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Original Article

Evaluation of forensic cases under the age of 18 reported at İnönü University Turgut Özal Medical Center forensic medicine polyclinic

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Abstract

Aim: The aim of our study was to reveal the sociodemographic characteristics of children presenting with forensic cases, determine the types of trauma they were exposed to based on age groups and sex, identify key factors to consider in forensic medical evaluations, and develop recommendations for child protection.
Materials and Methods: Between September 2008 and May 2021, 132 cases under the age of 18 for whom forensic reports were prepared at the Department of Forensic Medicine at İnönü University were retrospectively analyzed in terms of age, sex, reason for the report request, requesting units, date of the incident, location of the trauma, injuries sustained, and report results.
Results: Among the cases, 91 (68.9%) were male and 41 (31.1%) were female. The highest number of reports were requested for the 0-6 age group (43.2%). The majority of report requests (64.4%) were made by judicial law enforcement units. The incidents occurred most frequently in July (13.6%) and during the summer season (31.8%). The most common causes of injury were traffic accidents (37.1%), followed by assault (15.9%) and falls (15.9%). In the 15-17 age group, assault incidents (33.3%) were the most common, while traffic accidents were the most frequent in other age groups. Injuries to the head, neck, and face accounted for 36.1% of the total injuries. It was determined that 62 cases involved bone fractures, 45.5% of which had moderate to severe effects on vital functions.
Conclusion: To support the healthy development of children, it is crucial to identify all adverse factors, undertake efforts to prevent these factors, and implement effective rehabilitation measures. In this context, forensic evaluations can offer significant opportunities for safeguarding children. Families, educational institutions, and governments hold important responsibilities in ensuring the healthy upbringing of children and reducing their exposure to judicial cases, trauma, and acts of violence.

Keywords: Forensic medicine,forensic reports, children, traffic accident, assault

INTRODUCTION

A substantial number of cases presenting to emergency services have a forensic nature and are evaluated through medical and legal assessments in forensic medicine clinics. These forensic cases span all age groups. However, children are more frequently exposed to trauma that may result in forensic cases due to factors such as their mobility, underdeveloped self-defense mechanisms, and the failure of adults to adequately fulfill their duties of supervision and protection. According to Article 1 of the Convention on the Rights of the Child, which gained international status on September 2, 1990, and was adopted in our country on January 27, 1995, following its publication in the Official Gazette, every individual under the age of 18 is considered a child unless they reach legal maturity at an earlier age under national laws [1]. The guardian responsible for a child is legally obligated to protect them from external harm and ensure their physical safety. As stated in the Convention on the Rights of the Child, the state is also responsible for protecting children from any form of physical or emotional abuse inflicted by caregivers, including parents. Additionally, the state must implement social programs aimed at preventing child

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abuse, treating children exposed to such harm, and safeguarding their right to live and develop [2]. Globally, children are frequently subjected to trauma such as traffic accidents, falls from heights, physical assault, firearm injuries, stab wounds, poisoning, electrocution, lightning strikes, asphyxia, burns, as well as physical and verbal abuse. Such incidents have underscored the need for protective laws worldwide. However, despite these legal and protective measures, the number of forensic cases involving children remains alarmingly high [3].

Most physical traumas recognized as forensic incidents during childhood are preventable if appropriate precautions and interventions are taken. This study aims to evaluate the forensic cases involving children referred to the Forensic Medicine Clinic of İnönü University Turgut Ozal Medical Center. By analyzing the sociodemographic characteristics of these cases, identifying the types of trauma based on age groups and sex, and emphasizing key considerations for forensic medical evaluations, we hope to raise awareness about these preventable traumas. Ultimately, our goal is to propose new strategies to better protect children and reduce the occurrence of such cases.

