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Epidemiology of Pediatric Trauma and its Outcome Presenting to an Emergency Department in a Tertiary Care Hospital in Oman

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ABSTRACT

Objectives: This study aimed to analyze pediatric trauma cases treated at Sultan Qaboos University Hospital in Oman, focusing on injury patterns, mechanisms, and outcomes. ***Methods***: We conducted a retrospective chart review of pediatric patients aged 15 years and younger who presented to the emergency department over 12 months, from January to December 2022. Data were collected on demographics, injury characteristics, clinical management, and outcomes, including pediatric intensive care unit admissions and length of stay. ***Results:*** A total of 1643 pediatric trauma cases were included in the study. Most injuries occurred in males (64.8%) and children aged 0–5 years (51.4%). The leading cause of injury was falls from height (50.8%), followed by collisions with fixed objects (12.2%) and sports injuries (8.2%). Injuries predominantly occurred at home (72.7%) and were most frequent during the evening and nighttime (71.5%). Lacerations (32.3%) and soft tissue injuries (19.3%) were the most common types of injuries, with the face (33.0%) and upper extremities (25.3%) being the most frequently affected anatomical sites. Adolescents (11–15 years) were more prone to road traffic accidents and sports-related injuries, while younger children were more vulnerable to falls. Sex differences showed males were more susceptible to lacerations and fractures, while females experienced higher rates of crush injuries and contusions. Most patients (89.3%) were treated and discharged from the emergency department, while 6.7% were admitted to the hospital, and 2.0% had significant clinical outcomes. Patients admitted to the pediatric intensive care unit had higher rates of motor vehicle collisions and polytrauma and required more intensive interventions. ***Conclusions:*** Falls from height were the most common mechanism of injury in our study, particularly among younger children. Males were more frequently affected, with lacerations and soft tissue injuries being the most common injury types. Adolescents were more prone to road traffic and sports-related injuries. The results emphasize the need for targeted preventive measures, especially at home, roadside, and during recreational activities, to reduce pediatric trauma.

Trauma is an injury to the body caused by an external force. It can result from a variety of factors, such as accidents, falls, violence, or disasters, and can lead to physical harm or psychological distress. Trauma can involve any part of the body and is classified based on the severity of the injury.[1]

Pediatric trauma is a significant public health problem worldwide and the most common cause of morbidity and mortality. Each year, approximately 950 000 children < 18 years die due to injury and violence.[2] Additionally, trauma accounts for over 20% of all deaths in the Gulf Cooperation Council.[3] Trauma—especially falls, motor vehicle collisions, and burns—contributes significantly to pediatric emergency department (ED) visits and hospital admissions.[4] These injuries often lead to long-term disabilities, emphasizing the need for effective prevention and management approaches. In many cases, pediatric trauma is preventable, which underscores its importance as a public health concern.[2]

Despite the global burden, regional studies focusing on pediatric trauma remain limited, especially in Middle Eastern countries like Oman. Recent international studies suggest that falls and road traffic incidents are the primary mechanisms of injury in children under 15.[5–7] Boys are typically at higher risk than girls, with younger children more likely to be injured at home, while adolescents are more frequently involved in outdoor or sports-related

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injuries.[8] There is limited data available that focuses on the distinct features of trauma in the local younger population, which hampers efforts to concentrate on targeted, age-specific prevention strategies.[7]

Sultan Qaboos University Hospital (SQUH) is a teaching hospital with a 600-bed capacity and a large catchment area. Its emergency department comprises 25 beds and serves both adult and pediatric patients. The ED handles approximately 60 000 visits annually, of which 12 000 to 15 000 are pediatric cases. We have sought to analyze pediatric trauma cases at SQUH for over one year. This study's primary focus was to identify common injury sites, patterns of injuries, trauma mechanisms, and their relationship to demographic factors like age and sex in children < 15 years old. This study sought to provide data to understand the burden of pediatric trauma in Oman and help improve trauma care by highlighting the risks and understanding the most common mechanisms and outcomes of pediatric injuries.

METHODS

A retrospective chart review of pediatric trauma cases was conducted from January to December 2022. The inclusion criteria included patients aged 15 years or younger who presented to the Emergency Department (ED) of SQUH with a history of trauma. Children with medical conditions associated with any form of trauma were excluded from the study.

