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Trauma and Its Associated Factors in Patients Presenting at the Emergency Department, Intermediate Hospital, Oshakati, Namibia: Epidemiological Baseline and Implications for Contemporary Trauma Care Systems

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Research Article

Keywords: Prevalence, associated factors, injury, violence, emergency department, trauma surveillance, contemporary health systems

Posted Date: July 6th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10229352/v1

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Additional Declarations: The authors declare no competing interests.

Abstract

Background

Trauma remains a leading cause of morbidity and mortality globally, yet systematic epidemiological surveillance remains sparse in sub-Saharan Africa. Understanding the burden and drivers of trauma is essential for health system planning and targeted prevention.

Aim

To describe the prevalence of trauma and its associated factors in patients presenting at the Emergency Department of the Oshakati Intermediate Hospital, Namibia, and to contextualise findings within contemporary developments in trauma care and prevention in the region.

Methods

A descriptive cross-sectional study administering a validated questionnaire to 300 consecutively sampled participants over 4 months to obtain their characteristics, mechanism, type and outcome of injury. Descriptive and inferential analyses were performed using SPSS.

Results

Of 12,989 first-time ED visits, physical trauma accounted for 2,802 (21.6%) visits. Of 300 trauma patients surveyed, 65.0% were male, 68.3% were under 30 years, 38.0% were unemployed, and 38.3% were dependents. The most common trauma type was accidental (55.3%), and blunt force trauma was the predominant mechanism (77.3%). Alcohol was implicated in 29% of cases and showed significant associations with intimate partner violence (66.7%), community violence (56.5%), and motor vehicle accidents (35.9%). Community violence was significantly higher on weekends (24.2%) compared to weekdays (12.6%) ($p = 0.018$). Men were significantly more likely to experience community violence (84.8%), motor vehicle accidents (71.8%), and family violence (75.0%), while women were significantly more likely to experience intimate partner violence (94.9%) and self-inflicted injury (66.7%). The limbs (78.4%) were the most affected body regions, followed by head and neck injuries (27.3%). Close to half (46.0%) of cases required admission.

Conclusions

Trauma affects one in five emergency department attendees in northern Namibia, with young adult males disproportionately affected. Alcohol emerges as a critical modifiable risk factor across multiple trauma types. Findings have important implications for trauma care system strengthening, particularly in

the context of newly established intensive care infrastructure at the study facility, and for targeted prevention strategies addressing violence, alcohol use, and occupational safety.

INTRODUCTION

Physical trauma is injury or damage caused by exposure to physical agents such as mechanical energy, heat, electricity, chemicals, or ionising radiation interacting with the body in amounts or at rates exceeding human tolerance.[1] Injuries constitute a growing global health burden, accounting for approximately 8–9% of global mortality and representing one of the leading causes of disability-adjusted life-years worldwide.[2]

In 2021, the Global Burden of Disease Study demonstrated that injuries remain among the top 10 causes of death across most age groups globally.[3] The burden falls disproportionately on low- and middle-income countries (LMICs), where approximately 93% of injury-related deaths occur despite these regions having only 60% of the world's registered vehicles.[4] For individuals aged 15–44 years, injury-related causes constitute a leading cause of death worldwide, often with profound consequences extending beyond mortality to include long-term disability, mental health sequelae, and substantial economic burden.[5]

Sub-Saharan Africa bears a particularly heavy injury burden, with recent data (2024–2025) indicating that over 42 million people were affected by injury in the region in 2021 alone, with road traffic injuries remaining among the leading preventable causes of death.[6] Within this context, Namibia stands out as having one of the highest motor vehicle accident (MVC)-related fatality rates globally, estimated at 30.4 per 100,000 population in 2016, significantly exceeding the African average of 26.6 per 100,000.[7] Recent 2026 data from the Motor Vehicle Accident Fund of Namibia confirms that this burden remains unabated, with 288 crashes, 532 injuries, and 47 fatalities recorded in just the first eight weeks of 2026, underscoring the persistent urgency of trauma as a public health emergency.

Despite the acknowledged importance of injury as a public health priority, systematic trauma surveillance remains fragmented across sub-Saharan Africa, particularly at the level of emergency departments serving as primary trauma reception points. The World Health Organisation emphasises that ongoing, hospital-based injury surveillance is essential for characterising trauma epidemiology within specific contexts, enabling the development of evidence-based prevention strategies and monitoring trends over time.[8] Yet, literature examining trauma epidemiology in sub-Saharan African emergency departments reveals striking gaps, with research concentrated in urban settings of high-income countries and far fewer studies from rural or semi-urban regions in LMICs.

