Turkish Journal of Pediatric Disease

Original Article

Pediatric unintentional injuries in emergency care: A three-year retrospective study from a tertiary care center

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Received : 03.11.2025, Accepted : 24.02.2026
DOI: 10.12956/TJPD.2025.1265

ABSTRACT

Objective: Pediatric unintentional injuries are a major public health concern, as most are preventable. This study aimed to assess emergency department cases by etiology, demographics, seasonal distribution, and outcomes, to define the regional profile and guide prevention.

Material and Methods: This retrospective study included 2524 children aged 0–18 years admitted with unintentional injuries between January 2021 and June 2024. Cases were classified as trauma, poisoning/aspiration, environmental injuries, or other causes.

Results: Of the cases, 1454 (57.6%) were male, median age 47 months. Poisoning/aspiration was most common (n=1153; 45.6%), followed by trauma (n=840; 33.2%), environmental injuries (n=473; 18.7%), and others (n=62; 2.4%). Poisonings predominated in 0–5 years, while trauma was more frequent in adolescents. Leading poisoning causes were drugs (n=516; 20.4%) and corrosives (n=441; 17.5%). Carbon monoxide poisoning was notable among environmental injuries (n=267; 10.6%). Most patients were discharged (80.6%), while 14.5% were hospitalized, 3.7% required intensive care, and 5.5% underwent surgery. Mortality and sequelae were each 0.3%. Seasonal variation was evident: poisonings in spring–summer, trauma in summer–autumn, and carbon monoxide in winter.

Conclusion: Poisonings were the leading cause in early childhood, while trauma predominated in adolescents. Preventive strategies, including parental education, household safety, and region-specific policies, are essential to reduce morbidity and mortality.

Keywords: Accident, adolescent, child, poisoning, wounds and injuries

Introduction

Unintentional injuries are defined as physical harm occurring without intent, most commonly resulting from road traffic accidents, falls, burns, drownings, and poisonings (1). They are a major cause of morbidity and mortality in childhood and account for nearly 5 million deaths worldwide each year, most of which occur in low- and middle-income countries (2-4). Such injuries also constitute about 10% of pediatric outpatient visits, placing a considerable burden on healthcare systems (5,6).

According to the Turkish Statistical Institute, children aged 1–17 comprise 25.5% of Türkiye population, a proportion notably higher than in European countries (14.6%) (7).

In Van city province, this rate reaches 65.7%, ranking fourth nationally, and accidents and poisonings represent the leading causes of mortality in this age group (8). Globally, approximately 15.3% of children and adolescents experience at least one injury annually, with adolescents sustaining more severe injuries due to risk-taking behaviours and access to firearms, alcohol, and drugs, while younger children are particularly vulnerable because of curiosity and incomplete physical development (4,9,10).

Socioeconomic status and parental education have consistently been shown to inversely affect the incidence of childhood injuries (4,11-13). Van city, located in eastern Türkiye, ranks lowest in the national socioeconomic development index (14).

The aim of this study was to describe the age, gender, seasonal, and temporal characteristics of childhood unintentional injuries in Van city, thereby contributing to the limited literature and supporting the development of preventive policies and child health protection strategies.

Materials and Methods

This study included 2524 children and adolescents (0–18 years) with unintentional injuries admitted to the Pediatric Emergency Department of Van Training and Research Hospital between January 2021 and June 2024. As the largest tertiary care center in eastern Türkiye, the hospital serves approximately six neighboring provinces.

The study was retrospectively designed using Electronic Medical Records (EMR). Since data were anonymized, individual consent was not required. However, families had been informed at admission that their records might be used for research, and written consent was obtained.

Patients admitted by self-presentation, ambulance, or referral from other healthcare centers were included. Initial screening was performed via ICD-10 codes, but due to inconsistencies, cases registered as "forensic" in the pediatric emergency EMR were used. Intentional injuries (suicide attempts, abuse, assaults) were excluded. Accidental genital trauma was classified as unintentional and included. Total of 4.500 forensic cases were referred to the Pediatric Emergency Department. Of these, 1976 were intentional and excluded; 2524 unintentional cases were analyzed.

Recorded variables were age, gender, admission date, season, weekday/weekend, public/religious holidays, and school status at the time of admission. Patients discharged with residual dysfunction were defined as having physical impairment. Mortality referred to in-hospital deaths during the index admission only (15,16).

Cases were categorized into four groups according to the nature of the incident:

Group 1 : Trauma-related injuries [e.g., traffic accidents, falls, head injuries, major long bone or pelvic fractures, thoracic trauma, hand or foot trauma, abdominal injuries from sharp objects, firearm injuries, ocular foreign bodies, earthquake-related injuries].

Group 2 : Poisonings and aspiration [drug ingestion, non-drug ingestions (e.g., mushrooms or toxic plants) and corrosive substance ingestions (e.g., chemical agents such as detergents), foreign body ingestion or aspiration].

Group 3 : Environmental injuries [burns, electric shock, frostbite, carbon monoxide poisoning].