The study team designed a structured proforma to document the necessary information. Patient data were obtained from the SQUH electronic medical record system. The collected data included patient demographics, time, day, and month of presentation, source of patients, site of injury, mechanisms of trauma, type of injury, anatomical location, ED assessment, management, outcomes, and pediatric intensive care unit (PICU) admissions and length of stay.

Patients were stratified and compared based on the site of injury, mechanisms of trauma, and type of injury across three age groups: 0–5 years, 6–10 years, and 11–15 years. The sources of patients were direct arrivals to the ED, those brought by emergency medical services, or those escorted from primary health centers.

Mechanisms of injury included fall from height, impacts with fixed objects, sports injuries, motor vehicle collisions (MVC), and others. Injuries were categorized according to the body area involved: head, neck, face, chest, abdomen, pelvis, back, and extremities. The operational definition of traumatic injuries was established using the International Classification of Diseases, Tenth Revision codes. To quantify trauma severity, the Injury Severity Score (ISS) was used, with scores ranging from 1 to 75, where higher scores indicate more severe injuries. Injuries were categorized as minor (ISS: < 8), moderate (ISS: 9–15), severe (ISS: 16–24), and critical (ISS: > 24). Patient triage was conducted using the Canadian Triage and Acuity Scale, a five-level system that prioritizes care based on condition severity, ranging from level 1 (resuscitation) to level 5 (non-urgent).

Ethical approval for the study was obtained from the ethics committee of the SQU, College of Medicine and Health Sciences (REF. NO. SQU – EC/017/2023).

Statistical analysis was conducted using STATA 15 software (StataCorp. (2017). Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC.). Data were presented as frequencies and mean ± SD where appropriate. Continuous variables were analyzed using the Student's *t*-test, and categorical variables were analyzed using the chi-square test. A *p*-value < 0.05 was considered statistically significant.

RESULTS

A total of 1750 pediatric trauma cases met the inclusion criteria during the study period. Following data screening, 107 cases with incomplete records were excluded, resulting in 1643 patients included in the final analysis. The mean age was 6.2 ± 0.1 years, with 845 (51.4%) patients aged 0–5 years, and 1064 (64.8%) were male.

More than two-thirds of the trauma cases (n = 1174, 71.5%) visited the ED during the evening or nighttime hours [Figure 1]. The majority of visits occurred on weekdays (n = 1135; 69.1%), while 508 (30.9%) occurred on weekends. Monthly patient volume averaged 136.9, with peaks noted in March and July [Figure 2]. Most patients (n = 1559; 94.9%) presented directly to the ED; only 84 (5.1%) arrived via emergency services or referral centers.

The most common site of injury was the home, accounting for 1195 (72.7%) cases, followed by 142 (8.6%) on the road, and 134 (8.2%) at sports grounds. The leading mechanism of injury was fall from height, with 835 (50.8%) cases, followed by collisions with fixed objects, 200 (12.2%) cases. Sports-related

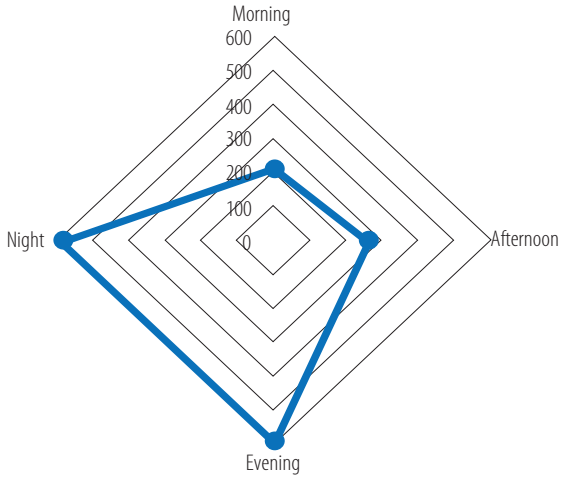

Figure 1: Radar chart of pediatric trauma patient's emergency department arrival time plotted over parts of the day.

