ORIGINAL ARTICLE

Clinical characteristics and socioeconomic determinants of unintentional childhood injuries: An emergency department perspective

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ABSTRACT

BACKGROUND: Unintentional childhood injuries (UCIs) are a leading cause of morbidity and mortality among children globally, imposing significant clinical and economic burdens, particularly in low- and middle-income countries. Emergency Departments (EDs) serve not only as the first point of contact for such events but also as the initial entry point for non-fatal UCIs, which represent a hidden and more substantial burden on health services. The primary objective of this study is to comprehensively analyze the clinical and socioeconomic determinants and predictors of unintentional childhood injuries (UCIs) presenting to the emergency department. Based on insights from these empirical data, the study further proposes a multidisciplinary, four-dimensional framework as a conceptual model to enhance systemic prevention and intervention strategies.

METHODS: This is a prospective and cross-sectional study. Data were collected using structured forms and digital medical records, covering demographic, familial, socioeconomic, and injury-related variables. Statistical analyses were performed to examine associations among risk factors, injury mechanisms, clinical outcomes, and mortality predictors.

RESULTS: Falls were the most common cause of UCI (49.8%), followed by traffic accidents (12.4%). Injuries most frequently occurred at home(43.6%), particularly in kitchens and gardens. Male patients constituted 62.7% of the cases. Statistically significant associations were observed between low maternal education, poor economic status, and higher Injury Severity Score (ISS). Multiple trauma(MT) was more common among children aged≥12 years and those with separated parents. Elevatedserum glucose (≥153 mg/dL) and glucose/potassium ratio (≥39.48) were identified as potential clinical markers for assessing mortality risk ($p<0.001$). MT, abdominal and thoracic trauma, and higher ISS were associated with increased mortality.

CONCLUSION: Early identification of high-risk patients using clinical predictors such as serum glucose may improve treatment outcomes. Additionally, the frequent occurrence of head, upper, and lower extremity injuries in the ED indicates that these regions should be carefully examined for potential injuries. The tendency for thoracic and abdominal injuries to co-occur, as well as the higher prevalence of MT among patients with abdominal trauma—and the predictive value of abdominal injuries for adverse clinical outcomes—underscore the need for thorough evaluation of other systems and differentiated clinical monitoring in children identified with abdominal injury. Multidisciplinary and systematic prevention and treatment strategies that address clinical, socioeconomic, and environmental factors remain essential for reducing both the incidence and severity of such injuries. The multidisciplinary, task force-oriented approach proposed in this study—emphasizing the clear definition of roles—may offer significant improvements in this regard.

Keywords: Childhood trauma; clinical prediction rule; emergency medicine; fourth dimension approach; multidisciplinary health team; models; risk factors; theoretical; unintentional injury.

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INTRODUCTION

Unintentional injuries refer to events that are undesired, unplanned, unintended, and not caused deliberately, in other words, accidents. The vast majority of unintentional injuries in children result from incidents such as falls, traffic accidents, burns, and drowning. According to the 2008 WHO/UNICEF World Report on Child Injury Prevention, it is estimated that 100 children die every hour due to such causes. As this projection illustrates, Unintentional Child Injuries (UCI) are among the leading causes of death in the pediatric population worldwide. In fact, as early as 1958, the WHO Regional Office for Europe identified injuries as "the leading cause of death among children in Europe." Despite numerous initiatives developed by governments and international organizations to address UCI, which is a preventable cause of mortality, recent statistics published by the CDC indicate that UCI remains one of the primary causes of childhood deaths. This situation underscores that UCI continues to represent a significant public health challenge requiring sustained international attention and intervention.[1-3]

In addition to mortality, injuries resulting from UCI impose a substantial burden on the healthcare system, particularly on emergency departments (EDs).[4] This is because non-fatal injuries occur far more frequently than deaths, and most affected children first present to the ED. A considerable proportion of these patients subsequently require inpatient treatment. This distribution is commonly illustrated by the injury pyramid.[5] Beyond their physiological and psychological impact on children, UCI also leads to significant anxiety and emotional distress among families and creates a notable socioeconomic burden on society. Research indicates that UCI is the leading cause of disability-adjusted life years (DALYs) lost among children.[6,7] These disabilities may be physical, cognitive, or psychological. Their consequences include school absenteeism, poor academic performance, reduced participation in social activities, and decreased employment opportunities in later life. Considering that approximately 90% of childhood injuries are caused by UCI, affecting tens of millions of children worldwide,[2] it is evident that research and policy interventions targeting the causes of UCI have the potential to produce meaningful reductions in morbidity, an impact that is at least as important as reducing mortality.

It is expected that the risk factors and underlying dynamics associated with non-fatal UCIs differ from those of fatal UCIs. Identifying these risks and implementing targeted interventions has the potential to significantly reduce the number of children who develop disabilities or require long-term care. Considering all these factors, UCIs constitute a substantial portion of the workload in emergency departments. Moreover, given that UCIs are a major source of both mortality and morbidity and that they are largely preventable or at least controllable. UCIs represent an important public health concern. Every child in the world has the right to protection and to live in a safe environment, and even small preventive measures can make a meaningful difference. This study aims to investigate the prevalence, mechanisms, and clinical outcomes of UCIs while identifying key socio-environmental risk factors. Distinct from traditional descriptive analyses, this research utilizes its clinical findings to develop a conceptual multidisciplinary and four-dimensional approach, providing a structured task-force model for public health and emergency medicine integration.

MATERIALS AND METHODS

Study Design

This research was designed as a prospective cross-sectional study. The study population consisted of boys and girls aged 0–18 years who presented to the ED of Konya City Hospital due to unintentional injuries. Hospital records indicated that approximately 9.821 pediatric trauma cases in this age group presented to the ED within one year. Previous studies in the literature have reported that childhood injuries occur with an average prevalence of 30% in this population.[4,8] Taking a population size of 9.821, a prevalence of 30%, a 5% margin of error, and a 90% confidence level, the required sample size was calculated as 222; therefore, a target of 225 participants was determined.

Study Population and Inclusion/Exclusion Criteria

The study included patients aged 0 to 18 years presenting to the emergency department due to unintentional injuries (e.g., falls, traffic accidents, burns). The inclusion criteria were defined as a confirmed history of an unintentional accident and the provision of parental consent. Cases with suspected intentional injury (e.g., physical abuse, assault) and those presenting with non-traumatic etiologies (e.g., infections, acute exacerbations of chronic diseases) were excluded. Furthermore, patients with missing essential data in their medical records, specifically serum glucose/potassium levels or Injury Severity Score (ISS), were excluded from the analysis.