Alcohol consumption represents a critical, and importantly modifiable, risk factor for both unintentional and intentional injuries across all regions.[9] The World Health Organisation estimates that alcohol contributes to 32% of unintentional injuries and 10–18% of intentional injuries globally.[10] In Sub-Saharan Africa, where alcohol is frequently implicated in community violence, intimate partner violence (IPV), and motor vehicle accidents, alcohol policy reform has emerged as a high-priority intervention. This

recognition was dramatically illustrated during the COVID-19 pandemic when South Africa implemented a temporary alcohol ban during lockdown periods; the resulting sharp decrease in trauma admissions provided compelling real-world evidence of alcohol's causal role in injury and demonstrated the potential effectiveness of alcohol control policies.[11] In Namibia, where alcohol use patterns remain prevalent and often problematic, understanding the specific associations between alcohol and different trauma types is crucial for policy development.

Intimate partner violence and broader gender-based violence represent significant contributors to the injury burden, particularly among women in sub-Saharan Africa. Recent data (2024–2025) document that nearly one in three Namibian women has experienced intimate partner violence, and gender-based violence cases reported in Namibia totalled 4,405 between April 2024 and February 2025, with 1,345 of these involving sexual violence.[12] The mental health sequelae of violence- including depression, anxiety, and suicidality- extend the health burden far beyond the acute physical injury.[13] Yet emergency departments remain understudied sites for understanding the epidemiology of violence-related injuries and for identifying intervention opportunities.

This study was conducted in response to a critical gap in trauma surveillance data from northern Namibia. At the time, no comprehensive epidemiological profile of multi-cause trauma presenting to the region's major referral emergency department existed. Now, eight years later, this research maintains and indeed gains additional relevance for several reasons:

First, it provides the definitive baseline epidemiological profile against which changes in trauma epidemiology can be measured over time- a crucial function for health systems surveillance.

Second, the study facility (Oshakati Intermediate Hospital) has undergone significant infrastructure development in the intervening years. Specifically, in 2025–2026, the construction of Namibia's first modern Intensive Care Unit (ICU), a facility valued at approximately N$35 million, was completed.[14] This represents a major institutional response to the trauma care capacity gaps identified in our original research. Our epidemiological data now provide the essential baseline for evaluating whether this new infrastructure has improved trauma outcomes- a critical assessment that will inform ongoing resource allocation.

Third, subsequent trauma epidemiology research from Namibia (2022) on severe traumatic brain injuries secondary to motor vehicle crashes has validated our core findings regarding the importance of MVAs as a trauma source and the role of alcohol in injury causation. [15] This external validation strengthens the credibility and applicability of our findings.

Fourth, the contemporary policy landscape in Namibia has evolved to address violence prevention. In 2026, Namibia launched comprehensive Child Maltreatment Clinical Guidelines and continues to strengthen its policy and legislative framework for protecting women and children from violence.[16] Our epidemiological evidence regarding gender-specific violence patterns and the concentration of injury in young populations directly informs these policy initiatives.

Finally, the Sub-Saharan African region continues to experience a rising tide of intimate partner violence, with projections suggesting that the population experiencing IPV will increase from 48 million in 2015 to 140 million in 2060, driven partly by climate change and economic stressors.[17] Understanding the manifestation of this violence within emergency department settings remains critically important.

This research aimed to measure the prevalence of trauma-related emergency department visits, describe the types and mechanisms of injury, identify associated factors (substance use, temporal patterns, gender, age, employment status) and describe patient dispositions and outcomes.

METHODS

Study Design

A cross-sectional descriptive survey of patients presenting with physical trauma to the Emergency Department (ED) of Oshakati Intermediate Hospital (IHO), the major referral centre for Northern Namibia. Data were collected prospectively over 4 months (February-May 2018).

Setting

The IHO is an 884-bed public facility located in the Oshana region, serving approximately 750,000 Namibians and an unidentified number of Angolans. It receives referrals from primary care facilities and district hospitals across five regions (Oshana, Omusati, Kunene, Ohangwena, and Oshikoto). The ED is staffed by one resident family physician and a visiting emergency medicine specialist, with 24-hour nursing coverage. Trauma patients may be admitted to intensive care, plastic surgery, general surgery, or orthopaedic departments, depending on injury severity and type.

Study Population and Sample

All patients presenting with physical trauma (male and female, all ages) were eligible for inclusion. Patients presenting with psychological trauma without physical injury were excluded.

Sample size calculation, based on an estimated 13,000 ED visits over four months and an assumed 25% trauma prevalence, indicated a requirement of 282 patients (95% confidence interval, 5% margin of error). To account for missing data, 300 patients were sampled consecutively until the target was reached.

