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Pediatric Trauma in Cameroon: Prevalence, Clinical Patterns, and Outcomes in Three Referral Hospitals

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Abstract

Background: Trauma is a leading cause of pediatric morbidity and mortality worldwide, disproportionately affecting low- and middle-income countries (LMICs). In Cameroon, pediatric trauma has not been adequately described. **Objective:** To assess the prevalence, clinical patterns, and outcomes of pediatric trauma in three referral hospitals in Cameroon. **Methods:** A retrospective cross-sectional review was conducted between January 2019 and December 2021 at Douala General Hospital, Laquintinie Hospital Douala, and Buea Regional Hospital. Children aged 0 - 18 years admitted with trauma-related conditions were included. Data on demographics, mechanisms of injury, clinical presentations, and outcomes were analyzed using SPSS v25. **Results:** Of 10,539 pediatric admissions, 537 (39.8% of surgical cases; 5.1% overall) were trauma-related. Boys predominated (67.5%), with a male-to-female ratio of 2:1. The most affected age group was 6 - 12 years (29.5%). Road traffic accidents (42.4%) and falls (31.2%) were the main causes. The most frequent clinical presentations were limb pain/swelling (49.7%) and wounds (28.5%). The main lesions were fractures (46.1%) and head injuries (34.5%). Complications occurred in 12.6% of patients, and overall mortality was 5.2%, reaching 54.5% among severe head trauma. **Conclusion:** Pediatric trauma constitutes a major health burden in Cameroon, dominated by road traffic accidents and falls. Mortality remains high, especially for severe head injuries. Strengthening preventive strategies, referral systems, and trauma care is essential to reduce mortality.

Keywords

Pediatric Trauma, Clinical Patterns, Outcomes, Cameroon

1. Introduction

Trauma is a major cause of morbidity and mortality among children worldwide and accounts for up to 40% of pediatric surgical admissions in low- and middle-income countries (LMICs) [1]. The World Health Organization estimates that 95% of all injury-related pediatric deaths occur in LMICs [2]. In sub-Saharan Africa, road traffic accidents (RTAs), falls, burns, and domestic injuries are consistently reported as the leading mechanisms of pediatric trauma [3] [4].

In LMICs, children face heightened vulnerability due to factors such as poor road infrastructure, weak enforcement of safety regulations, and inadequate referral systems. Pediatric trauma mortality in Africa is also elevated because of the absence of prehospital care, limited pediatric trauma expertise, and delayed access to definitive management [5].

Despite children constituting more than half of Cameroon's population [6], trauma-related data remain scarce. Existing studies originate mainly from single hospitals and often focus on specific injuries [7]. Multicenter data are necessary to inform national prevention and management policies.

This study aimed to determine the prevalence, clinical presentations, and outcomes of pediatric trauma in three major referral hospitals in Cameroon.

2. Methods

We performed a retrospective cross-sectional study from January 2019 to December 2021 in three tertiary hospitals: Douala General Hospital (DGH), Laquintinie Hospital Douala (LHD), and Buea Regional Hospital (BRH). These centers provide pediatric surgical care for the Littoral and South-West regions.

All children aged 0 - 18 years admitted for trauma were included. Ophthalmologic and ENT trauma cases were excluded.

Hospital records were reviewed to extract sociodemographic characteristics, mechanism of injury, clinical presentation, complications, and outcomes. Severe head trauma was defined as GCS ≤ 8. Hemodynamic instability required hypotension/tachycardia for age. Respiratory failure was defined by SpO_2 < 90% or need for oxygen support.

Data were entered into SPSS v25. Descriptive statistics were used. Mortality was stratified by injury type. Categorical variables were analyzed using the Chi-square test and p-value ≤0.05 was considered significant.

Approval was obtained from the University of Buea Faculty of Health Sciences IRB. Hospital authorities granted administrative clearance. Confidentiality was maintained.

3. Results

Of the 10,539 pediatric admissions recorded during the study period, 537 were trauma related, representing 39.8% of pediatric surgical cases and 5.1% of overall admissions (Table 1). Boys constituted 67.5% of cases (male-to-female ratio: 2:1). The most affected age group was 6 - 12 years (29.5%), followed by 1 - 5 years (27.3%).

Table 1. Sociodemographic characteristics of pediatric trauma patients (N = 537).

Variable	Frequency	Percentage (%)
Male	363	67.5
Female	174	32.5
Neonates (0 - 28 d)	12	2.2
Infants (1 - 12 m)	46	8.6
1 - 5 years	147	27.3
6 - 12 years	158	29.5
13 - 18 years	174	32.4

Mechanisms of injury were predominantly road traffic accidents (42.4%) and falls (31.2%). Domestic accidents accounted for 11.8%, and assaults for 6.2% (Table 2).