Sampling Strategy

Injury mechanisms and the duration of time spent in various environments (home, school, and outdoors) vary significantly by age group. Considering this variability and to mitigate potential selection bias associated with ED workload and shift patterns, the sampling process was structured to cover the entire 24-hour cycle. Randomization was not restricted to specific hours but was designed to encompass all presentations within the daily loop. In our ED, both ambulatory and ambulance-transported pediatric trauma cases are evaluated in the same examination area. A random number table was applied to the chronological examination order of all admissions, and cases corresponding to the determined sequence numbers were included in the study. Data were collected consecutively from May 15 to June 15, 2025, to ensure a balance between weekday and weekend presentations and to achieve full temporal representation of the sample

Data Collection

A structured information form was used to assess variables including: mother's age, educational status, and employment status, father's age, education, and employment, presence of chronic disease, presence and number of siblings, socioeconomic status, mechanism and location of injury. For this study, clinical parameters such as trauma severity scores and affected body regions were recorded based on standardized diagnostic criteria. Specifically, Abdominal Trauma was defined as injuries to the abdominal wall or intra-abdominal organs (e.g., liver, spleen, intestines) identified via physical examination findings—including tenderness, ecchymosis, or distension—and/or confirmed through radiological imaging such as ultrasonography or computed tomography. Thoracic Trauma encompasses injuries involving the thoracic cage and its internal structures, such as rib fractures, pneumothorax, hemothorax, or parenchymal lung contusion, verified by clinical assessment and radiological findings (chest X-ray or computed tomography). Furthermore, Multisystem Trauma was characterized by the simultaneous involvement of two or more anatomical regions based on the Abbreviated Injury Scale (AIS) (head/neck, face, thorax, abdomen, extremities, and external structures), thereby distinguishing these cases from single-system injuries confined to a single body region. Information such as surgical intervention and survival status during follow-up was obtained from the hospital's digital medical records.

Statistical Analysis

Data obtained from the study were analyzed using IBM SPSS Statistics 23.0 (IBM Corp., Armonk, NY). Frequency, number, and percentage values were used for descriptive analyses of categorical variables. Continuous numerical variables were presented as Mean±Standard Deviation and ordinal variables as median (min–max).

For comparisons, Categorical variables were analyzed using the Chi-square (χ^2) test, and multi-group comparisons using multi-way Chi-square tests. When significant differences were detected, Dunn–Bonferroni post-hoc analysis was performed. Normality of distribution was assessed with the Kolmogorov–Smirnov and Shapiro–Wilk tests. For two-group comparisons of ordinal variables, the Mann–Whitney U test or Student's t-test was applied, depending on distribution characteristics. For comparisons involving more than two ordinal groups, the Kruskal–Wallis H test was used. Post-hoc analyses were conducted using Tukey or Games–Howell tests based on homogeneity of variance. Correlations between variables were evaluated using the Spearman correlation coefficient (ρ).

A p-value of <0.05 was considered statistically significant.

Ethical Approval

Ethical approval for the study was obtained from the University of Health Sciences Hamdiye Scientific Researches Ethics Committee (dated 22.08.2024, decision number 2024/9). Informed consent was obtained from parents or primary caregivers prior to data collection.

The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

Child-Related Variables

In this study, pediatric patients presenting to the ED due to UCIs were evaluated. UCIs occurred most frequently at age 10, accounting for 11.6% of all injuries. The mean age of injured children was 8.8±4.9 years. The age group with the lowest incidence of injuries was Age ≤2, whereas the group most frequently exposed to injuries was Age ≥12. As age and developmental skills increased, the number of UCIs also rose, and a statistically significant positive correlation was observed between age and UCI occurrence (p=0.04, ρ=0.951). Of the 225 children included in the study, 84 (37.3%) were female and 141 (62.7%) were male. Although boys predominated across all age groups (Age ≤2: males 61.5%, females 38.5%; 3≤ Age ≤6: males 58.9%, females 41.1%; 7≤ Age ≤11: males 60.9%, females 39.1%; Age ≥12: males 67.6%, females 32.4), the difference in gender distribution among age groups was not statistically significant (p=0.752, χ^2=1.204). The median number of siblings among injured children was 1 (Q1=1, Q3=2), and the median birth order was 2 (Q1=1, Q3=3), indicating that most children were the youngest in the family. Additionally, 184 families (81.8%) were identified as having a poor economic status. Sociodemographic characteristics of the children are presented in Table 1

Familial, Socioeconomic, and Environmental Variables

Among the children evaluated in the ED due to UCI, the median age of mothers was 35 years (Q1=30, Q3=40), while the median age of fathers was 38 years (Q1=34, Q3=42). The median floor level of the homes in which the children resided was 2 (Q1=1, Q3=3). A statistically significant relationship was found between maternal education level and the frequency of ED presentations due to UCI; as maternal education decreased, the number of children presenting with UCI increased (p=0.04, ρ=−0.948). Although the association between paternal education level and UCI was not statistically significant (p=0.20), the highest proportion of UCIs occurred among children whose fathers had lower educational attainment. Other familial characteristics of the children are presented in Table 2.

Injury-Related Variables

It was determined that 43.6% (n=98) of UCIs occurred at home, making it the most common location. Among home-related UCIs, the most frequent site was the garden (27%, n=27), followed by the kitchen (24%, n=24).

The most common type of injury was falls, observed in 112 cases (49.8%). Of these, 33 children (29.5%) sustained falls from height, whereas 66 children (58.9%) experienced same-

Table 1. General characteristics of children presenting to the emergency department due to unintentional injuries

Variables	n	%
Age Groups		
Age ≤2	26	11.5
3≤ Age ≤6	56	24.9
7≤ Age ≤11	69	30.7
Age ≥12	74	32.9
Gender		
Girl	84	37.3
Boy	141	62.7
Working Status		
Working	29	12.9
Not working	196	87.1
Chronic Disease		
Present	9	4.0
Absent	216	96.0
Diagnosis of Attention Deficit		
Present	6	2.7
Absent	219	97.3
Family's Economic Status		
Good	41	18.2
Moderate/Poor	184	81.8
Presence of Siblings		
Yes	196	87.1
No	29	12.9
Birth Order (n=196)		
First child	57	25.3
Middle child	35	15.6
Last child	104	46.2

level falls. Additionally, 1 child (0.9%) fell from a stroller, and 12 children (10.7%) were injured due to bicycle falls.

Among traffic-related injuries, 11 (4.9%) were pedestrians, 10 (4.4%) were passengers, and 7 (3.1%) were drivers. All UCIs reported as occurring in the workplace involved working children. When injury location was evaluated by age, the following median ages were recorded: Home injuries: median = 5 years (Q1=3, Q3=10), School injuries: median = 10 years (Q1=8, Q3=13), Workplace injuries: median = 15 years (Q1=13, Q3=16), Outdoor injuries: median = 10 years (Q1=6, Q3=15)

Other findings related to injury mechanisms and event characteristics, as well as factors demonstrating statistically significant associations, are presented in Table 3. Post-hoc analysis

Table 2. Family characteristics of children presenting to the emergency department due to unintentional injuries

Variables	n	%
Mother Alive		
Yes	224	99.6
No	1	0.4
Father Alive		
Yes	219	97.3
No	6	2.7
Mother's Employment Status (n=224)		
Employed	41	18.3
Unemployed	183	81.7
Father's Employment Status (n=219)		
Employed	202	92.2
Unemployed	17	7.8
Mother's Education Level (n=224)		
Primary/Secondary school	137	60.9
High school	48	21.3
University	39	17.3
Father's Education Level (n=224)		
Primary/Secondary school	139	61.8
High school	22	9.8
University	58	25.8
Parental Separation		
Yes	43	19.1
No	182	80.9
Chronic Disease in Mother (n=224)		
Present	27	12.1
Absent	197	87.9
Chronic Disease in Father (n=219)		
Present	19	8.7
Absent	200	91.3
Chronic Disease in Siblings (n=194)		
Present	12	6.2
Absent	182	93.8
Housing Type		
Detached house	68	30.2
Apartment	157	69.8
Home Ownership		
Rented	114	50.7
Owned	111	49.3

of Table 3 revealed significant age-dependent variations in injury locations. Children aged ≤2 years and 3–6 years experienced significantly higher rates of home injuries compared to