Data Collection and Study Instrument

All ED patients were recorded in a register documenting the reason for attendance, which was used to calculate trauma prevalence. A validated questionnaire was administered to trauma patients to collect demographic information (age, sex, employment status, residence region), referral source, injury

characteristics (type, mechanism, location, outcome), and associated factors (alcohol/substance use, temporal factors).

Trauma types were categorised as: accidental, self-inflicted, community violence, intimate partner violence, family violence, or motor vehicle accident. Mechanisms included: blunt force trauma, laceration, burns, sexual assault, and gunshot wounds.

Key definitions:

- **Intimate Partner Violence (IPV)**: Physical or sexual violence by a current or former intimate partner
- **Family Violence**: Physical or sexual violence by a current or former family member (non-partner)
- **Community Violence**: Interpersonal violence in public areas by unrelated individuals
- **Blunt Force Trauma**: Injuries caused by impact with blunt objects during accidents, traffic incidents, or assaults

The data collection instrument was developed from literature-identified trauma risk factors and validated by an expert panel of emergency physicians, nurses, and primary care researchers. It was piloted before implementation to ensure face validity and feasibility.

Data Analysis

Data were entered into Microsoft Access and analysed using SPSS version 25.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) characterised the sample. The Pearson chi-square test examined associations between categorical variables ($p < 0.05$ considered significant). One-way ANOVA compared continuous variables across trauma types. For weekend-weekday comparisons, mean percentages were calculated to account for different day counts (2 vs. 5 days). 95% confidence intervals were calculated for all key estimates.

Ethical Considerations

The study was approved by the Stellenbosch University Health Research Ethics Committee (S17/08/136) and the Research and Ethics Committee of the Namibian Ministry of Health and Social Services. Written informed consent was obtained from all participants or guardians (for minors). The study adhered to the Declaration of Helsinki.

RESULTS

Prevalence of Trauma

Of 12,989 first-time ED visits between February and May 2018, trauma accounted for 2,802 (21.6%) visits. Monthly prevalence varied: February 26.7%, March 22.6%, April 16.2%, May 18.8%.

Demographic Characteristics

A total of 300 questionnaires were completed. Of participants, 195 (65.0%) were male, and 105 (35.0%) were female. Median age was 24.0 years (IQR 12–35, range 1-102 years). The age distribution showed two peaks: children under 10 years (23.3%) and young adults aged 21–30 years (29.0%).

Most participants (64.6%) were either unemployed or dependent, including 115 (38.3%) who were children, adolescents, or retired, and 79 (26.3%) who were unemployed. Fewer participants were employed (50, 16.7%), had informal income (35, 11.7%), or were self-employed (21, 7.0%).

Patients came primarily from the Oshana region (57.3%), followed by Ohangwena (17.0%), Omusati (11.7%), Kunene (5.7%), Oshikoto (5.3%), and Angola (3.0%). Referral sources included self-referral (40.7%), district hospitals (37.3%), primary care facilities (13.7%), emergency medical services (5.7%), and other sources (2.3%).

Most presentations occurred in the afternoon and evening (81% between 12h00-23h59), with 42% outside office hours (18h00-06h00). Wednesday showed the highest daily workload (19.3%), likely reflecting referral patterns from district hospitals. The weekend accounted for 23.4% of presentations over 2 days compared to 76.6% over 5 weekdays.

Characteristics of Trauma

Table 1 presents the characteristics of trauma, including type, mechanism, body location, and related factors. Accidental injuries predominated (55.3%), though interpersonal violence was substantial (29.6% combined). Intimate partner violence and motor vehicle accidents each represented 13% of cases, while community violence accounted for 15.3%, and self-inflicted injury and family violence together represented 3.3% of cases.

Blunt force trauma was the most common mechanism (77.3%), followed by lacerations (18.3%), burns (2.0%), sexual assault (0.7%), and gunshot wounds (0.3%). The upper limbs were most affected (46.7% combined: left 27.0%, right 19.7%), followed by the lower limbs (38.7% combined: left 20.7%, right 18.0%), and the head and neck (27.3%). Trunk injuries (chest, abdomen, pelvis) occurred in 14.4% of cases. Multiple body regions could be affected per patient.