MATERIAL AND METHOD

Cases involving individuals under the age of 18, for whom a forensic report was issued and registered at the İnönü University Department of Forensic Medicine between September 2008 and May 2021, were retrospectively evaluated in terms of age, sex, the type of incident for which the report was requested, the units that requested , the date of the incident, the services consulted, trauma locations, resulting injuries, and the outcomes of the reports. The 22nd version of the Statistical Package for the Social Sciences (SPSS) software was used for the statistical analysis of the study. As a result of the statistical analysis, descriptive statistics were presented as frequencies and percentages. Ethics committee approval for our study was obtained from the İnönü University Health Sciences Non-Interventional Clinical Research Ethics Committee with the decision numbered 2024/6916.

RESULTS

In our study, 132 cases referred to the Forensic Medicine Polyclinic between September 2008 and May 2021 were evaluated. Of the 132 cases examined, 68.9% (91) were male, and 31.1% (41) were female.

The average age of the examined cases was 8.4±5 years, with a minimum age of 0 and a maximum age of 17. The ages of the cases were divided into four groups 0-6, 7-11, 12-14, and 15-17 according to school entry readiness and the development of behavioral self-regulation abilities. The largest group (43.2%) among the cases referred to the forensic medicine polyclinic was the 0-6 age group, followed by the 15-17 age group with 25%. The distribution of age groups by sex is presented in Table 1.

The highest frequency of incidents requiring forensic reports among pediatric cases occurred in July (13.8%), followed by June (11.4%) and September (11.4%). Seasonally, the majority of forensic reports were issued during the summer, accounting for 42 cases (31.8%). The distribution of incident types across seasons and months is presented in Table 2.

Regarding the authorities requesting forensic reports, 64.4% (n=85) of the reports were requested by judicial law enforcement units, while 35.6% were requested by courts and prosecutor's offices.

Upon examining the types of incidents for which forensic reports were requested, the most common was traffic accidents (37.1%), followed by assault (corporal punishment) (15.9%) and falls (15.9%). In terms of the duration of trauma exposure by sex, 32% of the traumas experienced by males were traffic accidents, followed by 22% due to physical assaults. For females, 48.8% of the total traumas were traffic accidents, followed by 19.5% due to falls from heights. The distribution of incident types by sex is shown in Table 3.

In terms of event types according to the age distribution of the cases, traffic accidents are the most common in child forensic cases aged 0-14 presented to the forensic medicine clinic. In the 15-17 age group, physical assaults are the most prevalent. In the 0-6 age group, falls from heights (28.1%) are the second most common incident, followed by assault (15.4%) in the 7-11 age group and assault and electric shock (18.8%) in the 12-14 age group. In the 15-17 age group, traffic accidents (27.3%) rank second. The distribution of event types by age group is shown in Table 4.

When the distribution of cases according to the injured body parts was examined, it was found that the most commonly injured areas were the head and neck (22.7%), followed by the face (13.4%). The distribution of cases by injured body part is shown in Table 5.

It was determined that 80.3% of the injuries in the cases were not mild enough to be treated with simple medical intervention, and 53% were life-threatening. Regarding permanent facial scars, a report indicated that 106 cases (80.3%) did not have permanent facial scars, 20 cases (15.2%) required re-evaluation after 6 months to assess whether the injury resulted in permanent facial scars, and 6 cases (4.5%) had permanent facial scars. A report also stated that 50% of the cases did not lead to permanent impairment or loss of function in any of the senses or organs. Bone fractures were observed in 62 cases (47%), with fractures in 2 of these cases having mild effects on vital functions, 24 cases being of moderate severity, and 36 cases being severe. The status of the cases according to their severity is shown in Table 6.