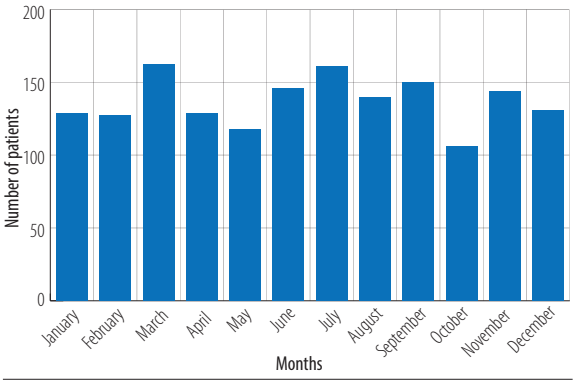

Figure 2: Distribution of pediatric trauma patients by months over study period.

injuries, 134 (8.2%) cases, were the third leading cause of trauma. The most frequent injury types were lacerations (32.3%), followed by soft tissue injuries (19.3%), and fractures (16.6%). The face (33.0%) and upper extremities (25.3%) were the most frequently injured anatomical regions [Table 1].

Younger children (0–5 years) were more prone to injuries at home (88.3%) compared to those aged 6–10 years (63.5%) and 11–15 years (44.4%), whereas adolescents (11–15 years) were more frequently injured on the road (17.6% vs. 8.9% for 6–10 years and 5.3% for 0–5 years) and at sports grounds (26.5% vs. 9.9% for 6–10 years and 0.6% for 0–5 years). Those children sustaining injuries on the street had a higher proportion within 6–10 years (6.5%) than those aged 11–15 years (3.6%) and 0–5 years (1.2%). These differences were statistically significant.

Younger patients (0–5 years) had higher rates of falls (57.4% vs. 49.5% for 6–10 years and 34.8% for

Table 1: Demographics, source of patients, and injury characteristics among study population (N = 1643).

Variables	n (%)
Age, mean ± SD, years	6.2 ± 0.1
Age, years	
0–5	845 (51.4)
6–10	496 (30.2)
11–15	302 (18.4)
Sex	
Male	1064 (64.8)
Female	579 (35.2)
Source of patients	
Direct arrival to ED	1559 (94.9)
Brought by EMS	47 (2.9)
Escorted from LHC	37 (2.2)
Site of injury	
Home	1195 (72.7)
Street	53 (3.3)
School	51 (3.1)
Road	142 (8.6)
Sports	134 (8.2)
Park/public place	68 (4.1)
Mechanisms of injury	
Fall from height	835 (50.8)
MVC-pedestrian	47 (2.9)
MVC-passenger	115 (7.0)
Burn	17 (1.0)
Assault	5 (0.3)
Animal bite	14 (0.8)
Drowning	10 (0.6)
Electric shock	3 (0.2)
Falling of object on body part	62 (3.8)
Hit over fixed object	200 (12.2)
Needle prick/knife-cut	33 (2.0)
Foreign body	87 (5.3)
Pulled elbow	36 (2.2)
Sports injury	134 (8.2)
Finger entrapped in door	45 (2.7)
Type of injury	
Laceration	531 (32.3)
Fracture/dislocation	273 (16.6)
Crush injury	18 (1.1)
Penetrating injury	27 (1.6)
Soft tissue injury	316 (19.3)
Burn	17 (1.0)
Contusion	206 (12.5)
Foreign body	87 (5.3)
Blunt injury	114 (7.0)
Drowning	10 (0.6)
Polytrauma	44 (2.7)
Anatomic location of injury	
Head and neck	300 (18.3)
Face	543 (33.0)

Table 1: Demographics, source of patients, and injury characteristics among study population (N = 1643).

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Variables	n (%)
Abdomen, pelvis, and genitalia	45 (2.7)
Upper extremity	416 (25.3)
Lower extremity	254 (15.5)
Chest and back	41 (2.5)
Multiple injury	44 (2.7)

ED: emergency department; EMS: emergency medical services; LHC: local health center; MVC: motor vehicle collision.

11–15 years) and foreign bodies (8.0% vs. 3.6% for 6–10 years and 0.3% for 11–15 years), but lower rates of assault (0.0% vs. 0.4% for 6–10 years and 1.0% for 11–15 years). Older children (11–15 years) had higher rates of sports-related injuries (26.5% vs. 9.9% for 6–10 years and 0.6% for 0–5 years) and MVC-passenger injuries (13.9% vs. 6.7% for 6–10 years and 4.7% for 0–5 years) compared to younger children with $p < 0.001$. Lacerations and blunt injuries were more common in the younger study population (0–5 years: 37.3% and 9.1%) compared to those aged 6–10 years (31.7% and 5.2%) and 11–15 years (19.6% and

Table 2: Characteristics of pediatric trauma patients according to age categories.