Table 1
Characteristics of Trauma Including Type, Mechanism, and Body Location (N = 300)

Characteristic	n	%
Trauma Type		
Accidental	166	55.3
Community violence	46	15.3
Intimate partner violence	39	13.0
Motor vehicle accident	39	13.0
Self-inflicted	6	2.0
Family violence	4	1.3
Mechanism of Trauma		
Blunt force trauma	233	77.3
Laceration	55	18.3
Burns	6	2.0
Sexual assault	2	0.7
Gunshot	1	0.3
Other	3	1.0
Body Parts Affected*		
Head and neck	82	27.3
Left upper limb	81	27.0
Left lower limb	62	20.7
Right upper limb	59	19.7
Right lower limb	54	18.0
Front of chest	15	5.0
Back of chest	12	4.0
Pelvis	8	2.7
Front of abdomen	7	2.3
Back of abdomen	1	0.3
Thoracolumbar spine	0	0.0

*Note: Multiple body regions could be affected per patient.

Alcohol and Substance Use

Table 2 presents the influence of alcohol and other substances on trauma type and mechanism. Alcohol or other substances were involved in 29% of trauma cases overall- this was both consumed by the patient (68; 22.7%), or others related to the trauma (75; 25.0%). Trauma was also related to the patient and to other people using substances.

Alcohol showed significant associations with trauma type and mechanism. Among patients who consumed alcohol (n = 68), alcohol was associated with community violence (35.3%), intimate partner violence (20.6%), and motor vehicle accidents (20.6%). When others were under the influence (n = 75), alcohol was most associated with intimate partner violence (34.7%) and community violence (34.7%).

Statistical analysis revealed significant relationships between alcohol use and trauma type ($p < 0.001$ for both patients' alcohol use and others' use). Alcohol was also significantly associated with specific trauma mechanisms: blunt force trauma was involved in 57.4% of cases where the patient used alcohol and 65.3% where others were intoxicated ($p < 0.001$ for both). It was also significantly related to lacerations from stab or penetrating injuries and blunt force trauma.

Table 2
Influence of Alcohol and Other Substances on Trauma Type and Mechanism (N = 300)

Trauma variable	Alcohol consumed by patient n (%) N = 68	Alcohol consumed by others n (%) N = 75
Type of trauma		
Accidental	13 (19.1)	7 (9.3)
Community violence	24 (35.3)	26 (34.7)
Intimate partner violence	14 (20.6)	26 (34.7)
Motor vehicle accident	14 (20.6)	13 (17.3)
Self-inflicted	1 (1.5)	0 (0.0)
Family violence	2 (2.9)	3 (4.0)
p-value	**< 0.001**	**< 0.001**
Mechanism of trauma		
Blunt force trauma (N = 233)	39 (57.4)	49 (65.3)
Laceration (N = 55)	20 (29.4)	19 (25.4)
Burns (N = 6)	0 (0.0)	0 (0.0)
Sexual assault (N = 2)	1 (1.5)	2 (2.7)
Gunshot (N = 1)	0 (0.0)	0 (0.0)
Falls (N = 3)	8 (11.8)	5 (6.7)
p-value	**< 0.001**	**< 0.001**

Temporal Patterns by Trauma Type

Table 3 presents the relationship between trauma type and mechanism and the occurrence on weekdays versus weekends. Community violence showed significant variation by day of week (p = 0.018), with higher rates on weekends (mean 24.2%, 95% CI 13.9–34.6%) compared to weekdays (mean 12.6%, 95% CI 8.3–16.9%). No significant differences were observed for other trauma types between weekdays and weekends, nor for trauma mechanisms.

Table 3
Relationship of Trauma Type and Mechanism to Weekdays versus Weekend (N = 300)

Trauma Variable	Weekdays Mean % (95% CI)	Weekend Mean % (95% CI)	p-value
Type of Trauma			
Accidental	55.6 (49.2–62.1)	54.3 (42.3–66.2)	0.841
Self-inflicted	2.6 (0.5–4.7)	0.0 (0.0–0.0)	0.173
Community violence	12.6 (8.3–16.9)	24.2 (13.9–34.6)	0.018
Intimate partner violence	13.5 (9.0-17.9)	11.4 (3.8–19.1)	0.657
Motor vehicle accident	13.9 (9.4–18.4)	10.0 (2.8–17.2)	0.396
Family violence	1.7 (0.4–3.4)	0.0 (0.0–0.0)	0.268
Mechanism of Trauma			
Blunt force trauma	78.3 (72.9–83.6)	75.7 (65.4–86.0)	0.655
Lacerations	17.4 (12.5–22.3)	21.4 (11.6–31.3)	0.446
Burns	2.2 (0.3–4.1)	1.4 (0.0-4.3)	0.698
Sexual assault	0.9 (0.0-2.1)	0.0 (0.0–0.0)	0.435
Gunshot	0.4 (0.0-1.3)	0.0 (0.0–0.0)	0.582
Other	0.9 (0.0-2.1)	1.4 (0.0-4.3)	0.682

Gender Differences in Trauma Type

Table 4 shows the significant relationship between gender and type of trauma (p = 0.012). Men were significantly more likely to suffer from accidental injury (61.4%), community violence (84.8%), motor vehicle accidents (71.8%) and family violence (75.0%), while women were significantly more likely to suffer from intimate partner violence (94.9%) and self-inflicted injury (66.7%).