Group 4 : Other injuries and conditions [snake/insect bites, drowning, asphyxia, animal attacks].

Final clinical outcomes were categorized as emergency department discharge, hospitalization, intensive care unit admission, death, or referral to a higher-level center, while surgical interventions were documented separately. All cases were stratified into three age groups: 0–5, 6–12, and 13–18 years. Poisoning cases were specifically classified according to the American Association of Poison Control Centers system, and a comparable classification approach was applied to the other injury groups for consistency (14).

Statistical analysis

Analyses were performed with IBM SPSS Statistics v26 (IBM Corp., Armonk, NY, USA), and figures generated using GraphPad Prism v9 (GraphPad Software, San Diego, CA, USA). Categorical variables were summarized as frequencies and percentages, and continuous variables as medians with interquartile ranges. Group comparisons used the Kruskal-Wallis test for continuous data and Pearson's chi-square or Fisher's exact test for categorical data (when expected counts <5). Subgroup analyses were conducted by etiology and age, with Bonferroni-adjusted post-hoc tests applied where global significance was found. Etiology Group 4 was excluded from comparisons due to small numbers and overlapping categories. A two-sided $p<0.050$ was considered significant.

Results

Males accounted for 1454 (57.6%) cases, with a median age of 47 months (IQR; 25–107). Group 2 was the most common etiology (n= 1153; 45.6%), followed by Group 1 (n = 840; 33.2%), Group 3 (n = 473; 18.7%), and Group 4 (n = 62; 2.4%).

Most presentations occurred on weekdays (n = 1873; 74.2%), while 651 (25.8%) were on weekends; 85 (3.4%) were during religious and 31 (1.2%) during official holidays. Injury type differed by day of the week (χ^2 = 22.261; p = 0.043). No significant association was found with school periods (χ^2 = 2.119; p = 0.333). Seasonal variation was evident (χ^2 = 132.439; p <0.001): Group 1 peaked in fall and summer, Group 2 in spring and summer, and Group 3 in winter but declined in summer (Table I). Group 2 was significantly more frequent on weekends (χ^2 = 21.568; p=0.043).Regarding outcomes, 2034 (80.6%) patients were discharged, 366 (14.5%) hospitalized, and 94 (3.7%) admitted to PICU. Surgical intervention was required in 139 (5.5%). Seven (0.3%) were discharged with sequelae, and 7 (0.3%) died.

Trauma-related injuries were frequent: head trauma (n= 164; 6.5%) and traffic accidents (n= 142; 5.6%) predominated, followed by bone fractures (n= 94; 3.7%) and genital trauma (n= 88; 3.5%). Other injuries included hand trauma (2.3%), sharp object injuries (1.5%), ocular foreign bodies (1.1%), foot trauma (1.0%), firearm injuries (0.8%), pelvic fractures (0.6%), and thoracic trauma (0.4%). Rare events were earthquake-related (0.2%) and occupational injuries (0.2%) (Table II).

Ingestion and intoxication were also common. Drug intoxication was the leading cause (n= 516; 20.4%), followed by corrosive ingestion (n= 441; 17.5%). Non-drug intoxications occurred in 115 cases (4.6%). Foreign body ingestion was less frequent: non-battery objects (2.6%), batteries (0.5%), and aspiration (0.1%) (Table II). Among environmental exposures, CO poisoning (n= 267; 10.6%) was most common, followed by burns (4.8%), electrocution (3.2%), and frostbite (0.3%). Other external causes were animal attacks (1.3%), drowning (0.6%), snake/insect bites (0.3%), and asphyxia (0.2%) (Table II). Gender was

Table I: Demographic and clinical characteristics of pediatric forensic cases

Variable	Values*
Gender	
Female	1070 (42.4)
Male	1454 (57.6)
Day of the week	
Monday	367 (14.5)
Tuesday	379 (15)
Wednesday	390 (15.5)
Thursday	386 (15.3)
Friday	351 (13.9)
Saturday	298 (11.8)
Sunday	353 (14)
Season	
Fall	545 (21.6)
Spring	701 (27.8)
Summer	724 (28.7)
Winter	554 (21.9)
Holiday name	
Week-day	1794 (71.1)
Weekend	614 (24.3)
New Year's Day	5 (0.2)
National Sovereignty and Children's Day	5 (0.2)
Labor and Solidarity Day	11 (0.4)
Commemoration of Atatürk, Youth and Sports Day	3 (0.1)
Democracy and National Unity Day	2 (0.1)
Victory Day	2 (0.1)
Republic Day	3 (0.1)
Ramadan Feast (Eid al-Fitr)	26 (1)
Sacrifice Feast (Eid al-Adha)	59 (2.3)
Holiday category	
Religious	85 (3.4)
Official/Administrative	31 (1.2)
School holiday status	
Closed	730 (28.9)
Open	1794 (71.1)
Final outcome	
Discharge to outpatient clinics	2034 (80.6)
Hospitalization (Ward)	366 (14.5)
Intensive care unit admission	94 (3.7)
Underwent surgery	139 (5.5)
Physical impairment	7 (0.3)
Mortality	7 (0.3)

**: n(%)*

significantly associated with injury distribution (χ^2=10.250; p=0.006); males predominated in Group 1, while females were more frequent in Group 3. Age group was also strongly associated with etiology (χ^2 = 573.920; p< 0.001). Group 2 was most common in 0–5 years, Group 1 in 6–12 years, and Groups 1 and 3 in adolescents (Table III).