Variables	0–5 years n = 845 n (%)	6–10 years n = 496 n (%)	11–15 years n = 302 n (%)	*p*-value
Site of injury				
Home	746 (88.3)	315 (63.5)	134 (44.4)	
Street	10 (1.2)	32 (6.5)	11 (3.6)	
School	12 (1.4)	26 (5.2)	13 (4.3)	0.001
Road	45 (5.3)	44 (8.9)	53 (17.6)	
Sports ground	5 (0.6)	49 (9.9)	80 (26.5)	
Park/public places	27 (3.2)	30 (6.0)	11 (3.6)	
Mechanisms of injury				
Fall from height	485 (57.4)	245 (49.5)	105 (34.8)	
MVC-pedestrian	11 (1.3)	21 (4.2)	15 (5.0)	
MVC-passenger	40 (4.7)	33 (6.7)	42 (13.9)	
Burn	9 (1.1)	3 (0.6)	5 (1.7)	
Assault	0 (0.0)	2 (0.4)	3 (1.0)	
Animal bite	5 (0.6)	6 (1.2)	3 (1.0)	
Drowning	8 (0.9)	1 (0.2)	1 (0.3)	0.001
Electric shock	1 (0.1)	2 (0.4)	0 (0.0)	
Falling of objects	30 (3.6)	19 (3.8)	13 (4.3)	
Hit over fixed object	105 (12.4)	68 (13.7)	27 (8.9)	
Needle prick	17 (2.0)	13 (2.6)	3 (1.0)	
Foreign body	68 (8.0)	18 (3.6)	1 (0.3)	
Pulled elbow	34 (4.0)	2 (0.4)	0 (0.0)	
Sport injury	5 (0.6)	49 (9.9)	80 (26.5)	
Finger entrapped in door	27 (3.3)	14 (2.8)	4 (1.3)	
Type of injury				
Laceration	315 (37.3)	157 (31.7)	59 (19.6)	
Fracture/dislocation	82 (9.7)	107 (21.6)	84 (27.8)	
Crush injury	11 (1.3)	7 (1.4)	0 (0.0)	
Penetrating injury	15 (1.8)	10 (2.0)	2 (0.7)	
Soft tissue injury	145 (17.2)	93 (18.8)	78 (25.8)	
Burn	10 (1.2)	2 (0.4)	5 (1.7)	0.001
Contusion	93 (11.0)	65 (13.1)	48 (15.9)	
Foreign body	68 (8.0)	18 (3.6)	1 (0.3)	
Blunt injury	77 (9.1)	26 (5.2)	11 (3.6)	
Drowning	8 (0.9)	1 (0.2)	1 (0.3)	
Polytrauma	21 (2.5)	10 (2.0)	13 (4.3)	

MVC: motor vehicle collision.

3.6%). Conversely, fractures and soft tissue injuries were more prevalent in the oldest age group (11–15 years: 27.8% and 25.8%) compared to children aged 6–10 years (21.6% and 18.8%) and 0–5 years (9.7% and 17.2%) [Table 2].

Females were more frequently injured at home (76.0%) and had a higher incidence of fall-related injuries (52.9%) and pulled elbows (3.3%). Males were more commonly injured during sports (11.0%) and from assaults (0.5%) or fixed object collisions (13.2%). While lacerations and fractures were more common in males, females had higher rates of contusions and crush injuries. However, differences in injury types by sex were not statistically significant ($p = 0.173$) [Table 3].

During the ED assessment, one (0.1%) patient was declared dead on arrival. Among the patients assessed, 58.7% received a Canadian Triage and Acuity Scale yellow triage code, indicating their conditions were urgent but stable enough to wait 30 minutes for treatment. The ISS revealed that most injuries (65.7%) were classified as minor with scores < 8. Most patients (98.4%) had a normal Glasgow Coma Scale. The trauma patients who had abnormal Glasgow Coma

Table 3: Characteristics of pediatric trauma patients according to sex.