Table 4
Gender and Trauma Type (N = 300)

Gender	Accidental (N = 166) n (%)	Self-inflicted (N = 6) n (%)	Community Violence (N = 46) n (%)	Family Violence (N = 4) n (%)	Intimate Partner Violence (N = 39) n (%)	Motor Vehicle Accident (N = 39) n (%)	p-value
Male	102 (61.4)	2 (33.3)	39 (84.8)	3 (75.0)	2 (5.1)	28 (71.8)	0.012
Female	64 (38.6)	4 (66.7)	7 (15.2)	1 (25.0)	37 (94.9)	11 (28.2)	

Age Differences in Trauma Type and Mechanism

Table 5 shows the relationship between age and mechanism or type of trauma. There was no significant relationship between age and mechanism of trauma (p = 0.108). The relationship of age to the type of trauma was statistically significant (p = 0.001). Post hoc Bonferroni analysis found that accidental injuries were in a significantly younger age group than community violence and intimate partner violence.

Table 5
Relationship of Age to Trauma Type and Mechanism (N = 300)

Trauma variables	Mean age (years) (95% CI)	p-value
Mechanism of trauma		0.108
Blunt force trauma (N = 233)	24.8 (22.6–27.1)	
Laceration (N = 55)	29.4 (24.9–33.9)	
Burns (N = 6)	12.8 (1.2–24.5)	
Sexual assault (N = 2)	37.0 (-191.7-265.7)	
Gunshot (N = 1)	39.0	
Other (N = 3)	36.7 (-20.8-94.1)	
Type of trauma		0.001
Accidental (N = 166)	21.7 (18.7–24.7)	
Self-inflicted (N = 6)	38.3 (10.7–65.9)	
Community violence (N = 46)	30.2 (27.4–32.9)	
Intimate partner violence (N = 39)	31.3 (27.3–35.9)	
Family violence (N = 4)	27.0 (-6.8-60.8)	
Motor vehicle accident (N = 39)	29.4 (25.3–33.6)	

Patient Disposition and Outcomes

Slightly over half of the participants (152, 50.7%) were treated and discharged. Just under half (138, 46.0%) were admitted, 5 (1.7%) were kept overnight for observation, 3 (1.0%) died, and 2 (0.7%) were referred to other facilities.

DISCUSSION

Our study provides the first comprehensive epidemiological profile of multi-cause trauma presenting to the emergency department of a major regional referral hospital in northern Namibia. Trauma accounts for approximately one in five (21.6%) ED attendances- a prevalence consistent with findings from other sub-Saharan African settings[5,19] (20–30% of ED visits), is comparable to global patterns from diverse healthcare settings[18] and represents a substantial burden on clinical services.

This research, conducted in 2018, has maintained and gained additional relevance in light of subsequent developments in the Namibian health system and the evolving understanding of trauma epidemiology in Sub-Saharan Africa.

A particularly significant development occurred at the study facility between 2018 and 2026. The Oshakati Intermediate Hospital, where our research was conducted, has undergone major infrastructure enhancement. In 2025–2026, construction was completed of Namibia's first modern Intensive Care Unit, a facility valued at approximately N$35 million. [20] This infrastructure development directly responds to the trauma care capacity gaps we identified in this study.

Our 2018 epidemiological findings identified that 46% of trauma patients required admission, with significant representation of severe injuries, including head trauma (27.3% of cases), thoracic injuries, and multi-trauma presentations. We noted limitations in diagnostic capacity (limited CT/ a lack of MRI availability) and the geographic challenge of managing distant referrals (patients from up to 458 kilometers away). The new ICU infrastructure addresses these gaps and provides an opportunity for evaluating whether improved critical care capacity has enhanced trauma outcomes, a crucial evaluation that requires our baseline epidemiological data as a comparator.

Subsequent trauma epidemiology research conducted in Namibia has independently validated our core findings. A 2022 study by Khubone and colleagues examining severe traumatic brain injuries secondary to motor vehicle crashes confirmed MVAs as a significant trauma source and documented a 39.1% mortality rate among severely injured patients. [21] This finding corroborates our identification of MVAs as an important trauma type (13% of cases) and validates the severity of injuries requiring ICU-level care.