Table 3. Distribution of injury locations, event types, and related factors in unintentional child injuries

Variables	n	%	Related Factors
Injury Location			
Home	98	43.6	Age Group ($p<0.001$, $\chi^2=56.3$); Maternal chronic disease
School/Daycare	31	13.8	($p=0.03$, $\chi^2=4.37$); Family chronic disease ($p=0.02$, $\chi^2=5.25$);
Workplace	5	2.2	Parental separation ($p=0.037$, $\chi^2=4.35$); Event Type
Outdoor	91	40.4	($p<0.001$, $\chi^2=70.59$
Location of Injuries Occurring at Home (n=98)			
Bedroom	1	1.0	Age Group ($p=0.04$, $\chi^2=42.50$); Home ownership
Children's Room	5	5.1	($p=0.039$, $\chi^2=14.74$); Level of fall ($p<0.001$, $\chi^2=47.58$)
Living Room	22	22.4	
Kitchen	24	24.5	
Sitting Room	4	4.1	
Garden	27	27.6	
Stairs	4	11.2	
Bathroom/Washroom	4	4.1	
Event Type			
Burn	10	4.4	Age Group ($p<0.001$, $\chi^2=60.09$); Child working status
Laceration	8	3.6	($p=0.03$, $\chi^2=13.77$); Maternal employment
Collision / Impact	54	24.0	($p=0.009$, $\chi^2=17.08$); Injury Location ($p<0.001$, $\chi^2=70.59$);
Fall	112	49.8	Single vs. Multiple Trauma ($p=0.07$, $\chi^2=17.76$)
Falling Object	7	3.1	
Traffic Accident	28	12.4	
Animal-related (Cat/Dog)	6	2.7	

the 7–11 and ≥12 age groups, whereas school injuries were predominant in the 7–11 age group. Conversely, outdoor injuries—92.2% of which were traffic-related—were significantly more frequent in adolescents (≥12 years). Working children presented a distinct profile, sustaining significantly more workplace injuries but fewer home, school, and outdoor injuries compared to non-working peers. Workplace injuries were notably associated with advanced maternal/paternal age and larger household size. Furthermore, higher rates of outdoor injuries were observed in children from families with separated parents or chronic familial illnesses.

Regarding specific injury mechanisms, kitchen injuries (44.4%) and burn injuries (60.0%) were significantly clustered in the ≤2-year age group. Most burns (77.8%) occurred in the kitchen, exceeding falls or injuries from falling objects in this location. Garden injuries were most prevalent among children aged 7–11 years (57.1%). Notably, in detached houses, 42.9% of injuries occurred in the garden—where bicycle accidents were more common than falls—whereas in rented households, injuries were more frequent in the child's room. Traffic accidents were the leading cause of injury in the ≥12 age group (67.9%) and among working children. Finally, maternal employment status significantly influenced injury patterns; children of employed mothers had a higher incidence of lacerations (62.5%), while falls were more common (87.4%) among children of unemployed mothers. Clinically, injuries resulting from traffic accidents and falling objects were significantly associated with multisystem involvement.

The distribution of body regions affected by UCI and their frequencies is presented in Figure 1.

Head injuries were significantly more common among children in the Age ≤2 group ($p=0.02$, $\chi^2=14.90$), those with siblings ($p=0.04$, $\chi^2=4.05$), children living in rented homes ($p=0.01$, $\chi^2=5.93$), those who were hospitalized ($p=0.04$, $\chi^2=8.21$), and those who died ($p=0.02$, $\chi^2=5.16$). Conversely, head injury rates were significantly lower in non-operated patients compared with hospitalized patients ($p=0.001$, $\chi^2=13.08$), in first-born children compared with middle and last-born children ($p=0.04$, $\chi^2=7.97$), and in the Age ≥12 group compared with the younger age groups ($p=0.02$, $\chi^2=14.90$).

Neck injuries were significantly more common among children whose caregivers reported attention deficit compared with those without attention deficit ($p<0.001$, $\chi^2=11.02$).

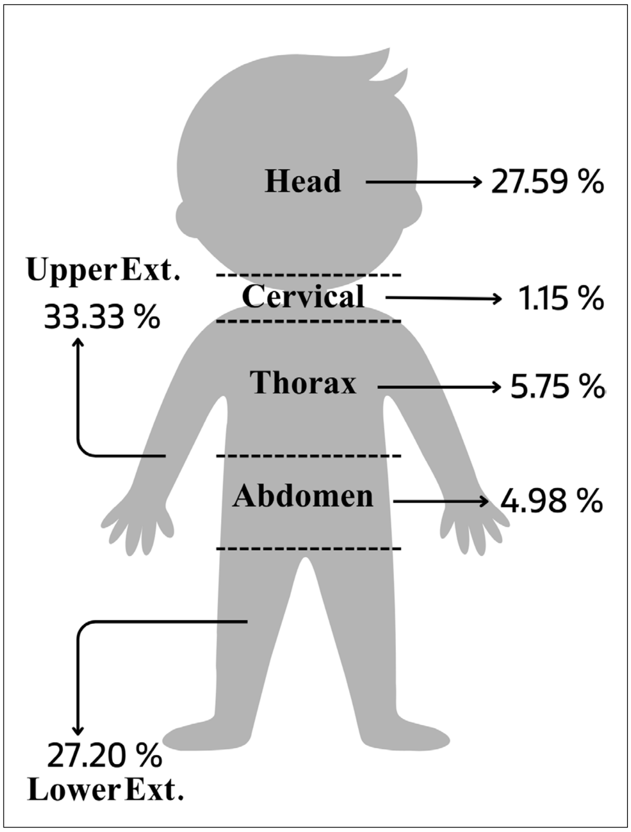

Figure 1. The anatomical distribution and incidence of body region involvement following unintentional childhood injuries. *Ext: Extremity.*

Upper extremity injuries were significantly more frequent in children with siblings than in those without (p=0.03, χ^2=4.53). Working children also had a significantly higher rate of upper extremity trauma (p=0.01, χ^2=5.58), and all workplace injuries involved the upper extremities. Upper extremity trauma in workplace settings was significantly higher than in all other injury mechanisms (p=0.01, χ^2=10.17).

Thoracic injuries were significantly more common in the 7–11 and ≥12 age groups compared with the younger groups (p=0.04, χ^2=13.02), and were markedly higher among children who died compared with survivors (p<0.001, χ^2=48.69).

Abdominal injuries were significantly more frequent in children whose mothers had lower educational levels (p=0.02, χ^2=5.16), in children with thoracic injuries (p<0.001, χ^2=22.41), and among non-survivors compared with survivors (p<0.001, χ^2=18.25).

Lower extremity injuries were significantly more common in fall-related events compared with other mechanisms (p=0.006, χ^2=17.96) and were significantly higher among children in the Age ≥12 group compared with younger groups (p=0.02, χ^2=9.66).

A total of 21 children (9.3%) presented with multisystem trauma. The likelihood of multisystem involvement was significantly higher in children with abdominal injury (p<0.001, χ^2=32.30) and those with thoracic injury (p<0.001, χ^2=77.79).

Among all 225 cases, 66 children (29.3%) required consultation, with a total of 83 consultations performed; 9 patients required consultation from more than one specialty. The remaining 159 children (70.7%) did not require consultation.