By age, 1486 (58.9%) cases were 0–5 years, 618 (24.5%) were 6–12 years, and 420 (16.6%) were 13–18 years. The clinical outcomes exhibited variability according to age, as evidenced by the statistical analysis (Table IV). The discharge of patients as outpatients (χ^2 = 6.794; p = 0.033), admission to the Pediatric Intensive Care Unit (PICU) (χ^2 = 7.455; p = 0.024), the necessity for surgical intervention (χ^2 = 45.502; p < 0.001), and the season of presentation (χ^2 = 35.485; p < 0.001) were found to be statistically significant. Post-hoc tests indicated that outpatient treatment and PICU admissions were more prevalent in children aged 0–5 years, whereas surgical interventions were more common in older children (see Table IV and Figures 1). The seasonal peaks differed according to age group, with peaks of 0–5 years in spring/summer and 13–18 years in fall/winter. The detailed associations are illustrated in Table IV.

Table II: Etiological distribution of pediatric forensic cases

Variable	n (%)
Group 1	840 (33.2)
Traffic accident	142 (16.9)* (5.6)†
Head trauma	164 (19.5)* (6.5)†
Major bone fracture	94 (11.2)* (3.7)†
Pelvic ring injury	14 (1.7)* (0.6)†
Thoracic trauma	9 (1.1)* (0.4)†
Hand trauma	58 (6.9)* (2.3)†
Injury by sharp or piercing object	38 (4.5)* (1.5)†
Foot trauma or laceration	26 (3.1)* (1)†
Foreign body in the eye	29 (3.5)* (1.1)†
Firearm injury	20 (2.4)* (0.8)†
Genital trauma	88 (10.5)* (3.5)†
Other trauma	252 (30)* (10)†
Occupational injury	4 (0.5)* (0.2)†
Earthquake-related injury	5 (0.6)* (0.2)†
Group 2	1153 (45.6)
Drug intoxication	516 (44.8)* (20.4)†
Non-drug intoxication	115 (10.0)* (4.6)†
Corrosive substance ingestion	441 (38.2)* (17.5)†
Foreign body aspiration	3 (0.3)* (0.1)†
Foreign body (non-battery) ingestion	65 (5.7)* (2.6)†
Foreign body (battery) ingestion	13 (1.1)* (0.5)†
Group 3	473 (18.7)
Electrocution	80 (16.9)* (3.2)†
Frostbite	7 (1.5)* (0.3)†
Burn injury	120 (25.4)* (4.8)†
CO Poisoning	267 (56.4)* (10.6)†
Group 4	62 (2.4)
Drowning	16 (25.8)* (0.6)†
Asphyxia	4 (6.5)* (0.2)†
Animal attack	33 (53.2)* (1.3)†
Snake/insect bite or sting	9 (14.5)* (0.3)†

**: within the subgroup, †: within the whole study group*

Discussion

Injuries continue to be a leading cause of morbidity and mortality in childhood in both developed and developing countries. Although recent trends show a decline in overall rates, injury types vary significantly by age, gender, and region, and further progress is needed to protect children's health (17,18). Although preventive measures have historically reduced pediatric poisonings, recent evidence indicates a resurgence in certain types, and injuries and poisonings are once again among the leading factors threatening child health. This situation highlights the need for sustainable preventive strategies and a closer assessment of emerging risk factors, particularly in older children (19,20). This study examined the types and demographic characteristics of pediatric accidental injuries, their distribution by age group and season, and found that poisoning ranked first among unintentional injuries in childhood, followed by trauma.

Table III: Comparison of demographic and clinical variables across unintentional injury groups

