millions of people experience non-fatal injuries requiring emergency treatment, hospitalization, rehabilitation, or long-term care (World Health Organization, 2024).

In Sri Lanka, injuries are particularly important from a health-service perspective. The Ministry of Health reports that injuries remain the leading cause of hospital admissions. Approximately 1.3 million injury-related admissions were reported from government hospitals in 2024, an increase of 6.6% compared with 2023 (Ministry of Health Sri Lanka, 2026).

Previous Sri Lankan studies have demonstrated the value of hospital injury data for understanding local patterns. Analysis of injury data from the National Hospital of Sri Lanka for 2009-2012 found a marked male predominance and identified falls as the leading component of non-transport unintentional injuries (Jayatilleke et al., 2016). A population-based study in Galle District similarly identified falls, mechanical injuries, and road-traffic injuries among the leading causes of non-fatal injury (Navaratne et al., 2009).

National and tertiary-care findings, however, may not fully describe the service burden experienced by secondary-care hospitals that receive both direct presentations and referrals from peripheral institutions. Institution-level analysis can identify high-volume injury mechanisms and the demand for onward transfer, thereby supporting prevention planning, emergency preparedness, staffing, and referral-system improvement.

Base Hospital Muthur is a Type A Base Hospital in Trincomalee District, Eastern Province, Sri Lanka. It serves an estimated catchment population of approximately 150,000 and functions as an apex referral hospital for six surrounding divisional hospitals. This study aimed to describe the pattern, sex distribution, quarterly variation, and referral burden of injuries managed at Base Hospital Muthur during 2025.

2. Methods

2.1 Study design and setting

A retrospective descriptive study was conducted at Base Hospital Muthur using routinely collected aggregate institutional injury data for the period 1 January to 31 December 2025. The hospital is a Type A Base Hospital serving an estimated catchment population of approximately 150,000 and acting

as an apex referral institution for six surrounding divisional hospitals.

2.2 Data source and study population

The source documents were the four quarterly institutional returns of information on injuries for 2025. All injury cases represented in the quarterly returns were included; therefore, no sampling was performed. Data were extracted for quarter, sex, injury category, number transferred, and recorded deaths.

2.3 Variables and data management

Injury categories followed the categories in the national institutional return, including transport injuries, falls, struck/hit injuries, stab/cut injuries, firearm and blast injuries, animal-related injuries, venomous and non-venomous stings, poisoning, drowning/submersion, threats to breathing, exposure-related injuries, and other injuries. Quarterly control totals recorded on the source forms were used for overall caseload, sex, and transfer totals. For category-level analysis, categories that could be transcribed consistently across all four returns were analysed individually; remaining low-frequency categories were considered collectively when calculating the overall burden.

2.4 Statistical analysis

Data were summarized using frequencies, percentages, and ratios. The annual male and female proportions and quarterly transfer proportions were calculated. The distribution of sex across the seven leading injury categories plus the remaining categories was compared using a chi-square test. Statistical significance was defined as $p<0.05$. Because the data were aggregate institutional counts rather than population-based incident cases, no population incidence rate was calculated.

2.5 Ethical and administrative considerations

The analysis used routinely collected, aggregate institutional data and contained no patient names, registration numbers, contact details, or other individual identifiers. The work was undertaken for institutional service evaluation and research reporting; no individual-level patient data were accessed for this analysis.

3. Results

3.1 Overall injury burden and sex distribution

During 2025, 3,227 injury cases were recorded across the four quarterly returns. Of these, 1,988 (61.6%) were male and 1,239 (38.4%) were female, giving an overall male-to-female ratio of 1.60:1. The largest quarterly caseload occurred in Q3 (886; 27.5%), followed by Q4 (868; 26.9%), Q2 (772; 23.9%), and Q1 (701; 21.7%).

Table 1. Quarterly injury caseload, sex distribution, and transfers in 2025

Quarter	Male	Female	Total	% annual cases	Transferred	Transfer %
Q1	375	326	701	21.7	67	9.6
Q2	469	303	772	23.9	192	24.9
Q3	579	307	886	27.5	133	15.0
Q4	565	303	868	26.9	125	14.4
Total	1,988	1,239	3,227	100.0	517	16.0

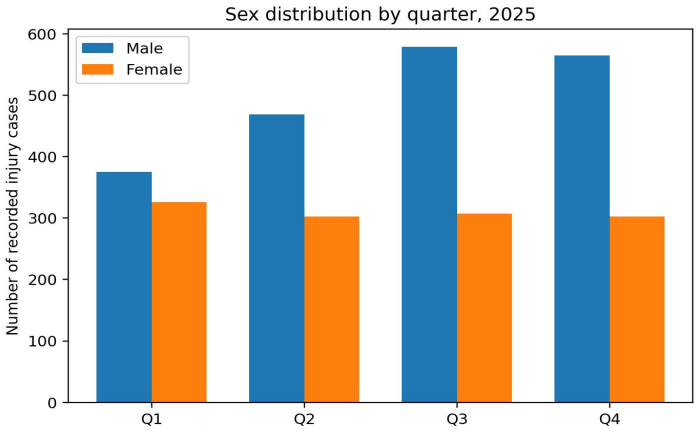


Figure 1. Sex distribution of recorded injury cases by quarter, 2025.