Variables	Male n = 1064 n (%)	Female n = 579 n (%)	*p*-value
Site of injury			
Home	755 (71.0)	440 (76.0)	
Street	39 (3.7)	14 (2.4)	
School	35 (3.3)	16 (2.8)	0.001
Road	76 (7.1)	66 (11.4)	
Sports ground	117 (11.0)	17 (2.9)	
Park/public places	42 (3.9)	26 (4.5)	
Mechanisms of injury			
Fall from height	529 (49.7)	306 (52.9)	
MVC-pedestrian	34 (3.2)	13 (2.2)	
MVC-passenger	56 (5.3)	59 (10.2)	
Burn	14 (1.3)	3 (0.5)	
Assault	5 (0.5)	0 (0.0)	
Animal bite	10 (0.9)	4 (0.7)	
Drowning	6 (0.6)	4 (0.7)	0.001
Electric shock	1 (0.1)	2 (0.3)	
Falling of objects	41 (3.8)	21 (3.6)	
Hit over fixed object	141 (13.2)	59 (10.2)	
Needle prick	19 (1.8)	14 (2.4)	
Foreign body	53 (5.0)	34 (5.9)	
Pulled elbow	17 (1.6)	19 (3.3)	
Sport injury	117 (11.0)	17 (2.9)	
Finger entrapped in door	21 (2.0)	24 (4.2)	
Type of injury			
Laceration	354 (33.3)	177 (30.6)	
Fracture/dislocation	189 (17.8)	84 (14.5)	
Crush injury	7 (0.6)	11 (1.9)	
Penetrating injury	16 (1.5)	11 (1.9)	
Soft tissue injury	204 (19.2)	112 (19.3)	0.173
Burn	13 (1.2)	4 (0.7)	
Contusion	121 (11.4)	85 (14.7)	
Foreign body	53 (4.9)	34 (5.9)	
Blunt injury	72 (6.8)	42 (7.2)	
Drowning	6 (0.6)	4 (0.7)	
Polytrauma	29 (2.7)	15 (2.6)	

MVC: motor vehicle collision.

Table 4: Emergency department assessment and management of study population (N = 1643).

Variables	n (%)
ED triage code*	
Immediate (1-blue)	16 (1.0)
15 min (2-red)	106 (6.5)
30 min (3-yellow)	965 (58.7)
60 min (4-green)	556 (33.8)
GCS score	
15	1617 (98.4)
< 15	26 (1.6)
Injury severity score	
Minor (< 8)	1080 (65.7)
Moderate (9–15)	460 (28.0)
Severe (16–24)	68 (4.2)
Critical (> 24)	35 (2.1)
Imaging performed†	
Yes	733 (44.6)
No	910 (55.4)
Results of imaging‡ (n = 733)	
Positive trauma related findings	403 (55.0)
Negative trauma related findings	330 (45.0)
Interventions	
Observation	490 (29.8)
Systemic analgesia	299 (18.2)
Wound management	434 (26.4)
Fracture management	311 (18.9)
Intubation	26 (1.7)
Others	82 (5.0)
Disposition and outcome	
Brought dead	1 (0.1)
Discharged from ED	1467 (89.3)
Admission	111 (6.7)
Referred to other hospital	64 (3.9)

GCS: Glasgow Coma Scale; ED: emergency department.
**Canadian Triage and Acuity Scale (CTAS) Level 1 (resuscitation, blue): immediate care required for life-threatening conditions. Level 2 (emergent, red): urgent care within 15 minutes needed for potentially serious conditions. Level 3 (urgent, yellow): assessment required within 30 minutes for serious conditions. Level 4 (less urgent, green): stable conditions requiring medical attention within 60 minutes. †X-ray, CT scan and sonography; ‡fractures, pneumothorax, intracranial hemorrhage, and solid organ lacerations.*

Scale and severe or critical ISS (≥16) were involved in an MVC, falling from height, or struck by an object.

Diagnostic imaging, including X-ray, CT scan, and sonography for trauma, was performed on 733 (44.6%) patients, with 55% of these imaging studies revealing positive trauma-related findings. Emergency physicians treated 68.0% of the patients, while 32.0% required specialist care from trauma, orthopedic, neurosurgery, pediatric surgery, ENT, ophthalmology, and maxillofacial teams. Common interventions included a 4–6-hour observation period for minor injuries (29.8%). Systemic analgesia was administered in 18.2% of patients. Fracture management involved the application of back slabs for 14.3% of patients and reduction under sedation for 4.6%. Wound care included treating lacerations with skin adhesive (13.4%), sutures (10.3%), and dressings (2.7%). The majority (n = 1467, 89.3%) of patients were treated and discharged from the ED, while 111 (6.7%) required hospital admission, and 64 (3.9%) were referred to specialized trauma centers [Table 4].