Variable	Group 1	Group 2	Group 3	Test Statistic	p
Number of patients	840	1153	473	-	-
Age (months)*	90 (46-148)	31 (20-47)	73 (30-145)	511.052†	<0.001
Age group‡					
0-5 Years	279 (19)	970 (66.2)	216 (14.7)	573.920§	<0.001
6-12 Years	341 (57.4)	115 (19.4)	138 (23.2)		
13-18 Years	220 (54.1)	68 (16.7)	119 (29.2)		
Gender‡					
Female	326 (30.9)	504 (47.8)	225 (21.3)	10.250§	0.006
Male	514 (36.4)	649 (46)	248 (17.6)		
Day of the week‡					
Monday	119 (32.9)	177 (48.9)	66 (18.2)	21.568§	0.043
Tuesday	140 (37.4)	158 (42.2)	76 (20.3)		
Wednesday	120 (31.3)	202 (52.6)	62 (16.1)		
Thursday	134 (36)	159 (42.7)	79 (21.2)		
Friday	120 (35.4)	164 (48.4)	55 (16.2)		
Saturday	93 (32.2)	123 (42.6)	73 (25.3)		
Sunday	114 (32.9)	170 (49.1)	62 (17.9)		
Season‡					
Fall	226 (42.7)	215 (40.6)	88 (16.6)	139.785§	<0.001
Spring	200 (29.3)	343 (50.2)	140 (20.5)		
Summer	285 (40.1)	358 (50.4)	67 (9.4)		
Winter	129 (23.7)	237 (43.6)	178 (32.7)		
Holiday category‡					
Religious	33 (39.2)	42 (50)	9 (10.7)	9.438§	0.307
Week-day	602 (34.4)	824 (47)	326 (18.6)		
Official/ administrative	12 (38.7)	14 (45.2)	5 (16.1)		
Weekend	193 (32.2)	273 (45.6)	133 (22.2)		
School holiday status‡					
Closed	238 (33.3)	329 (46.1)	147 (20.6)	1.294§	0.524
Open	602 (34.4)	824 (47)	326 (18.6)		
Final outcome‡					
Discharge to outpatient clinics	558 (28)	1089 (54.6)	346 (17.4)	268.342§	<0.001
Hospitalization (Ward)	206 (57.2)	46 (12.8)	108 (30)	196.185§	<0.001
Intensive care unit admission	73 (85.9)	6 (7.1)	6 (7.1)	105.813§	<0.001
Underwent surgery	114 (83.8)	16 (11.8)	6 (4.4)	158.691§	<0.001
Physical impairment	6 (100)	0	0	-	-
Mortality	2 (66.7)	0	1 (33.3)	-	-

**: median (Q1-Q3), †: Kruskal–Wallis test ‡: n (%), §: Pearson Chi-square Test (Post-hoc Bonferroni correction)*

In our cohort, poisonings were particularly concentrated in the 0-5 age group. Young children are particularly vulnerable to accidental poisoning due to their curiosity and exploratory behavior (21). According to the World Health Organisation, approximately 45000 children and adolescents die each year from acute poisoning, with mortality rates four times higher in low-income countries (22,23). Similar to our findings, a study conducted in Vietnam reported that 65.6% of acute poisoning cases occurred in the 1-5 age group, while a study conducted in Nigeria found that 78.4% of poisoning cases occurred in children aged 5 years and under, particularly in boys from low socioeconomic backgrounds (24,25). In our study, medication ingestion was the most common cause of poisoning, followed by corrosive substance ingestion. Enboklang et al. (21) also emphasised that prescription and non-prescription medications are the most common causes of acute poisoning in children under 12 years of age. Contrary to previous reports showing higher rates of accidental poisoning in boys and higher rates of intentional poisoning in adolescent girls, we observed a higher prevalence of poisoning in girls aged 0-5 years (26). This may reflect region-specific sociocultural and household exposure factors. Previous studies have shown that boys generally spend more time outdoors than girls. Young girls may remain at home for longer periods, which may increase their risk of exposure to medicines and corrosive substances in the home (27,28).

Ingestion of corrosive substances also constituted a significant proportion of the cases in our study. In the United States, more than 100000 cases of corrosive substance poisoning are reported in children each year (29). Although parental education was not evaluated in our study, the fact that Van city province has the lowest socioeconomic status among Türkiye six most socioeconomically developed regions may be related to inadequate parental supervision and unsafe home environments, particularly among young children (30).

Trauma was the second most common cause and was the main cause of accidental injuries in adolescents. Previous studies have shown that trauma is more common in males, that traffic accidents are the main cause, and that a significant