The consultations were distributed as follows: Orthopedics: 37 (44.6%), Neurosurgery: 13 (15.7%), Pediatric Surgery: 11 (13.3%), Thoracic Surgery: 8 (9.6%), Otolaryngology: 5 (6.0%), Ophthalmology: 5 (6.0%), Plastic and Reconstructive Surgery: 4 (4.8%),

Two children died in the ED, while among the remaining 223 children, 194 (86.2%) were treated and discharged from the ED. Treatment outcomes and mortality-related findings are presented in Table 4.

According to Table 4, when the Post-hoc analyses were made within the statistically significant variables and the groups that differed significantly were examined. Children in the Age ≥12 accounted for 57.1% of all multisystem traumas, representing a significantly higher proportion compared with other age groups. Among patients with multisystem trauma, the likelihood of parental separation was higher (19.5%) than in those with single-system injuries (7.1%). The need for consultation was also significantly greater among children with multisystem trauma (22.5%) compared with those without (3.8%). Children with multisystem trauma had markedly higher rates of hospital admission (31.0%), surgical intervention, and intensive care unit (ICU) follow-up (66.7%) compared with those with single-system trauma (6.1% and 15.0%, respectively). The mortality rate among children with multisystem UCI was 71.4%, significantly higher than the 7.3% observed in children with isolated injuries.

Injury Severity Score (ISS) among all UCI cases was 3.34±6.39 (min=1, max=45). ISS scores were significantly higher among children with multisystem involvement (p<0.001, U=27.18). A statistically significant difference in ISS was found according to maternal education level (p=0.02, H=9.76), with the significant pairwise difference observed between children of mothers with primary/middle school education (I) and those with university-level education (J) (p=0.03, Mean Difference I–J=3.56). Similarly, ISS varied significantly across age groups (p=0.02, H=9.74). The significant post-hoc difference was between the 7–11 age group (I) and the ≥12 age group (J) (p=0.04, Mean Difference I–J=−2.80). A weak but statistically significant positive correlation was observed between the child's age and ISS (p=0.03, r=0.139), and a negative correlation between maternal education and ISS (p=0.03, r=−0.144). There was a significant difference in ISS according to injury mechanism, driven by comparisons between traffic accidents (I) vs. collision injuries (J) (p=0.001, Mean Difference=5.85) and traffic accidents vs. falls (J) (p=0.01, Mean Difference=4.47). ISS was significantly higher among children who required consultation (p<0.001, U=269.00). Patients treated

Table 4. Multiple system trauma, treatment and mortality outcomes and related factors

Variables	n	%	Related Factors
System Involvement			
Single-system trauma	204	90.7	Age Group ($p=0.04$, $\chi^2=7.85$); Parental separation ($p=0.013$, $\chi^2=6.139$); Consultation ($p<0.001$, $\chi^2=19.80$); Event Type ($p=0.07$, $\chi^2=17.76$); Ward/ICU follow-up ($p<0.001$, $\chi^2=38.10$); Discharge/Hospitalization/Surgery ($p<0.001$, $\chi^2=21.89$); Mortality ($p<0.001$, $\chi^2=32.92$)
Multi-system trauma	21	9.3	
Treatment and Follow-up (n=223)			
Outpatient treatment	194	86.2	Multisystem trauma ($p<0.001$, $\chi^2=38.10$); ISS ($p<0.001$, U=182.0)
Inpatient treatment	29	13.8	
Surgically treated	14	48.2	
Not surgically treated	15	52.8	
Mortality			
Survived	218	96.9	Multipl travma ($p<0.001$, $\chi2=32.92$), Abdominal travma ($p<0.001$ $\chi2=18.25$), ISS ($p<0.001$ U=180.5), Serum Glikoz Seviyesi ($p=0.02$ U=684.0)
Died	7	3.1	
ED	2	28.6	
ICU	5	71.4	

ED: Emergency Department; ICU: Intensive Care Unit.

as outpatients (I) had significantly lower ISS than those who were hospitalized (J) ($p<0.001$, Mean Difference=−16.08) or underwent surgery(J) ($p<0.001$, Mean Difference=−8.27). ISS values were also significantly higher in children with thoracic injuries ($p<0.001$, U=508.00) and abdominal injuries ($p<0.001$, U=717.00).

Among non-survivors, ISS ($p<0.001$, U=180.50), glucose levels ($p<0.001$, z=−4.500), and the glucose/potassium ratio ($p<0.001$, z=−4.502) were all significantly higher than in survivors. A moderate, statistically significant positive correlation was found between glucose levels and ISS ($p<0.001$, r=0.620). Receiver Operating Characteristic (ROC) analysis demonstrated that at ED admission, a blood glucose level ≥153 mg/dL (Youden's Index=1) and a glucose/potassium ratio ≥39.48 (Youden's Index=1) represented clinically meaningful thresholds associated with increased mortality risk.

DISCUSSION

There is considerable variation in the reported ages at which UCIs most commonly occur in children. Some authors have stated that injuries are most frequent at an average age of 5.15±3.79 years, whereas others have reported higher-risk age groups such as 10–14 years.[9,10] In the present study, the mean age of UCI was 8.8±4.9 years, with the highest frequency observed at age 10. Several studies conducted in Türkiye support this finding.[11,12] This variation likely reflects unequal environmental conditions for children and suggests that UCIs have region-specific determinants.

Analysis of age groups revealed that children aged ≤2 years experienced the fewest UCIs, while the ≥12 age group experienced the most. The number of injuries increased with age and developmental progression ($p=0.04$, $\rho=0.951$). The observation that falls decrease with age, while home injuries occur more often in the ≤2 and 3–6 age groups, and traffic-related injuries increase in those ≥12, highlights the importance of age-stratified evaluation. These findings underscore the need for etiological studies that compare injury types across developmental stages.

The trends observed may be linked to children's increasing independence during exploration phases, combined with ongoing neurophysiological and psychological maturation. During these stages of heightened curiosity and exploratory behavior, balance and coordination skills are still developing.[13]

In this study, there was no statistically significant association between the child's sex and injury type or outcome. However, boys were more frequently admitted for UCIs across all age groups, consistent with previous reports.[11,14,15] Although physiological and motor development are generally similar between boys and girls—excluding changes during puberty—differences in injury rates may reflect sociocultural norms, gendered behavioral expectations, reinforced gender identity roles, and differences in play patterns, peer interactions, and social learning.[16]

The association of age with multiple variables—including common injury periods, injury location, mechanism, trauma region, multisystem injury frequency, and ISS—suggests that age may be a stronger determinant than sex in UCI patterns. Nonetheless, both age and sex must be considered when designing injury prevention strategies. Interventions involving parents, digital media, caregivers, peers, teachers, and educational environments play crucial roles. Risk-reduction strategies targeting environmental and physical hazards should also be prioritized.