Among 1643 participants, 33 (2.0%) had significant clinical outcomes. No statistically significant differences in age or sex were noted between the groups. PICU admissions were more frequent for children involved in MVC (45.4% vs. 10.3%), struck by falling objects (6.1% vs. 5.1%), and with polytrauma (54.5% vs. 12.8%), compared to those in ward or high-dependency units. Critical triage codes (blue: 42.4% vs. 1.3% and red: 45.4% vs. 35.9%) and severe (48.5% vs. 5.1%) or critical (33.3% vs. 1.3%) ISS correlated with more severe outcomes ($p = 0.001$). These patients often required intubation, laparotomy, and craniotomy with more extended hospital stays (10.9 vs. 2.1 days; $p = 0.001$) [Table 5].

DISCUSSION

This study presents valuable insights into pediatric trauma patterns at SQUH. It highlights key injury mechanisms, types, and demographic correlations while contributing to the regional body of knowledge on pediatric trauma.

This study identified specific injury types based on age and gender, revealing that a significant number (51.4%) of younger children (0–5 years) were more prone to injuries, with males being injured at twice the rate of females (2:1 ratio). However, the overall pattern of injury types across genders did not show statistically significant differences, which may suggest that gender-based differences are more activity-related than physiological.[9] These results are consistent with other epidemiological studies on pediatric trauma conducted in the Gulf Cooperation Council and sub-Saharan Africa regions.[10–12]

In this study, the primary trauma sites for both sexes were at home (72.7%) and on the road (8.6%). However, a higher percentage of adolescent males (11–15 years) were injured on sports grounds. This

Table 5: Characteristics of pediatric trauma patients upon admission.

Variables	Total n = 111 n (%)	Ward/HD n = 78 n (%)	PICU n = 33 n (%)	*p*-value
Age, mean ± SD, years		5.9 ± 0.4	5.9 ± 0.7	0.520
Sex				
Male	71 (64.0)	48 (61.5)	23 (69.7)	0.701
Female	40 (36.0)	30 (38.5)	10 (30.3)	
Mechanisms of injury				
Fall from height	43 (38.8)	35 (44.9)	8 (24.2)	
Hit over fixed object	6 (5.4)	4 (5.1)	2 (6.1)	
MVC-passenger	23 (20.7)	8 (10.3)	15 (45.4)	0.001
Falling of object	6 (5.4)	4 (5.1)	2 (6.1)	
MVC-pedestrian	15 (13.5)	11 (14.1)	4 (12.1)	
Drowning	4 (3.6)	2 (2.6)	2 (6.1)	
Others	14 (12.6)	14 (17.9)	0 (0.0)	
Type of injury				
Laceration	20 (18.0)	15 (19.2)	5 (15.2)	
Fracture	21 (19.0)	20 (25.7)	1 (3.0)	
Contusion	6 (5.4)	5 (6.4)	1 (3.0)	
Blunt injury	13 (11.7)	10 (12.8)	3 (9.1)	0.001
Polytrauma	28 (25.2)	10 (12.8)	18 (54.5)	
Penetrating injury	4 (3.6)	1 (1.3)	3 (9.1)	
Drowning	4 (3.6)	2 (2.6)	2 (6.1)	
Others	15 (13.5)	15 (19.2)	0 (0.0)	
ED triage code				
Immediate (1-blue)	15 (13.6)	1 (1.3)	14 (42.4)	
15 min (2-red)	43 (38.7)	28 (35.9)	15 (45.4)	0.001
30 min (3-yellow)	43 (38.7)	39 (50.0)	4 (12.2)	
60 min (4-green)	10 (9.0)	10 (12.8)	0 (0.0)	
Injury severity score†				
Minor (< 8)	29 (26.2)	29 (37.2)	0 (0.0)	
Moderate (9–15)	50 (45.0)	44 (56.4)	6 (18.2)	0.001
Severe (16–24)	20 (18.0)	4 (5.1)	16 (48.5)	
Critical (> 24)	12 (10.8)	1 (1.3)	11 (33.3)	
Interventions*				
Observation	38 (34.2)	35 (44.9)	3 (9.1)	
Intubation	26 (23.4)	0 (0.0)	26 (78.8)	
Chest tube	1 (0.9)	0(0.0)	1 (3.1)	
Exploratory laparotomy	4 (3.6)	1 (1.3)	3 (9.1)	
Fracture management	27 (24.3)	21 (26.9)	6 (18.2)	
Craniotomy	6 (5.4)	0 (0.0)	6 (18.2)	
Others	22 (19.8)	21 (26.9)	1 (3.1)	
Length of hospital stay, days		2.1 ± 0.2	10.9 ± 2.1	0.001