Table 2. Mechanisms of pediatric trauma.

Mechanism	Frequency	Percentage (%)
Road traffic accidents	228	42.4
Falls	168	31.2
Domestic accidents	63	11.8
Assaults	33	6.2
Burns/other causes	45	8.4

Traumatic lesions were mainly fractures (46.1%) and head injuries (34.5%), representing over 80% of all injuries (Figure 1).

Clinical presentations included limb pain or swelling (49.7%), wounds (28.5%), abdominal pain (20.3%), vomiting (14.9%), and loss of consciousness (9.8%). Complications on arrival occurred in 12.6% of children, primarily anemia and peritonitis (Table 3).

Lesion-specific findings (Table 4):

- Fractures: most common among school-aged children; mean hospital stay 10.4 days; mortality 9.1%.

- Head injuries: highest mortality (54.5%), especially when severe (GCS ≤ 8).
- Burns: predominantly in younger children; mortality 36.4%.
- Soft tissue injuries: frequent but with zero recorded mortality.

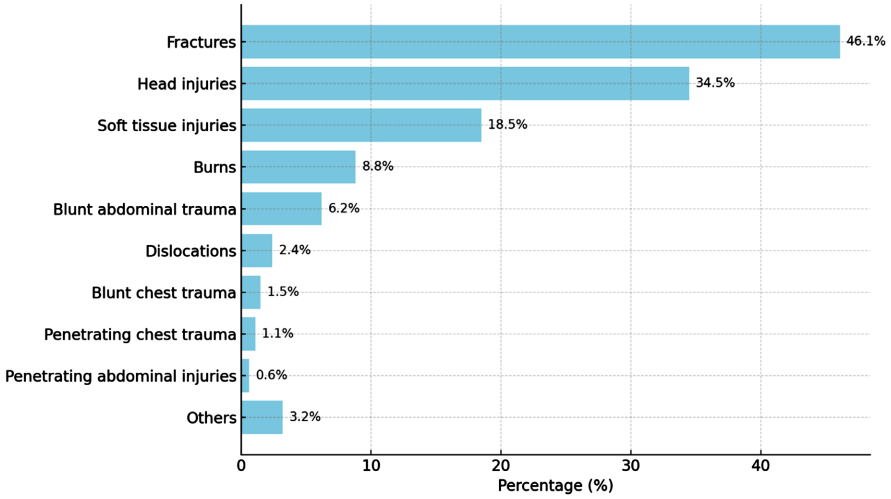

Figure 1. Distribution of pediatric traumatic lesions (N = 534).

Table 3. Clinical presentations and complications.

Presentation/Complication	Frequency	Percentage (%)
Limb pain/swelling	267	49.7
Wounds	153	28.5
Abdominal pain	109	20.3
Vomiting	80	14.9
Loss of consciousness	53	9.8
Complications on arrival	68	12.6

Table 4. Most frequent types of traumatic lesions among pediatric patients in three Cameroonian hospitals.

Type of Lesion	Frequency (n, %)	Most Affected Age Group	Mean Length of Stay (days)	Case Mortality (%)	Main Clinical Features/Mechanism
Fractures	246 (46.1%)	6 - 12 years	10.4	9.1%	Road traffic accidents, falls; limb pain, deformity
Head injuries	184 (34.5%)	12 - 18 years	8.6	54.5%	Loss of consciousness, scalp wounds, seizures
Soft tissue injuries	99 (18.5%)	12 - 18 years	7.0	0%	Lacerations, swelling, infection risk
Burns	47 (8.8%)	28 days - 2 years	11.1	36.4%	Flame/scald injuries, fluid loss, pain
Blunt abdominal trauma	33 (6.2%)	6 - 12 years	13.3	0%	Abdominal tenderness, distension

Continued

Chest trauma (blunt)	8 (1.5%)	6 - 12 years	6.1	9.1%	Chest pain, dyspnea, respiratory distress
Penetrating chest injuries	6 (1.1%)	12 - 18 years	8.2	0%	Open chest wound, pneumothorax
Dislocations	13 (2.4%)	12 - 18 years	8.0	0%	Joint deformity, loss of function
Others	17 (3.2%)	12 - 18 years	14.5	0%	Mixed or unspecified trauma

Postoperative complications occurred in 5.7% of managed cases. The most frequent were surgical site infection (37.3%), sepsis (16.2%), and anemia (13.6%) (Table 5). Hypovolemic shock and respiratory distress were less common but clinically significant. Delayed presentation and delayed surgical intervention were strongly associated with complications.