The most common UCI mechanism in this study was falls (49.8%), consistent with prior literatüre.[17,18] Most injuries occurred at home (43.6%), particularly in the kitchen. Similar to findings reported by Sara Rosenblum et al.,[19] a large proportion of minor UCIs occurred indoors. Previous studies have attributed this to unsafe household environments—especially the kitchen.[20] Although home injuries are often perceived as low-risk, this study identified that "falling objects" were associated with multisystem trauma, clearly demonstrating that the home can sometimes be more hazardous than outdoor environments. This indicates the need for increased safety measures, particularly regarding unsecured household items.[19,21] The association between rented housing and increased head injuries, as well as increased injury frequency in children's rooms, raises questions about whether being a tenant delays safety modifications or reflects socioeconomic disadvantage.[22] Studies assessing repeated childhood injuries may help clarify these findings.[23]

Lower maternal education was associated with higher rates of abdominal trauma and higher ISS scores. In contrast, paternal education showed no such association, possibly because mothers spend more time involved in daily childcare. The high proportion of UCIs among children with fathers of low educational level underscores the need for educational interventions targeting both parents. The statistically significant negative correlation between maternal education and ISS underscores the pivotal role of education in shaping safety awareness and risk perception. These results align with prior research highlighting maternal educational attainment as a key socioeconomic determinant of injury severity and clinical outcomes.[24,25]

Although some studies highlight the impact of advanced parental age and larger family size on injury risk,[14] the association of workplace injuries with older parents in this study may be linked to socioeconomic disadvantage. Older parents may face reduced economic productivity, and larger families often experience financial strain, making child labor more common. The finding that 81.8% of families in this study had low socioeconomic status supports prior evidence that socioeconomic inequity, environmental conditions, and living circumstances are key determinants of UCI.[26,27]

Parental involvement reduces UCI incidence.[28] This study demonstrated that parental separation and parental chronic illness were associated with increased outdoor injuries and higher multisystem trauma rates. These findings suggest that shared, active parental caregiving is essential. Furthermore, parental separation and chronic illness may create psychosocial stress, reduce supervision, and increase injury susceptibility.[14,29,30] Prior literature has similarly reported that low maternal education, mental health issues, smoking, and substance use raise injury risk.[25,31] An important but often overlooked point is that non-parental caregivers (e.g., babysitters, daycare providers) also play critical roles in children's safety.[32] With many children spending substantial time in such environments, preventive programs targeting these groups are essential. In this study, lacerations were more common in children of working mothers, while falls were more common among children whose mothers did not work, suggesting differences in supervision and injury mechanisms during non-parental caregiving.

Although studies are reporting that a higher number of children in the family is associated with an increased incidence of UCI, no studies have been identified that evaluate its impact on the anatomical site of trauma.[14] The presence of siblings increased the likelihood of head injuries and upper-extremity trauma. This may be related to sibling play dynamics or conflict. Younger children being more frequently injured may reflect supervisory challenges or modeling behavior from older siblings. These findings suggest that sibling-focused safety education may be beneficial.

Regarding injury regions, UCIs most commonly affected the upper extremities (33.33%), followed by the head (27.59%) and lower extremities (27.20%), consistent with previous studies.[15] These regions warrant careful examination during ED evaluations. Thoracic and abdominal injuries were associated with multisystem trauma, highlighting the need for thorough systemic assessment in these cases. The association between cervical trauma and attention-deficit symptoms also warrants further investigation. Children presenting with cervical injuries or certain mechanisms should be screened for attention disorders during repeated visits.[33,34]

The majority of UCIs in this study were low-energy and involved single systems: 90.7% affected a single body region, 86.2% were managed on an outpatient basis, and hospitalized cases were primarily managed conservatively. The distribution of injury severity in our study mirrors (Figure 2) the classical injury pyramid described in previous reports.[5,35] While the apex represents a small percentage of mortality and hospitalizations, the vast majority of cases formed the broad base of low-energy, single-system injuries managed on an outpatient basis. However, this massive volume at the base of the pyramid underscores that the clinical burden of UCIs is driven not only by the severity of the few but also by the sheer number of ED presentations, necessitating comprehensive preventive and resource management strategies.

As expected, multisystem trauma and higher ISS scores were associated with increased mortality. Abdominal trauma was also linked to multisystem involvement, emphasizing its prognostic significance, consistent with previous findings.[36] Biochemical predictors have been studied in relation to trauma outcomes, highlighting their importance in clinical decision-making.[37,38] In this study, elevated glucose levels were associated with increased mortality. Hyperglycemia is well-described as a physiological stress response mediated by catecholamines, cortisol, insulin resistance, and inflammatory cytokines.[39-41] While adult studies show strong evidence for the prognostic value of glucose,[42-47] pediatric evidence remains limited. Some researchers suggest that values exceeding 150 mg/dL, while others propose 200 mg/dL, indicate poor outcomes. In one study, a threshold of 120 mg/dL predicted abnormal CT results.[48,49] Optimal glucose management has been shown to influence mortality outcomes, and similar relationships have been described between ISS and glucose.[50,51] This study supports these findings and suggests that incorporating glucose measurements into scoring systems may improve prognostic accuracy.

UCI prevention requires a multidisciplinary public health approach, including risk identification, hazard reduction, and coordinated interventions. Prevention strategies may be conceptualized using levels such as primordial, primary, secondary, tertiary, and quaternary prevention, traditionally applied to chronic disease but also applicable to UCIs. Health professionals play crucial roles across these levels.[52-54] Many studies have proposed strategies for prevention, yet gaps remain in the knowledge and behavior of healthcare professionals.[6,55-58] Raising awareness among health workers may significantly improve collaboration in UCI prevention.[59] The Haddon Matrix is a useful framework for understanding injury epidemiology, categorizing interventions across pre-event, event, and post-event phases.[5,60,61] Modern approaches, such as the Injury Equity Framework, expand this to include multidisciplinary strategies incorporating 3E (Education, Engineering, Enforcement), 5E (Education, Engineering, Enforcement, Economic incentives, Emergency response), and 7E (Education, Engineering, Enforcement, Economic incentives, Emergency response, Enablement, Ergonomics) models.[5,62,63]

Integrating these frameworks, health protection strategies, the Haddon Matrix, and injury equity models may provide comprehensive insight into modifiable risk factors. A clear definition of interdisciplinary responsibilities is essential, yet often overlooked. As a contribution of this study, the Multidisciplinary Approach of Prevention and Treatment Framework is proposed (Figure 3) to guide future work.

Emergency medicine is the primary point of contact for childhood injuries. Therefore, beyond providing treatment services, emergency physicians play a crucial role in identifying children at risk for recurrent injuries and educating families about prevention, as well as guiding them regarding the requirements of the rehabilitation process. At this strategic intersection, emergency physicians are well-positioned to implement the Multidisciplinary and Four-dimensional Approach, which delineates the responsibilities of emergency medicine across the primordial, primary, secondary, tertiary, and quaternary levels of prevention in childhood injuries. The roles of emergency physicians can be clearly defined at each of these stages. In addressing this problem, emergency medicine physicians must act without delay to foster collaboration not only with family physicians and pediatricians, but also with a broad spectrum of medical and non-medical disciplines.

Limitation

This study focused on the epidemiology of UCIs, emergency department diagnoses, treatment strategies, mortality, and ISS outcomes. Its primary limitation is the single-center design, which may restrict the generalizability of the findings as injury mechanisms and event types vary significantly by region. While the sample size (n=225) was calculated to pro-

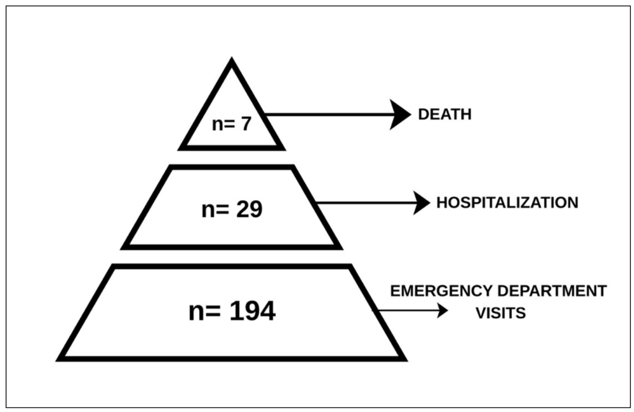

Figure 2. The pediatric injury severity pyramid. The diagram illustrates the distribution of cases based on injury outcome severity within the study population (n=225). The base represents patients discharged after outpatient treatment (n=194), the middle section represents hospitalized patients requiring surgical or conservative management (n=29), and the apex represents mortality (n=7) occurring in the ED or ICU.