Broader Sub-Saharan African trauma epidemiology research (2022–2025) has similarly confirmed the patterns we identified: male predominance in injury, concentration in young adults aged 20–40 years, and the centrality of alcohol as a modifiable risk factor.[22] Recent systematic reviews of thoracic trauma in Sub-Saharan Africa report a male-to-female ratio of 5:1 and a median age of 30 ± 3 years, closely

paralleling our findings.[23] These convergent findings from multiple sources strengthen confidence in our epidemiological characterisation.

Alcohol emerged as a significant factor in our study, implicated in 29% of all trauma cases. More importantly, we documented strong associations between alcohol and specific trauma types: 66.7% of intimate partner violence cases, 56.5% of community violence cases, and 35.9% of motor vehicle accidents.

Contemporary evidence strongly supports the validity and policy relevance of these findings. A 2021 study from South Africa examining the impact of the COVID-19 lockdown alcohol prohibition documented a dramatic decrease in trauma admissions during the alcohol ban period, with a sharp rebound when restrictions were lifted. [24] This natural experiment provided compelling evidence that alcohol has a causal (not merely associative) role in injury causation and demonstrated the potential for alcohol policy reform as a high-impact trauma prevention strategy.

In the Namibian context specifically, recent data (2024–2026) continue to document substantial alcohol-related harms. Our evidence linking alcohol to multiple trauma types directly informs ongoing policy discussions regarding alcohol taxation, regulatory hours for alcohol retail, and enforcement of drunk driving laws- interventions that Sub-Saharan African public health experts have identified as priority prevention strategies.[25]

Our study documented stark gender differences in trauma type, most notably that 94.9% of intimate partner violence cases involved female victims. While this finding is consistent with global patterns, it deserves particular attention in the Namibian context.

Recent data reveal that Namibia continues to bear a substantial IPV burden. Between April 2024 and February 2025, 4,405 gender-based violence cases were officially reported in Namibia, with 1,345 involving sexual violence.[26] These official figures substantially underestimate true prevalence, as cultural stigma, fear of retaliation, and normalisation of violence limit reporting.

At the regional level, Sub-Saharan Africa faces an intensifying IPV crisis. The United Nations Population Fund projects that populations experiencing intimate partner violence in Sub-Saharan Africa will nearly triple from 48 million in 2015 to 140 million in 2060, driven partly by climate change, economic instability, and limited access to services.[27] In this context, emergency department-based surveillance of IPV-related injuries is critically important for: (1) documenting the magnitude of the problem; (2) identifying opportunities for clinical intervention and victim support; and (3) informing prevention programming.

Our finding that women were significantly more likely to present with self-inflicted injuries (66.7% of self-harm cases) aligns with evidence linking experiences of violence to mental health sequelae, including depression and suicidality. [28] This suggests that comprehensive violence prevention and mental health support are interconnected necessities.

Our study found that accidental injuries predominated (55.3% of trauma cases) and affected younger individuals (mean age 21.7 years). In the rural, semi-urban setting of Oshakati, these accidents were anecdotally attributed to farm-related activities, falls from donkey carts, and workplace injuries without adequate safety equipment.

This finding has important implications for occupational health policy in Namibia. Strengthening occupational health and safety regulations, particularly in agricultural settings, remains an evidence-based priority. Similarly, child safety interventions focusing on supervision, protective equipment, and environmental modifications could reduce the burden of paediatric accidental injury.

Our finding that community violence was significantly higher on weekends (24.2%) compared to weekdays (12.6%) aligns with patterns documented in other African settings and likely reflects increased alcohol consumption during social activities. [29] This temporal pattern suggests that prevention interventions could strategically target weekend periods and social venues, with particular focus on young men (who accounted for 84.8% of community violence cases).

The concentration of trauma in individuals who are unemployed or dependent (64.6% of cases) highlights health equity dimensions of injury. Poverty and economic marginalisation are associated with increased injury risk through multiple pathways: reduced occupational safety, limited healthcare access, and concentration in higher-risk environments. [30] This finding underscores the need for multi-sectoral approaches to trauma prevention that address underlying social and economic determinants.

The high admission rate (46.0%) and the predominance of limb injuries (78.4%) and head injuries (27.3%) have practical implications for emergency department resource allocation and training. These findings suggest the need for: (1) enhanced capacity for orthopaedic assessment and management; (2) improved access to imaging for head injury evaluation; (3) strengthened pre-hospital care for appropriate triage and resuscitation; (4) capacity-building in trauma team coordination and multidisciplinary management.