Table IV: Comparison of variables across age groups in pediatric forensic cases

Variable	0-5 Years*	6-12 Years*	13-18 Years*	Test Statistic†	p
Number of patients	1486 (58.9)	618 (24.5)	420 (16.6)	-	-
Gender					
Female	651 (60.8)	258(24.1)	161 (15)	4.160	0.125
Male	835 (57.4)	360 (24.8)	259 (17.8)		
Day of the week					
Monday	228 (62.1)	87 (23.7)	52 (14.2)	8.160	0.772
Tuesday	216 (57)	97 (25.6)	66 (17.4)		
Wednesday	239 (61.3)	84 (21.5)	67 (17.2)		
Thursday	220 (57)	92 (23.8)	74 (19.2)		
Friday	209 (59.5)	89 (25.4)	53 (15.1)		
Saturday	168 (56.4)	81 (27.2)	49 (16.4)		
Sunday	206 (58.4)	88 (24.9)	59 (16.7)		
Season					
Fall	297 (54.5)	138 (25.3)	110 (20.2)	35.485	<0.001
Spring	446 (63.6)	153 (21.8)	102 (14.6)		
Summer	446 (61.6)	191 (26.4)	87 (12)		
Winter	297 (53.6)	136 (24.5)	121 (21.8)		
Holiday category					
Religious	53 (62.3)	21 (24.7)	11 (12.9)	9.674	0.289
Week-day	1061(59.1)	426 (23.7)	307 (17.1)		
Official/ administrative	21 (67.7)	9 (29)	1 (3.2)		
Weekend	351 (57.2)	162 (26.4)	101(16.4)		
School holiday status					
Closed	425 (58.2)	192 (26.3)	113 (15.5)	2.291	0.318
Open	1061 (59.1)	426 (23.7)	307 (17.1)		
Final outcome					
Discharge to outpatient clinics	1219 (59.9)	494 (24.3)	321 (15.8)	6.794	0.033
Hospitalization (Ward)	201 (54.9)	93 (25.4)	72 (19.7)	3.653	0.161
Intensive care unit admission	44 (46.8)	26 (27.7)	24 (25.5)	7.455	0.024
Underwent surgery	47 (33.8)	45 (32.4)	47 (33.8)	45.502	<0.001
Physical impairment	4 (57.1)	1 (14.3)	2 (28.6)	-	-
Mortality	5 (71.4)	1 (14.3)	1 (14.3)	-	-

**: n (%) , †: Pearson Chi-square Test (Post-hoc Bonferroni correction*

proportion of cases require major surgical intervention (31). Large cohort studies have also reported that head trauma is the most severe type of trauma and that mortality is higher in children under five years of age (32). Similarly, our findings show that trauma is more common in adolescent males and that hospitalisation and surgical intervention rates are higher than for other types of accidental injury, highlighting the significant burden of trauma on healthcare services. These cases typically require multidisciplinary treatment, including surgery and intensive care, highlighting the need for well-trained healthcare providers, adequate infrastructure, and preventive measures (33-35).

On February 6, 2023, two powerful earthquakes of magnitude 7.7 and 7.6 struck southeastern Türkiye, causing massive destruction and affecting millions in Türkiye and Syria (36). In our cohort, five patients (0.6%) presented with earthquake-related injuries, underscoring the impact of large-scale disasters on the pediatric injury burden.

Seasonal variations were also evident. Trauma was more common in summer and during weekdays, consistent with reports linking increased cases to school and outdoor activities (36). Children spend much of their time at school during weekdays and engage in various activities that carry a risk of injury, which may contribute to the higher number of weekday injury cases (37). In our cohort, the higher incidence of environmental events during winter months may be attributed to carbon monoxide poisoning due to the use of stoves and solid fuels in the region (38). Carbon monoxide poisoning accounted for more than 10% of all cases. This indicates that the use of stoves and solid fuels in the region is a significant public health issue. Therefore, preventive policies at the public health level are necessary, in addition to clinical approaches. Strengthening stove and chimney safety standards, educating the community on ventilation, promoting the widespread use of affordable carbon monoxide detectors, and providing government support for safe heating systems for disadvantaged families can reduce these preventable deaths and morbidity in childhood (39,40). These findings indicate that preventive strategies should take seasonal and regional risk factors into account.

Even minor injuries can negatively affect children's health and reveal underlying environmental risks. Many of these risks can be reduced through anticipatory guidance and