MVC: motor vehicle collision; HDU: high-dependency unit; PICU: pediatric intensive care unit; ISS injury severity score.
*†Minor: not life-threatening and require minimal medical intervention. Moderate: may require significant medical attention but are not immediately life-threatening. Severe: life-threatening and may require intensive care or surgical intervention. Critical: denotes injuries that are life-threatening or unsurvivable often associated with multi-system trauma. *11 patient had multiple procedures.*

aligns with the literature, which associates this age group with increased participation in organized sports and outdoor activities, resulting in a higher incidence of injuries.[13,14] Road traffic accidents, though less frequent in this study, remain a notable cause of trauma in adolescents, which corresponds to findings from other regions where traffic injuries are a common concern in this age group.[15]

Our findings align with previous studies that have identified falls as the leading cause of pediatric trauma, accounting for 50.8% of cases in this study. This is consistent with global reports, which indicate that falls constitute a significant proportion of pediatric injuries, particularly among younger children.[2,16–18] Smaller children are vulnerable to falls due to their developmental stage, lack of coordination, and natural tendency to explore their surroundings. This highlights the need for focused preventive measures within homes, including child-friendly environments, to reduce fall risks.

Lacerations (32.3%) and soft tissue injuries (19.3%) were the most frequent types of injuries, with the face (33.0%) and upper extremities (25.3%) being the most commonly affected. These results are consistent with other studies, which have identified lacerations and soft tissue injuries as the leading types of trauma in pediatric populations.[19,20] The predominance of these injury types showed the relatively minor nature of most pediatric trauma cases, many of which were caused by low-energy mechanisms. The high number of facial and upper extremity injuries likely reflects the vulnerability of these regions in common mechanisms of injury, such as falls and sports-related trauma.[21,22]

Interestingly, long bone fractures were more common in adolescents than in younger children. One possible explanation for this difference is that older children are more likely to engage in vigorous activities, such as sports or road traffic accidents, leading to more severe injuries like fractures. Additionally, younger children's bones are more flexible and less likely to break than those of adolescents.[23]

According to the study, most (89.3%) patients were treated and discharged from the ED, indicating a pattern of non-severe injuries that could be managed with conservative treatments, such as wound closure using Dermabond or suturing, and fracture management using back slabs or reduction under sedation. This matches with other studies, showing that most pediatric trauma cases involve minor injuries that do not require surgical intervention.[24,25] However, a small proportion (6.7%) of patients required hospital admission, and 2.0% experienced significant clinical outcomes, such as admission to the PICU. Patients admitted to the PICU were associated with severe trauma mechanisms, including motor vehicle collisions and polytrauma, emphasizing the importance of traffic safety measures for children.[9] Preventive measures, such as enforcing child seatbelt use, promoting pedestrian safety, and implementing sports safety protocols, likely reduced the severity of injuries.[26] Overall, the results of this study are consistent with global trends in pediatric trauma, underscoring the need for targeted preventive strategies to reduce the incidence and severity of injuries in children.[27]

To the best of our knowledge, this is the first study with a thorough understanding of pediatric trauma in this context. There were limitations in this study. The first limitation was its retrospective nature and reliance on previously recorded medical charts and electronic data. This can lead to incomplete or inaccurate information due to missing data or variability in clinical documentation. Second, the study overlooked parental supervision, or environmental factors, which can significantly influence the incidence and type of injuries among children. Third, follow-up data for patients with severe traumatic injuries were missing. Lastly, the study was conducted at a single tertiary care hospital. Therefore, the results may not generalize to other regions or healthcare settings across Oman or the Middle East.

CONCLUSION

This study provides valuable information about the patterns of pediatric trauma and identifies falls from height as the most common mechanism of injury, particularly among younger children. Males were more frequently affected with lacerations and soft tissue injuries, which were the most common injury types. Adolescents were more prone to road traffic and sports-related injuries. The results also highlight the importance of focused safety measures—especially at home, on the road, and during recreational activities—to prevent injuries in children. Future research should focus on intervention strategies and long-term outcomes, and include other healthcare settings to understand pediatric trauma and prevention methods better.

Disclosure
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