Table 5. Common postoperative complications after management of trauma lesions.

Type of Lesion	Frequency (n)	Percentage (%)	Principal Trauma Lesions Involved	Clinical Consequences/Remarks
Surgical site infection (SSI)	22	37.3%	Fractures, burns, soft-tissue injuries	Delayed wound healing, prolonged hospital stay
Sepsis	12	16.2%	Burns, multiple trauma, infected wounds	Systemic infection, contributed to mortality
Anemia	8	13.6%	Burns, fractures, postoperative bleeding	Required transfusion in most cases
Hypovolemic shock	4	6.8%	Severe burns, abdominal or chest trauma	Fluid/blood loss requiring resuscitation
Wound dehiscence	5	8.0%	Soft-tissue injuries, fractures	Delayed closure, increased infection risk
Respiratory distress/pneumonia	3	5.0%	Chest trauma, head injuries	Prolonged oxygen therapy, ICU admission
Others (minor)	6	9.0%	Various trauma lesions	Fever, delayed mobilization, electrolyte imbalance

Outcomes (Table 6):

- 91.5% of children were discharged after treatment.
- Mortality was 5.2%.
- Severe head injuries (54.5%) and burns (36.4%) accounted for most deaths.
- A small proportion left against medical advice (3.3%) or were referred for specialized care (1.1%).

Table 6. Outcomes of pediatric trauma patients.

Outcome	Frequency	Percentage (%)
Discharged/survived	491	91.5
Died	28	5.2
Left against medical advice	18	3.3
Referred to higher center	6	1.1

4. Discussion

4.1. Magnitude of Pediatric Trauma

This study reaffirms that trauma accounts for a substantial proportion of pediatric surgical admissions in Cameroon. The predominance of males and school-aged children aligns with regional findings [8]-[14] and likely reflects increased exposure to roadways, unsupervised activities, and risk-taking behaviors.

The presence of complications on arrival in 12.6% of cases highlights shortcomings in prehospital care. Delayed recognition of injuries, lack of ambulance services, unsafe modes of transport, and limited first-aid knowledge likely contributed to these early complications.

4.2. Mechanisms of Injury

RTAs were the leading cause of pediatric trauma. Contributing factors include rapid urbanization, inadequate pedestrian walkways, poor road conditions, absence of child restraint regulations, and weak enforcement of traffic laws. These findings mirror those reported in other African settings [9] [15] [16].

4.3. Injury Patterns

Fractures and head injuries comprised the largest proportion of trauma lesions, consistent with patterns observed across LMICs [17]. Severe head injuries were associated with high mortality due to limited neurosurgical capacity, late presentation, and insufficient ICU facilities [18].

4.4. Mortality and Determinants of Outcome

The overall mortality of 5.2% in our study parallels earlier reports from pediatric surgery units in Africa (4% - 10%) [8] [19]. However, the case-specific mortality of 54.5% among severe head injuries underscores the gap in trauma critical care capacity.

The high fatality among burn victims (36.4%) further highlights the lack of burn units, fluid resuscitation expertise, and early excision protocols in Cameroon's hospitals [20]. These patterns reflect both the mechanisms of injury and limited availability of specialized trauma care, especially neurosurgical support and burn units.

4.5. Postoperative Complications

The most frequent postoperative complications were surgical site infections (37.3%) and sepsis (16.2%). These are preventable through aseptic surgical techniques, antibiotic prophylaxis, and improved postoperative monitoring. Strengthening perioperative infection control, blood transfusion services, and nutritional support are key to reducing these outcomes.

4.6. Preventive Strategies

To reduce pediatric trauma, actionable preventive measures include:

- **Road safety enforcement:** speed limits, helmet use, pedestrian crossings, speed bumps.
- **Child restraint laws:** enforcement and subsidies for child car seats.
- **Community-based prevention:** first-aid training, domestic safety education, school road safety programs.
- **Trauma system strengthening:** prehospital care development, referral network coordination, and training in pediatric trauma management.

5. Study Strengths and Limitations

5.1. Strengths

- Multicenter design providing a broad picture of trauma burden.
- Use of standardized data collection.

5.2. Limitations

- Retrospective nature leading to incomplete records.
- Lack of long-term follow-up on functional outcomes.
- Absence of prehospital mortality data.

6. Conclusion

Pediatric trauma is a leading cause of morbidity and mortality in Cameroon, dominated by road traffic accidents and falls. Boys and school-aged children are most at risk. Mortality remains high, particularly in severe head injuries. Preventive measures, better referral pathways, and improved trauma care capacity are urgently needed.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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