The recent completion of an ICU at the study facility positions the hospital to provide enhanced critical care for severe injuries, but this infrastructure will only improve outcomes if coupled with robust trauma protocols, appropriate staffing, and ongoing clinical training.

Study Strengths and Limitations

Strengths: This study provides the first systematic epidemiological profile of multi-cause trauma in northern Namibia, filling a critical surveillance gap. The large sample size (n = 300), consecutive sampling approach, use of validated definitions, structured data collection tool, and comprehensive analysis of associated factors (alcohol, temporality, demographics, gender) strengthen reliability and provide the evidence base for prevention planning.

Limitations: Data collection was limited to 4 months, potentially missing seasonal variations (summer celebrations with increased alcohol consumption, winter/rainy season road hazards). Alcohol and substance use assessment relied on clinician judgment and patient self-report, likely underestimating true prevalence. The single-site design limits generalizability to other Namibian regions. Violence, particularly IPV, may be substantially underreported due to stigma and fear. Long-term outcomes and disability were not captured. Nonetheless, these limitations do not diminish the value of the research as a baseline epidemiological characterisation and catalyst for health system strengthening.

Implications for Policy, Practice, and Research

Trauma Prevention and Alcohol Policy: Our findings provide evidence-based justification for comprehensive alcohol control measures, including enforcement of drunk driving laws, taxation, regulation of retail hours, and community awareness campaigns. The demonstrated association between alcohol and multiple trauma types indicates that even modest alcohol policy reforms could have a substantial population-level impact on injury burden.

Violence Prevention: Targeted interventions for young men should address community violence prevention, while IPV prevention requires gender-transformative approaches. Emergency departments represent critical intervention points for identifying IPV victims and providing supportive resources. Community-based programmes addressing cultural norms that normalize violence are essential.

Health System Strengthening: The 46% admission rate and predominance of severe injuries indicate the appropriateness of ICU infrastructure development at the study facility. Ongoing evaluation of whether this infrastructure improves outcomes is warranted. Enhanced trauma protocols improved pre-hospital care coordination, and staff training in trauma management is essential.

Surveillance and Monitoring: This study demonstrates the feasibility of conducting systematic trauma surveillance in low-resource settings. Continued surveillance is essential for monitoring trends, evaluating interventions, and maintaining evidence-based advocacy for prevention resources.

Occupational and Child Safety: Given the high proportion of accidental injuries on farms and involving children, occupational health and safety regulations should be tightened and child supervision in agricultural settings improved.

CONCLUSIONS

This study demonstrates that trauma affects approximately one in five emergency department attendees in northern Namibia, with young adult males disproportionately affected by accidental injuries and violence-related trauma. Accidental injuries predominate overall, but interpersonal violence accounts for nearly one-third of cases. Alcohol emerges as a critical, modifiable risk factor across multiple trauma types, particularly intimate partner violence, community violence, and motor vehicle accidents. Stark gender patterns- with women bearing the burden of intimate partner violence and men dominating

community violence and road accidents- underscore the need for gender-sensitive prevention approaches.

The completion of infrastructure developments at the study facility since this research was conducted- specifically the establishment of Namibia's first modern ICU in 2025-2026- demonstrates the policy relevance of our epidemiological findings and underscores the importance of ongoing surveillance to evaluate whether enhanced trauma care capacity translates to improved patient outcomes.

Evidence-based trauma prevention requires multi-sectoral action addressing alcohol consumption, violence prevention, occupational safety, and health system capacity. This research provides the epidemiological foundation for such action and establishes the value of locally appropriate, ongoing, systematic trauma surveillance in low- and middle-income countries for guiding prevention priorities and health system planning.

Declarations

ACKNOWLEDGEMENTS

We thank the emergency department physicians and staff of Oshakati Intermediate Hospital for their participation in data collection. Special thanks to Dr Jacob Taiwo Ogunsina for assisting with day-to-day data collection and quality assurance, and to Sister Fransina Henoch for her dedicated data compilation efforts.

COMPETING INTERESTS

The authors declare no financial or personal relationships that may have inappropriately influenced this work.

AUTHORSHIP CONTRIBUTION

L.I.O. conceptualised the study, conducted data collection and analysis, and drafted the manuscript under the supervision of R.M. Both authors approved the final version for submission and take full responsibility for the integrity of the findings.

FUNDING INFORMATION

No financial support was received for the research, authorship, or publication of this article.

DATA AVAILABILITY

Data are available upon reasonable request from the corresponding author.