3.2 Leading injury categories

Falls were the dominant injury category, accounting for 1,144 cases (35.5% of all recorded injuries). The next most frequent categories were struck/hit by person, animal bite, poisoning, transport injuries, stab/cut injuries, and struck/hit by object. Together, these seven categories accounted for 2,912 cases (90.2% of the annual caseload).

Table 2. Leading injury categories by sex, 2025

Injury category	Male	Female	Total	% of annual cases
Falls	673	471	1,144	35.5
Struck/hit by person	186	144	330	10.2
Animal bite	219	109	328	10.2
Poisoning	127	177	304	9.4
Transport injuries	222	78	300	9.3
Stab or cut	189	72	261	8.1
Struck/hit by object	171	74	245	7.6
All remaining categories	201	114	315	9.8
Total	1,988	1,239	3,227	100.0

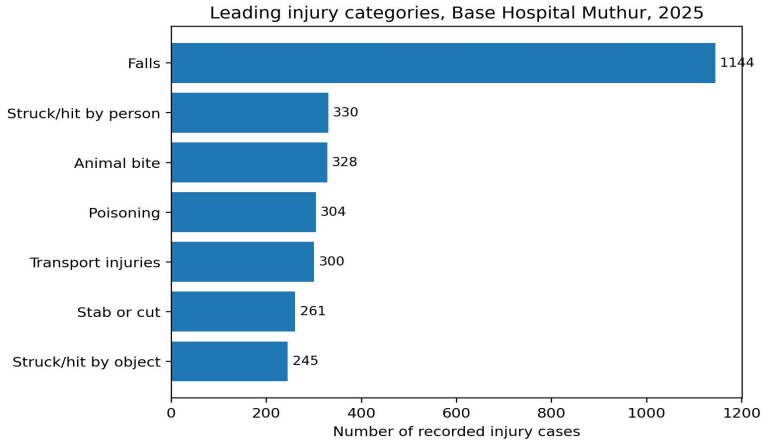


Figure 2. Leading injury categories recorded at Base Hospital Muthur in 2025.

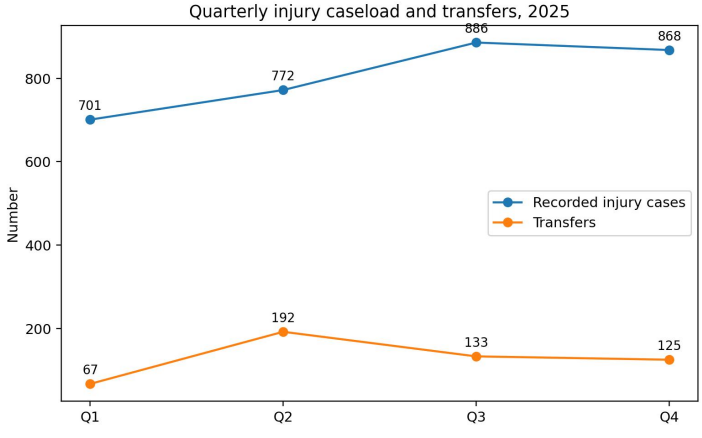
3.3 Sex pattern by injury category

Male predominance was evident in most leading injury categories. It was particularly marked for transport injuries (74.0% male), stab/cut injuries (72.4% male), struck/hit by object injuries (69.8% male), and animal bites (66.8% male). In contrast, poisoning showed a female predominance, with 177 of 304 cases (58.2%) occurring among females. Falls were more evenly distributed, although males still represented 58.8% of fall cases. The sex distribution differed significantly across the leading injury categories and the remaining categories (chi-square=101.8, df=7, $p<0.001$).

3.4 Referral burden and recorded mortality

A total of 517 patients were recorded as transferred during 2025, equivalent to 16.0% of the annual recorded injury caseload. The transfer burden varied substantially by quarter. Q2 recorded 192 transfers (24.9% of Q2 cases), compared with 133 (15.0%) in Q3, 125 (14.4%) in Q4, and 67 (9.6%) in Q1. Falls generated a particularly large absolute transfer burden, with 233 transfers recorded across the four quarters. Seventy-one transfers were recorded for transport injuries, 58 for struck/hit-by-person injuries, and 34 for struck/hit-by-object injuries. Two deaths were recorded in the quarterly returns during the year.

Figure 3. Quarterly injury caseload and number of transfers, 2025.