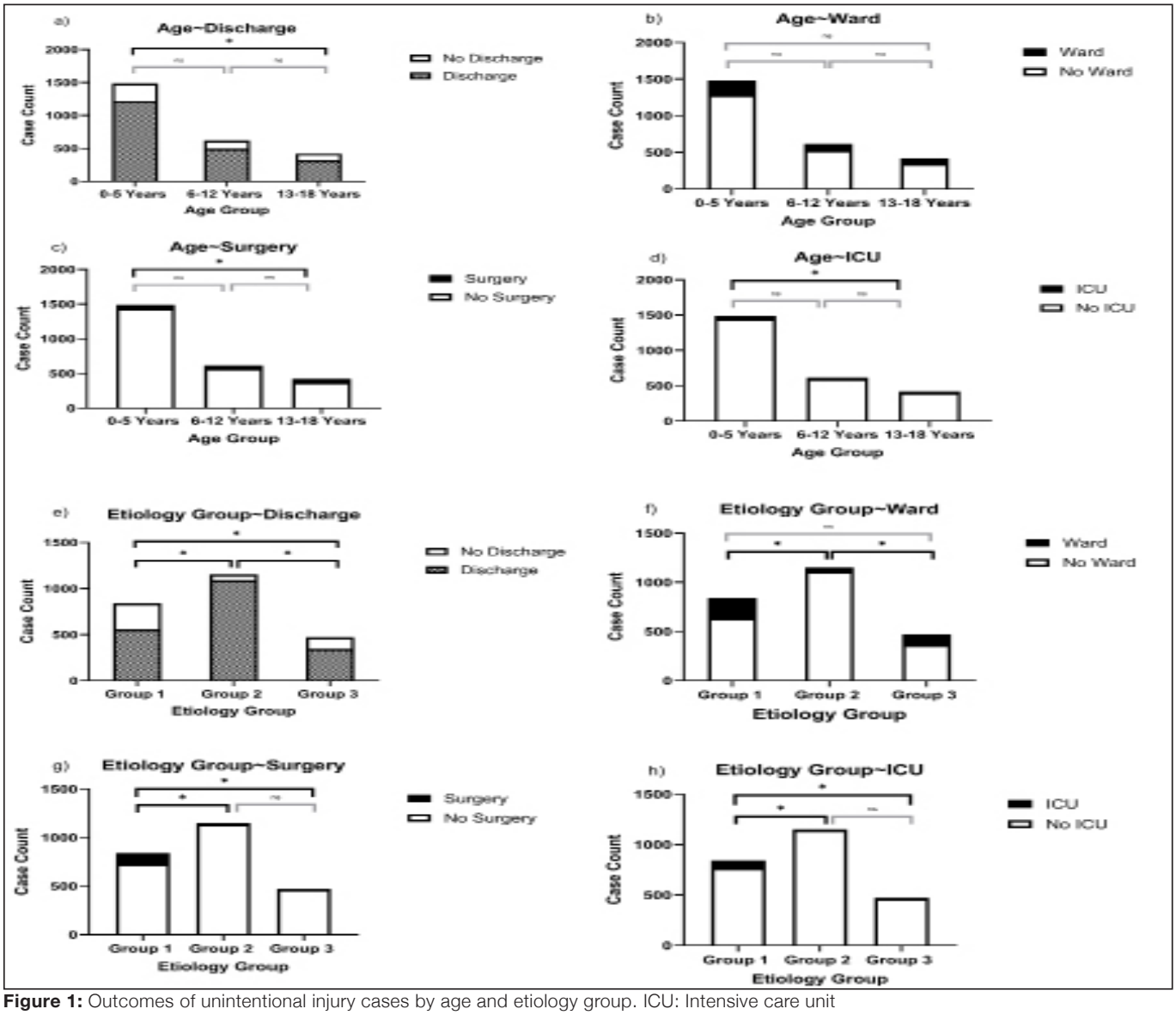

Figure 1: Outcomes of unintentional injury cases by age and etiology group. ICU: Intensive care unit

parental education provided by pediatricians in primary care. The American Academy of Pediatrics emphasizes safety promotion and injury prevention as key elements of child health supervision and recommends that counseling on unintentional injury prevention be offered at every health visit. In addition, family education programs, stronger household safety measures, and community-based awareness initiatives play a crucial role in reducing childhood poisonings and injuries (6).

Although most patients in our cohort were discharged from the emergency department without major health consequences, this does not indicate that pediatric forensic cases are clinically insignificant. Similar discharge rates have been reported in international studies (35). In a study from the United States, approximately 86% of pediatric poisoning cases were discharged from the emergency department (20). However, even cases with favorable clinical outcomes require substantial resource utilization, including prolonged observation, repeated laboratory testing, imaging, and antidote therapy. Therefore, despite low mortality and high discharge rates, pediatric unintentional injuries remain an important public health concern (25).

Limitations

Its retrospective design, based on forensic case records, may have led to underreporting of minor injuries. Analyses were restricted to demographic, seasonal, and temporal variables, without incorporating detailed clinical or sociodemographic factors such as parental education, income, residence, mechanism of injury, or treatments received. The low in-hospital mortality observed in our cohort likely underestimates the true burden, as fatalities before hospital arrival, severe cases directly admitted to intensive care, and long-term sequelae such as developmental or functional impairments were not systematically captured (3). Furthermore, post-discharge outcomes were unavailable, and the single-center design limits generalizability; however,

the hospital's role as a regional referral center enhances the representativeness of the findings. Despite these constraints, this study provides one of the largest datasets from a socioeconomically disadvantaged region of Türkiye, offering valuable evidence for pediatric emergency care and preventive policy development.

Conclusion

In this study evaluating 2524 pediatric forensic cases, poisonings were identified as the most common cause, predominantly affecting the 0–5 years age group. Trauma was more frequent among adolescents and was associated with higher rates of hospitalization and surgical intervention compared with other groups. In addition, the notable frequency of carbon monoxide poisoning in Van city highlights the significance of regional environmental risks.

These findings indicate that most pediatric forensic cases are largely preventable. Increasing parental awareness, strengthening household safety measures, and developing protective strategies tailored to regional risks are essential steps for ensuring the safety and well-being of children and adolescents.

Ethics committee approval

This study was conducted in accordance with the Helsinki Declaration Principles. The study was approved by Van Training and Research Hospital (01.11.2023, reference number: 2023/23-04).