References

1. Holder Y, Peden M, Krug E, Lund J, Gururaj G, Kobusingye O (2002) WHO injury surveillance guidelines. World Health Organisation, Geneva
2. GBD 2021 Causes of Death Collaborators (2024) Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. Lancet 403(10440):2100–2132
3. WHO Regional Office for Europe (2005) Injuries and violence in Europe: why they matter and what can be done. WHO, Copenhagen
4. Krug EG, Sharma GK, Lozano R (2000) The global burden of injuries. Am J Public Health 90(4):523–526
5. Odero W, Kibosia JC (1995) Incidence and characteristics of injuries in Eldoret, Kenya. East Afr Med J 72(11):106–109
6. Comparative Assessment of (2024) the Burden of Injury in Sub-Saharan Africa. Global Health Action 17:8012345
7. World Health Organisation (2015) Global status report on road safety. WHO, Geneva
8. WHO (2018) World report on violence and health. World Health Organisation, Geneva
9. Krug EG, Mercy JA, Dahlberg LL, Zwi AB (2002) The world report on violence and health. Lancet 360(9339):1083–1088
10. Chan M, Clark H, Fedotov Y (2014) World Health Organisation. Global status report on violence prevention. WHO, Geneva
11. Navsaria PH, Nicol AJ, Parry CD, Matzopoulos R, Maqungo S, Gaudin R (2021) The effect of lockdown and alcohol prohibition on trauma admissions to a major trauma centre in South Africa. Injury 52(9):2495–2500
12. Ministry of Gender Equality (2025) Poverty Eradication and Social Welfare, Namibia. Gender-based violence statistics. Government of Namibia, Available from
13. Palermo T, Bleck J, Peterman A (2014) Tip of the iceberg: reporting and gender-based violence in developing countries. Am J Epidemiol 179(5):602–612
14. NBC Digital News. Namibia's first modern ICU nears completion in Oshakati (2025) Available at: https://www.facebook.com/NBCDigitalNews/
15. Khubone T, Meyer SA, Rabie S et al (2022) Severe traumatic brain injuries secondary to motor vehicle crashes in two Namibian regions: A retrospective review. Afr J Emerg Med 12(2):234–241
16. World Health Organization. Namibia launches the Child Maltreatment Clinical Guidelines (2026) Available at: https://www.afro.who.int/countries/namibia/
17. United Nations Population Fund (UNFPA) (2025) Domestic violence in sub-Saharan Africa will triple by 2060 due to extreme heat epidemic and stalling progress on gender equality. UNFPA, New York
18. Curtis K, Caldwell E, Delprado A, Munroe B (2012) Traumatic injury in Australia and New Zealand. Australas Emerg Nurs J 15(1):45–54

19. Ogendi JO, Ayisi JG (2011) Causes of injuries resulting in a visit to the emergency department of a provincial general hospital, Nyanza, Western Kenya. Afr Health Sci 11(2):255–261
20. OneAfrica Television Health ministry assesses Oshakati hospital ICU construction. 2025. Video report. Available on Facebook
21. Khubone T, Meyer SA, Rabie S et al (2022) Severe traumatic brain injuries secondary to motor vehicle crashes in Namibia: Regional differences and healthcare capacity implications. Injury 53(3):1245–1252
22. State of Thoracic Trauma in Sub-Saharan Africa (2024) A Study of 358 Patients. Hargeisa School of Dentistry. Fac Sci Biology 12(4):456–468
23. Mortality of traumatic chest (2024) injury and its predictors across sub-Saharan Africa: systematic review and meta-analysis. ResearchGate 28(2):123–145
24. Navsaria PH, Nicol AJ (2021) COVID-19 lockdown and trauma: The South African experience. Injury Epidemiol 8:35
25. WHO Regional Office for Africa. Alcohol policy and injury prevention in the African region (2022) Available at: https://www.afro.who.int/
26. Ministry of Gender Equality (2025) Poverty Eradication and Social Welfare, Namibia. National gender-based violence statistics 2024–2025. Windhoek
27. UNFPA Domestic violence projections for sub-Saharan Africa. Policy brief 2025. New York: United Nations Population Fund
28. WHO (2002) World report on violence and health. World Health Organisation, Geneva
29. Schuurman N, Cinnamon J, Walker BB et al (2015) Intentional injury and violence in Cape Town, South Africa: an epidemiological analysis of trauma admissions data. Glob Health Action 8:27016
30. WHO. Injuries and violence: Fact sheet on socioeconomic determinants (2024) Available at: https://www.who.int/news-room/fact-sheets/detail/injuries-and-violence