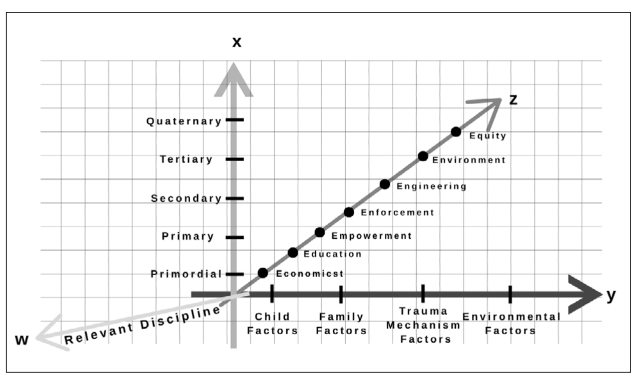

Figure 3. A Multidisciplinary and Four-Dimensional Approach to Unintentional Childhood Injuries. In the figure, the x-axis represents the concept of prevention in healthcare, the y-axis represents accident risk factors, the z-axis denotes the methodology to be followed in addressing risk factors and the clinical approach, and the w-axis indicates the relevant discipline responsible for intervention.

vide baseline insights, it limited the statistical power for more complex subgroup analyses. Most notably, the small number of fatal cases (n=7) in our study population directly affects the reliability and precision of the statistical thresholds. Therefore, the identified cut-off values for serum glucose and the glucose/potassium ratio should be interpreted as potential clinical indicators with limited confidence intervals, rather than definitive prognostic rules. These biochemical findings remain preliminary and necessitate validation in larger, multicenter cohorts with higher mortality rates. Nevertheless, the fundamental aim of this study was to contribute to ongoing efforts to highlight UCIs as a major public health issue. The need for continued action is clear, and each step taken in this direction has the potential to meaningfully improve the health and well-being of children worldwide.

CONCLUSION

This comprehensive analysis of children presenting to the ED following UCIs demonstrates that unintentional childhood injuries impose a significant clinical and socioeconomic burden and remain a major public health concern.

Our findings reveal that injury patterns and severity are shaped by a complex interplay of demographic, socioeconomic, familial, and environmental factors. In particular, low maternal education, poor socioeconomic status, and household-related characteristics were associated with higher injury severity and worse outcomes. These results underscore the potential diagnostic and prognostic value of incorporating sociodemographic factors into the clinical assessment of UCI presentations.

Clinical predictors such as elevated serum glucose and glucose/potassium ratios may offer auxiliary insights during acute triage; however, their application as independent clinical prediction rules requires more robust evidence from broader studies

Multidisciplinary, systematic prevention strategies that consider not only clinical factors but also the broader social context are essential to reducing both the frequency and impact of pediatric injuries. There is an urgent need for targeted interventions that engage families, healthcare providers, educators, and policymakers to strengthen both preventive and therapeutic approaches in the care of children affected by UCIs.

Ethics Committee Approval: This study was approved by the University of Health Sciences Hamdiye Scientific Research Ethics Committee (Date: 22.08.2024, Decision No: 2024/9).

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REFERENCES

1. Jin Z, Han B, He J, Huang X, Chen K, Wang J, et al. Unintentional injury and its associated factors among left-behind children: A cross-sectional study. BMC Psychiatry 2023;23:478. [CrossRef]
2. Towner E, Scott I. WHO guidelines approved by the guidelines review committee. In: Peden M, Oyegbite K, Ozanne-Smith J, Hyder AA, Branche C, Rahman A, et al., editors. World report on child injury prevention. Geneva: World Health Organization; 2008.
3. National Center for Health Statistics. Accidents or unintentional injuries. Available at: https://www.cdc.gov/nchs/fastats/accidental-injury.htm. Accessed March 4, 2026.
4. Fidancı İ, Derinöz O, Tokgöz A. Cases admitted to pediatric emergency department due to trauma related to fall. Pediatr Pract Res 2021;9:5–10. [In Turkish]
5. Yanchar NL, Warda LJ, Fuselli P. Child and youth injury prevention: A public health approach. Paediatr Child Health 2012;17:511–2. [CrossRef]
6. Jullien S. Prevention of unintentional injuries in children under five years. BMC Pediatr 2021;21:311. [CrossRef]
7. Xu RB, Jin DY, Song Y, Wang XJ, Dong YH, Yang ZG, et al. Study on the disease burden of Chinese adolescents in 2015. Zhonghua Yu Fang Yi Xue Za Zhi 2017;51:910–4. [In Chinese]
8. Mahboob A, Richmond SA, Harkins JP, Macpherson AK. Childhood unintentional injury: The impact of family income, education level, occupation status, and other measures of socioeconomic status. A systematic review. Paediatr Child Health 2021;26:e39–45. [CrossRef]
9. Gong H, Lu G, Ma J, Zheng J, Hu F, Liu J, et al. Causes and characteristics of children unintentional injuries in emergency department and its implications for prevention. Front Public Health 2021;9:669125. [CrossRef]
10. Haller F, Lauritsen JM, Faergemann C. Age-related trends in unintentional injuries among children and adolescents in an urban Danish population 1980–2021. A cohort study of 292,737 children and adolescents. Injury 2024;55:111400. [CrossRef]
11. Aydemir A, Ayyıldız M. Identification of demographic characteristics and emergency nursing interventions of traumatized children presenting to the emergency department. Sakarya Univ J Holist Health 2022;5:234–50. [In Turkish]
12. Kart Y, Bilaloğlu E, Duman L, Savaş M, Büyükyavuz İ. Assessment of patients followed up in pediatric surgery service due to trauma: a retrospective 5-year study. Med J SDU 2021;28:537–41. [In Turkish] [CrossRef]
13. Demircan HÖ, Saçan S. Fiziksel ve motor gelişim. In: Özçelik ADÖ, editor. Çocuk gelişimi. Ankara: Pegem Akademi; 2021. p. 1–28. [In Turkish] [CrossRef]
14. Ghebreab L, Kool B, Lee A, Morton S. Risk factors of unintentional injury among children in New Zealand: A systematic review. Aust N Z J Public Health 2021;45:403–10. [CrossRef]
15. Çelik E. Evaluation of pediatric trauma cases admitted to the emergency department. Maltepe Tıp Derg 2023;15:17–21. [In Turkish]
16. Eke K. Sosyal gelişim. In: Özçelik ADÖ, editor. Çocuk gelişimi. Ankara: Pegem Akademi; 2021. p. 133–61. [In Turkish] [CrossRef]
17. Henery PM, Dundas R, Katikireddi SV, Leyland A, Wood R, Pearce A. Social inequalities and hospital admission for unintentional injury in young children in Scotland: A nationwide linked cohort study. Lancet Reg Health Eur 2021;6:100117. [CrossRef]