Contribution of the authors

Study conception and design: ÖT, OS, ŞET; data collection: MÇK; analysis and interpretation of results: ÖT, OS, ŞET, MÇK; draft manuscript preparation: ÖT, ŞET. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Jullien S. Prevention of unintentional injuries in children under five years. BMC Pediatr. 2021;21(Suppl 1):311.https://doi.org/10.1186/s12887-021-02517-2
2. World Health Organization. Injuries and violence: the facts. Geneva: WHO; 2014. Available from: Chrome extension://efaidnbmnnnibpcajpcglclefindmkaj/https://iris.who.int/bitstream/handle/10665/149798/9789241508018_eng.pdf (Accessed: August 26, 2025).
3. World Health Organization. Injuries and violence: the facts. Geneva: WHO; 2014. Available from: http://whqlibdoc.who.int/ publications/2008/9789241563574 _ eng.pdf (accessed 28.08.2025).
4. World Health Organization. World Report on Child Injury Prevention: Summary. Geneva: WHO; 2008.
5. Balan B, Lingam L. Unintentional injuries among children in resource poor settings: where do the fingers point? Archives of disease in childhood. 2012;97(1):35-8. https://doi.org/10.1136/archdischild-2011-300589
6. Hagan JF, Shaw JS, Duncan PM. Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents. 4th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2017. https://doi.org/10.1542/9781610020237
7. Türkiye İstatistik Kurumu (TÜİK). Ulusal Eğitim İstatistikleri 2023. Bülten No: 53444. Ankara: TÜİK; 2024.
8. Perrin EM, Skinner AC, Sanders LM, et al. The injury prevention program to reduce early childhood injuries: a cluster randomized trial. Pediatrics. 2024;153(5):e2023062966. https://doi.org/10.1542/peds.2023-062966
9. T.C. Sanayi ve Teknoloji Bakanlığı, Kalkınma Ajansları Genel Müdürlüğü. İller ve Bölgeler Sosyoekonomik Gelişmişlik Sıralaması Araştırması (SEGE-2017). Ankara: Sanayi ve Teknoloji Bakanlığı; 2017. [07.06.2025]. Available from: https://www.sanayi.gov.tr/merkez-birimi/b94224510b7b/sege/il-sege-raporlari.
10. Varnaccia G, Saß AC, Rommel A. Unintentional injuries among children and adolescents in Germany. Data sources and results. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz. 2014;57(6):613-20. https://doi.org/10.1007/s00103-014-1962-z
11. Wang Z, Chen H, Yu T, et al. Status of injuries as a public health burden among children and adolescents in China: A systematic review and meta-analysis. Medicine (Baltimore). 2019;98(45):e17671. https://doi.org/10.1097/MD.0000000000017671
12. Giashuddin SM, Rahman A, Rahman F, et al. Socioeconomic inequality in child injury in Bangladesh-implication for developing countries. Int J Equity Health. 2009;8:1-8. https://doi.org/10.1186/1475-9276-8-7
13. Kanchan T, Menezes RG, Monteiro FN. Fatal unintentional injuries among young children-a hospital based retrospective analysis. J Forensic Leg Med. 2009;16(6):307-11. https://doi.org/10.1016/j.jflm.2008.12.017
14. Gummin DD, Mowry JB, Spyker DA, et al. 2017 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 35th Annual Report. Clin Toxicol (Phila). 2018;56(12):1213-415. https://doi.org/10.1080/15563650.2018.1533727
15. Gummin DD, Mowry JB, Beuhler MC, et al. 2022 Annual Report of the National Poison Data System(®) (NPDS) from America's Poison Centers(®): 40th Annual Report. Clin Toxicol (Phila). 2023;61(10):717-939. https://doi.org/10.1080/15563650.2018.1533727
16. Sawayama Y, Yamaji K, Kohsaka S, et al. Variation in in-hospital mortality and its association with percutaneous coronary intervention-related bleeding complications: A report from nationwide registry in Japan. PLoS One. 2021;16(12): e0261371. https://doi.org/10.1371/journal.pone.0261371
17. Jacobs JP, Mavroudis C, Jacobs ML, et al. What is operative mortality? Defining death in a surgical registry database: a report of the STS Congenital Database Taskforce and the Joint EACTS-STS Congenital Database Committee. Ann Thorac Surg. 2006;81(5):1937-41. https://doi.org/10.1016/j.athoracsur.2005.11.063
18. Haagsma JA, Graetz N, Bolliger I, et al. The global burden of injury: incidence, mortality, disability-adjusted life years and time trends from the Global Burden of Disease study 2013. Inj Prev. 2016;22(1):3-18. https://doi.org/10.1136/injuryprev-2015-041616
19. Hashikawa AN, Newton MF, Cunningham RM, et al. Unintentional injuries in child care centers in the United States: a systematic review. J Child Health Care. 2015;19(1):93-105. https://doi.org/10.1177/1367493513501020
20. Taplak AŞ, Tubaş F, Polat S. A retrospective records-based cohort of 1,082 pediatric forensic cases presenting to the emergency department. J Emerg Nurs. 2020;46(3):373-83. https://doi.org/10.1016/j.jen.2020.02.009