4. Discussion

This study demonstrates a substantial injury-related service burden at a secondary-care referral hospital in Eastern Sri Lanka. More than 3,200 injury cases were recorded during 2025, and almost two-thirds were male. Falls alone accounted for more than one-third of the annual burden, while interpersonal struck/hit injuries, animal bites, poisoning, transport injuries, stab/cut injuries, and struck/hit-by-object injuries together accounted for most of the remaining cases.

The predominance of falls is consistent with previous Sri Lankan evidence. Jayatilleke et al. (2016), analysing 80,718 injury records from the National Hospital of Sri Lanka, reported that falls accounted for 62.8% of non-transport unintentional injuries. A population-based study from Galle District also identified falls as the leading cause of non-fatal injury, followed by mechanical and road-traffic injuries (Navaratne et al., 2009). Although the denominators and case definitions differ from the present institutional study, the recurrence of falls as a major mechanism supports prioritising fall prevention in both community and hospital planning.

The overall male predominance in this study is also compatible with national and international patterns. WHO notes that males experience a higher injury mortality burden globally, and the National Hospital study in Sri Lanka reported that 73% of injured patients were male (World Health Organization, 2024; Jayatilleke et al., 2016). In Muthur, male predominance was especially apparent for transport, stab/cut, struck/hit-by-object, and animal-bite injuries. These patterns may reflect differences in occupational exposure, mobility, road use, and other behavioural or environmental exposures; however, the aggregate dataset did not contain occupation, age, location, or circumstances of injury, so causal explanations cannot be tested.

Poisoning differed from the other major categories because females formed the majority of recorded cases. This finding deserves further institution-level investigation using patient-level data that distinguish accidental, occupational, therapeutic, and intentional poisoning. The present aggregate return does not permit interpretation of intent or substance involved.

Referral burden was an important finding. Approximately one in six recorded injury cases was transferred, and the transfer proportion ranged from 9.6% in Q1 to 24.9% in Q2. Falls generated the largest absolute number of transfers. For a Type A Base Hospital serving as a referral centre for six divisional hospitals, this represents both a clinical and operational burden. Strengthening local trauma capability, imaging, surgical and anaesthetic support, stabilization protocols, ambulance coordination, and referral communication may reduce avoidable delays while ensuring timely transfer of patients requiring higher-level care.

The quarterly variation should be interpreted cautiously. Q3 had the highest overall caseload, while Q2 had the highest transfer proportion. Without patient-level information on date, place, severity, age, mechanism details, seasonal events, or referral origin, the reasons for these differences cannot be established. Future surveillance analysis should link institutional aggregate reporting with more detailed injury records to identify preventable temporal and geographic patterns.

5. Recommendations

1. Establish a focused fall-prevention programme, including community awareness and targeted assessment of common locations and circumstances of falls.
2. Strengthen injury-prevention activities addressing interpersonal violence, cut injuries, road safety, animal bites, and poisoning, based on locally identified high-volume categories.
3. Review the clinical pathways for high-transfer injury categories and identify services that could safely be strengthened at Base Hospital Muthur.
4. Conduct regular quarterly injury-data reviews involving emergency, surgical, medical, paediatric, nursing, and hospital-administration teams.
5. Improve the completeness and consistency of institutional injury recording and retain an electronic dataset to support trend analysis.
6. Undertake a follow-up patient-level study including age, residence, referral source, place and mechanism of injury, intent, severity, treatment, length of stay, and final outcome.

6. Limitations

This study used aggregate quarterly institutional returns rather than patient-level records. Consequently, age, residence, occupation, injury severity, intent, exact mechanism, referral origin, length of stay, treatment, and outcome could not be analysed. The study describes hospital service utilization and should not be interpreted as population incidence. Handwritten source returns may also be subject to transcription and classification error. Quarterly control totals were therefore used as the authoritative values for overall caseload, sex, and transfers, while category-level analysis focused on categories that could be consistently identified across all four returns. Referral counts indicate onward transfer but do not establish whether a transfer was avoidable or clinically necessary.

7. Conclusion

Injuries represented a considerable service burden at Base Hospital Muthur during 2025, with 3,227 recorded cases and 517 transfers. Falls were the dominant category, accounting for more than one-third of the annual burden, while interpersonal struck/hit injuries, animal bites, poisoning, transport injuries, stab/cut injuries, and struck/hit-by-object injuries accounted for most remaining cases. Males constituted the majority of cases overall, although poisoning was more frequent among females. The findings demonstrate the practical value of routine institutional injury data for identifying prevention priorities and planning trauma and referral services at secondary-care level.

Declarations

Conflict of interest: The author declares no conflict of interest.
Funding: No external funding was received for this study.
Data availability: The study was based on aggregate institutional injury returns. The underlying institutional data are not publicly available.
Acknowledgements: The author acknowledges the staff of Base Hospital Muthur involved in routine injury data recording and reporting.

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