18. Culasso M, Porta D, Brescianini S, Gagliardi L, Michelozzi P, Pizzi C, et al. Unintentional injuries and potential determinants of falls in young children: Results from the Piccolipiù Italian birth cohort. PLoS One 2022;17:e0275521. [CrossRef]
19. Rosenblum S, Nardi-Moses T, Goez H, Demeter N. Children who experience unintentional injuries: Their functional profiles. Occup Ther Int 2022;2022:6731339. [CrossRef]
20. Banerjee B, Banerjee R, Ingle GK, Mishra P. Unintentional childhood injuries and their association with activity and location at the time of injury: A case–crossover study in Delhi. Indian J Public Health 2021;65:352–5. [CrossRef]
21. Vatansever G, Şimşekli E, Sivaslı İ, Özge AE, Aksu AH, Barutçu A, et al. Home is not always safe: Pediatric unintentional home injuries in a tertiary emergency department setting. J Clin Med 2025;14:7444. [CrossRef]
22. Cohen JS, Howard MB, McDonald EM, Ryan LM. A call to action: Addressing socioeconomic disparities in childhood unintentional injury risk. Pediatrics 2024;153:e2023303445. [CrossRef]
23. Peters SM, Davies MA, Van As AB. Repeat injuries in childhood. S Afr Med J 2020;110:1218–25. [CrossRef]
24. Balogun OJ, Bello OO, Nkhata LA, Conran J. Maternal knowledge and attitude towards unintentional childhood injury among children under five. Afr J Disabil 2025;14:1617. [CrossRef]
25. Tanskanen AO, Metsä-Simola N, Volotinen L, Danielsbacka M, Martikainen P, Remes H. Maternal psychiatric and somatic illness, and the risk of unintentional injuries in children. J Epidemiol Community Health 2024;78:129. [CrossRef]
26. Shimony-Kanat S, Orr D, Falk A. Social and economic factors associated with child unintentional injury mortality in high-income countries. Inj Prev 2024;30:194–9. [CrossRef]
27. Sengoelge M, Elling B, Laflamme L, Hasselberg M. Country-level economic disparity and child mortality related to housing and injuries: A study in 26 European countries. Inj Prev 2013;19:311–5. [CrossRef]
28. Kawahara T, Doi S, Isumi A, Ochi M, Fujiwara T. Interventions to change parental parenting behaviour to reduce unintentional childhood injury: A randomised controlled trial. Inj Prev 2023;29:126–33. [CrossRef]
29. Swanson MH, Morgan CH, Johnston A, Schwebel DC. Caregiver accounts of unintentional childhood injury events in rural Uganda. J Safety Res 2023;85:101–13. [CrossRef]
30. Lyngsøe BK, Munk-Olsen T, Vestergaard CH, Rytter D, Christensen KS, Bech BH. Maternal depression and childhood injury risk: A population-based cohort study in Denmark. Brain Behav 2021;11:e02029. [CrossRef]
31. Senabye PK, Zeng X. Factors associated with under-fives unintentional injuries in Kgalagadi South, Botswana. Int J Inj Contr Saf Promot 2024;31:591–8. [CrossRef]
32. Pathak P, Joshi SK. Epidemiology of unintentional childhood injuries in urban and rural areas of Nepal: A comparative study. PLoS One 2023;18:e0287487. [CrossRef]
33. İz M, Çeri V. Prevalence of attention deficit hyperactivity disorder symptoms in children who were treated at emergency service due to unintentional injury. Emerg Med Int 2018;2018:7814910. [CrossRef]
34. Ayaz AB, Ayaz M, Şentürk E, Soylu N, Yüksel S, Yulaf Y. Factors related with unintentional injuries in children with newly diagnosed attention-deficit/hyperactivity disorder. Int J Inj Contr Saf Promot 2016;23:93–8. [CrossRef]
35. Akdeniz S, Okur MH, Göya C. Demographic, clinic, and laboratory results of the patient with blunt liver traumaretrospective analysis between 2006-2016. Dicle Med J 2020;47:366–76. [In Turkish] [CrossRef]
36. Çolakoğlu Y, Bakal Ü, Saraç M, Tartar T, Akkuş T, Kazez A. Mortality predictors in childhood trauma. Fırat Univ Sağlık Bil Tıp Derg 2021;35:46–50. [In Turkish]
37. Varol F, Can YY, Özgünay B, Cengiz M, Altas U, Güven Ş, et al. Retrospective evaluation of pediatric trauma patients: A single-center experience of a tertiary pediatric intensive care unit. J Med Palliat Care 2022;3:158–64. [CrossRef]
38. Çakır A, Durak VA, Taşkapılıoğlu MÖ, Özkaya G, Kahveci N. The Effect of Blood Glucose Level and Body Temperature on Prognosis in Pediatric Head Traumas. J Uludag Univ Med Fac 2022;48:137–41. [In Turkish] [CrossRef]
39. El-Menyar A, Asim M, Mir F, Hakim S, Kanbar A, Siddiqui T, et al. Patterns and effects of admission hyperglycemia and inflammatory response in trauma patients: A prospective clinical study. World J Surg 2021;45:2670–81. [CrossRef]
40. Al-Hassani I, Khan NA, Elmenyar E, Al-Hassani A, Rizoli S, Al-Thani H, et al. The interaction and implication of stress-induced hyperglycemia and cytokine release following traumatic injury: A structured scoping review. Diagnostics (Basel) 2024;14:2649. [CrossRef]
41. Rau CS, Wu SC, Chen YC, Chien PC, Hsieh HY, Kuo PJ, et al. Higher mortality in trauma patients is associated with stress-induced hyperglycemia, but not diabetic hyperglycemia. Int J Environ Res Public Health 2017;14:1161. [CrossRef]
42. Bulut B, Genc M, Öz MA, Hanalioglu D, Kokulu K, Sert ET, et al. Prognostic indicators in patients with isolated thoracic trauma: A retrospective cross-sectional study. 2024;30.
43. Katipoğlu B, Demirtas E. Assessment of serum glucose potassium ratio as a predictor for morbidity and mortality of blunt abdominal trauma. Turk J Trauma Emerg Surg 2022;28:134.
44. Buz M, Ustaalioğlu İ. Predicting mortality in penetrating thoracic trauma in the emergency department: The prognostic value of the glucose-to-potassium ratio. Turk J Trauma Emerg Surg 2025;31:40–6. [CrossRef]
45. Turan E, Şahin AJ. Role of glucose/potassium ratio and shock index in predicting mortality in patients with isolated thoracoabdominal blunt trauma. Turk J Trauma Emerg Surg 2022;28:1442. [CrossRef]
46. Unal A, Dogan A. Comparison of glucose/potassium ratio and revised trauma score in predicting mortality in patients with isolated blunt head trauma. Sci Rep 2025;15:33463. [CrossRef]
47. Su WT, Wu SC, Chou SE, Huang CY, Hsu SY, Liu HT, et al. Higher mortality rate in moderate-to-severe thoracoabdominal injury patients with admission hyperglycemia than nondiabetic normoglycemic patients. Int J Environ Res Public Health 2019;16:3562. [CrossRef]
48. Alexiou GA, Lianos GD, Sotiropoulos A, Voulgaris S. Novel biomarkers may aid the decision for CT scan in emergency settings in mild head trauma. Biomarkers Med 2019;13:1055–7. [CrossRef]
49. Melo JRT, de Brito Tischer CM, Rodrigues FPA, Giordano JC, de Oliveira LFG, Bodra SM, et al. Accuracy of acute hyperglycemia as a biomarker of severe brain damage in children with traumatic brain injury. Childs Nerv Syst 2024;40:2781–7. [CrossRef]
50. Quintana-Pajaro L, Padilla-Zambrano HS, Ramos-Villegas Y, Lopez-Cepeda D, Andrade-Lopez A, Hoz S, et al. Cerebral traumatic injury and glucose metabolism: A scoping review. Egypt J Neurosurg 2023;38:62. [CrossRef]
51. Pomerantz WJ, Hashkes PJ, Succop PA, Dowd MD. Relationship between serum glucose and injury severity score in childhood trauma. J Pediatr Surg 1999;34:1494–8. [CrossRef]
52. Keyes D, Turfe H, Das JM. Prevention strategies. StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.
53. Akyıldız HÇ, Okyay P. The development and scope of the concept of prevention in health. Sürekli Tıp Eğitimi Derg 2024;33:146–56. [In Turkish]
54. Agarwal M, McFadden TD, Schwebel DC. Developmental considerations for pediatric unintentional injury prevention. Pediatr Clin North Am 2025;72:1047–62. [CrossRef]
55. Curci SG, Gallegos JV. Commentary: Prevention of unintentional injury during preschool. J Pediatr Psychol 2023;49:244–6. [CrossRef]
56. Ding L, Luo J, Smith DM, Mackey M, Fu H, Davis M, et al. Effectiveness of warm-up intervention programs to prevent sports injuries among children and adolescents: A systematic review and meta-analysis. Int J Environ Res Public Health 2022;19:6336. [CrossRef]