21. Uwumiro F, Okpujie V, Olaomi OA, et al. Profile of Childhood Poisoning and Its Outcomes in the United States: A One-Year Nationwide Study of Emergency and Inpatient Admissions. Cureus. 2023;15(4): e37452. https://doi.org/10.7759/cureus.37452
22. Suting E, Bhaskar V, Batra P. Changing epidemiology of poisoning in children: a retrospective study from a tertiary care center in New Delhi, India. Indian J Public Health. 2021;65(4):400-2. https://doi.org/10.4103/ijph.IJPH_234_21
23. Peden M. World Report on Child Injury Prevention. Geneva: WHO; 2008. https://doi.org/10.1111/j.1651-2227.2008.01162.x
24. Saikia D, Sharma R, Janardhan KV. Clinical profile of poisoning due to various poisons in children of age 0-12 years. J Family Med Prim Care. 2020;9(5):2291-6. https://doi.org/10.4103/jfmpc.jfmpc_365_20
25. Nguyen SN, Vu LT, Nguyen HT, et al. Childhood Acute Poisoning at Haiphong Children's Hospital: A 10-Year Retrospective Study. Int J Pediatr. 2023;2023(1):2130755. https://doi.org/10.1155/2023/2130755
26. Heji CC, Onu NN, Nduagubam OC, et al. Childhood poisoning: a 10-year experience in a tertiary hospital in Enugu State, Nigeria. Emerg Care J. 2024;20(2). https://doi.org/10.4081/ecj.2024.12351
27. Andiran N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara: what has changed in twenty years? Turk J Pediatr. 2004;46(2):147-52.
28. Boxberger K, Reimers AK. Parental correlates of outdoor play in boys and girls aged 0 to 12 - a systematic review. Int J Environ Res Public Health. 2019;16(2):190. https://doi.org/10.3390/ijerph16020190
29. Larouche R, Kleinfeld M, Charles Rodriguez U, et al. Determinants of outdoor time in children and youth: a systematic review of longitudinal and intervention studies. Int J Environ Res Public Health. 2023;20(2). https://doi.org/10.3390/ijerph20021328
30. Litovitz TL, Schmitz BF, Bailey KM. 1989 Annual report of the American Association of Poison Control Centers national data collection system. Am J Emerg Med. 1990;8(5):394-442.https://doi.org/10.1016/0735-6757(90)90234-Q
31. Schmertmann M, Williamson A, Black D, et al. Risk factors for unintentional poisoning in children aged 1-3 years in NSW Australia: a case-control study. BMC Pediatr. 2013;13:88. Epub 20130524. https://doi.org/10.1186/1471-2431-13-88
32. Fernandes JP, Hazra D, Jyothirmayi CA, et al. Adolescent trauma: patterns and outcomes. Int J Acad Med. 2021;7(2):126-31.https://doi.org/10.4103/IJAM.IJAM_103_20
33. Aoki M, Abe T, Saitoh D, et al. Epidemiology, patterns of treatment, and mortality of pediatric trauma patients in Japan. Sci Rep. 2019;9(1):917. https://doi.org/10.1038/s41598-018-37579-3
34. Newgard CD, Lin A, Olson LM, et al. Evaluation of Emergency Department Pediatric Readiness and Outcomes Among US Trauma Centers. JAMA Pediatr. 2021;175(9):947-56. https://doi.org/10.1001/jamapediatrics.2021.1319
35. Yilmaz G, Alemdar DK. Evaluation of Pediatric Forensic Cases Admitted to the Emergency Department in Turkey: A Retrospective Analysis. J Forensic Nurs. 2021;17(1): E1-E8. https://doi.org/10.1097/JFN.0000000000000309
36. Düzova A, Akgül S, Utine GE, et al. The Türkiye-Syria Earthquake: a response from the editors of the Turkish Journal of Pediatrics. Turk J Pediatr. 2023;65(1):1-2. https://doi.org/10.24953/turkjped.2023.E001
37. Agar A, Sahin A, Gunes O, et al. Seasonal variation in paediatric orthopaedic trauma patients - A single centre experience from Turkey. J Orthop Surg (Hong Kong). 2022;30(1):23094990211068146. https://doi.org/10.1177/23094990211068146
38. Terrani KF, Bhogadi SK, Hosseinpour H, et al. What Is Going on in Our Schools? Review of Injuries Among School Children Across the United States. J Surg Res. 2024;295:310-7. https://doi.org/10.1016/j.jss.2023.11.019
39. Gozubuyuk AA, Dag H, Kacar A, et al. Epidemiology, pathophysiology, clinical evaluation, and treatment of carbon monoxide poisoning in child, infant, and fetus. North Clin Istanb. 2017;4(1):100-7. doi: 10.14744/nci.2017.49368.
40. Can G, Sayılı U, Aksu Sayman Ö, et al. Mapping of carbon monoxide related death risk in Turkey: a ten-year analysis based on news agency records. BMC Public Health. 2019;19(1):9. https://doi.org/10.1186/s12889-018-6342-4