57. Tupetz A, Friedman K, Zhao D, Liao H, Isenburg MV, Keating EM, et al. Prevention of childhood unintentional injuries in low- and middle-income countries: A systematic review. PLoS One 2020;15:e0243464. [CrossRef]
58. Ye PP, Jin Y, Er YL, Duan LL. Objectives and strategies of unintentional injury prevention and control in 31 provincial children's development outlines in China. Zhonghua Liu Xing Bing Xue Za Zhi 2021;42:1380–91.
59. Zosel A, Kohlbeck S, Davis CS, Meurer L, Hargarten S. Medical student education for injury prevention: Closing the gap. Inj Prev 2021;27:201–5. [CrossRef]
60. Gordon JE. The epidemiology of accidents. Am J Public Health Nations Health 1949;39:504–15. [CrossRef]
61. Runyan CW. Using the Haddon matrix: Introducing the third dimension. Inj Prev 1998;4:302–7. [CrossRef]
62. Kendi S, Macy ML. The injury equity framework — establishing a unified approach for addressing inequities. N Engl J Med 2023;388:774–6. [CrossRef]
63. Qi X, Yao X, Cong X, Li S, Han M, Tao Z, et al. Profile and risk factors in farmer injuries: A review based on Haddon matrix and 5 E's risk reduction strategy. Front Public Health 2024;12:1322884. [CrossRef]

ORİJİNAL ÇALIŞMA - *ÖZ*

Çocukluk çağı kazalarının klinik özellikleri ve sosyoekonomik belirleyicileri: Acil servis perspektifi

AMAÇ: Kazalar, çocuklar arasında dünya genelinde morbidite ve mortalitenin önde gelen nedenlerinden biridir ve özellikle düşük ve orta gelirli ülkelerde önemli klinik ve ekonomik yükler oluşturmaktadır. Acil servisler (AS), bu tür olaylar için yalnızca ilk başvuru noktası olmakla kalmayıp, aynı zamanda sağlık hizmetlerine daha büyük ve görünmeyen bir yük oluşturan ölümcül olmayan çocukluk çağı kazalarının da ilk başvuru noktasıdır. Bu çalışmanın temel amacı, acil servise (AS) başvuran kazara çocukluk çağı yaralanmalarının klinik ve sosyoekonomik belirleyicilerini ve öngörücülerini kapsamlı bir şekilde analiz etmektir. Elde edilen bu verilerden yola çıkarak çalışma; sistemik önleme ve müdahale stratejilerini güçlendirmek adına, çok disiplinli ve dört boyutlu bir çerçeveyi kavramsal bir model önerisi olarak sunmaktadır

GEREÇ VE YÖNTEM: Bu çalışma, acil servise kaza nedeniyle başvuran hastaları kapsayan prospektif, kesitsel bir çalışmadır. Veriler; demografik, ailevi, sosyoekonomik ve yaralanmayla ilgili değişkenleri içerecek şekilde yapılandırılmış formlar ve dijital tıbbi kayıtlar kullanılarak toplanmıştır. Risk faktörleri, yaralanma mekanizmaları, klinik sonuçlar ve mortalite öngörücüleri arasındaki ilişkileri incelemek için istatistiksel analizler yapılmıştır.

BULGULAR: Çocukluk çağı kazalarının en sık nedeni düşmelerdi (%49.8), bunu trafik kazaları (%12.4) izledi. Yaralanmalar en sık evde (%43,6), özellikle mutfak ve bahçelerde meydana gelmişti. Vakaların %62.7'sini erkek hastalar oluşturuyordu. Düşük anne eğitimi, kötü ekonomik durum ve yüksek Yaralanma Şiddet Skoru (ISS) arasında anlamlı ilişki saptandı. Multipl travmalar, 12 yaş ve üzeri çocuklarda ve ayrı ebeveynli olanlarda daha sık görülmekteydi. AS başvurusunda yüksek serum glukoz düzeyi (≥153 mg/dL) ve glukoz/potasyum oranı (≥39.48) mortalitenin potansiyel öngörücüleri olarak belirlendi ($p<0.001$). Multipl travma, abdominal ve torasik travma ile yüksek ISS artmış mortalite ile ilişkili bulundu.

SONUÇ: Serum glukozu gibi klinik öngörücüler kullanılarak yüksek riskli hastaların erken tespiti tedavi sonuçlarını iyileştirebilir. Ayrıca, acil serviste baş, üst ve alt ekstremite yaralanmalarının sık görülmesi, bu bölgelerin olası yaralanmalar açısından dikkatle incelenmesi gerektiğini göstermektedir. Abdominal yaralanmaların kötü klinik sonuçları öngörmedeki rolü dikkate alındığında, torasik ve abdominal yaralanmaların birlikte görülme eğilimi ve abdominal travmaya sahip hastalarda çoklu travma prevalansının yüksekliği, abdominal yaralanması tespit edilen çocuklarda diğer sistemlerin detaylı değerlendirilmesini ve farklı klinik izlem ve takibi gerektirdiğini göstermektedir. Çocukluk çağı kazaları, sonuçları potansiyel olarak önlenebilir olan önemli bir halk sağlığı sorunudur. Klinik, sosyoekonomik ve çevresel faktörleri ele alan çok disiplinli ve sistematik önleme stratejileri, bu tür yaralanmaların hem insidansını hem de şiddetini azaltmak açısından önemini korumaktadır. Bu çalışmada, elde edilen klinik ve sosyoekonomik bulgular ışığında önerilen görev gücü odaklı çok disiplinli yaklaşım, çocukluk çağı yaralanmalarının yönetiminde sistematik ve etkin bir iyileştirme sağlayabilir

Anahtar sözcükler: Acil tıp; çocuk travmaları; dördüncü boyut yaklaşımı; kazalar; klinik tahmin kuralı; multidisipliner sağlık ekibi; modeller; risk faktörleri; teorik.

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