Table 1. Distribution of age groups by sex

Age group	Female	Male	Total
0-6 (n)	40	17	57
%	44	41.5	43.2
7-11 (n)	16	10	26
%	17.6	24.4	19.7
12-14 (n)	10	6	16
%	11	14.6	12.1
15-17 (n)	25	8	33
%	27.5	19.5	25
Total (n)	91	41	132

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Table 2. Distribution of cases by month and season

Month	n	%	Season	n	%
December	10	7.6			
January	10	7.6	Winter	28	21.2
February	7	5.3			
March	7	5.3			
April	10	7.6	Spring	26	19.7
May	11	8.3			
June	15	11.4			
July	18	13.6	Summer	42	31.8
August	9	6.8			
September	15	11.4			
October	10	7.6	Autumn	36	27.3
November	10	7.6			
Total	132	100	90	132	100

Table 3. Current status of event types in cases according to sex

Sex	Traffic accident	Physical assault	Penetrating and sharp-force injuries	Burns	Gunshot wound	Falls from heights	Electrocution	The other one*	Total
Male (n)	29	20	4	5	7	13	5	8	91
%	32	22	4	6	8	14	6	9	100
Female (n)	20	1	2	4	4	8	1	1	41
%	48.8	2.4	4.9	9.8	9.8	19.5	2.4	2.4	100
Total (n)	49	21	6	9	11	21	6	9	132
%	37.1	15.9	4.5	6.8	8.3	15.9	4.5	6.8	100

*Door crush injury, drowning, hand caught in machinery, needle insertion, childbirth

Table 4. Occurrence of types of events in the events according to age

Age group	Traffic accident	Physical assault	Penetrating and sharp-force injuries	Burns	Gunshot wound	Falls from heights	Electrocution	The other one*	Total
0-6 (n)	18	3	3	8	2	16	0	7	57
%	31.6	5.3	5.3	14	3.5	28.1	0	12.3	100
7-11 (n)	15	4	1	0	3	1	0	2	26
%	57.7	15.4	3.8	0	11.5	3.8	0	7.7	100
12-14 (n)	7	3	0	0	1	2	3	0	16
%	43.8	18.8	0	0	6.3	12.5	18.8	0	100
15-17 (n)	9	11	2	1	5	2	3	0	33
%	27.3	33.3	6.1	3	15.2	6.1	9.1	0	100
Total (n)	49	21	6	9	11	21	6	9	132
%	37.1	15.9	4.5	6.8	8.3	15.9	4.5	6.8	100

*Door crush injury, drowning, hand caught in machinery, needle insertion, childbirth

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Table 5. Distribution of cases according to injured body parts

Injured Body Part	n	%
Head	45	18.2
Thorax	23	9.3
Abdomen	20	8.1
Neck	11	4.5
Hip	10	4
Foot	5	2
Forearm	18	7.3
Arm	22	8.9
Hand	8	3.2
Back	11	4.5
Thigh	12	4.9
Shoulder	8	3.2
Leg	14	5.7
Face	33	13.4
Finger	6	2.4
Toe	1	0.4
Total	237	100

Table 6. Distribution of cases according to injury severity

Of a nature that can be remedied with simple medical intervention	n	%
Mild	26	19.7
Not mild	106	80.3
Life-threatening		
Yes	70	53
No	62	47
Permanent facial scars		
Yes	6	4.5
No	106	80.3
Will be evaluated after 6 months	20	15.2
Permanent impairment or loss of function in any of the senses or organs		
No	66	50
The weakening of the organ's function,	1	0.8
Inability of the organ to perform its function	6	4.5
The disease that cannot be cured	1	0.8
Will be evaluated after recovery	14	10.6
Will be evaluated after 12 months	5	3.8
Will be evaluated after 18 months	39	29.5
Bone fractures		
Mild severity	2	1.5
Moderate severity	24	18.2
Severe severity	36	27.3
No	70	53

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DISCUSSION

Children may experience various forensic events that impact their health from bio-psycho-social perspectives, such as traffic accidents, falls, assault (corporal punishment), all forms of abuse and neglect, burns, gunshot wounds, and sharp object injuries. Some of these events are not reported to any healthcare institution for various reasons, and some that are reported are not evaluated as forensic cases. In this study, cases referred to the Forensic Medicine Polyclinic for the purpose of preparing a forensic report and evaluated as forensic cases over a 12-year period were assessed.

Of the child cases for which a forensic report was prepared at the Forensic Medicine Polyclinic, 91 (68.9%) were male and 41 (31.1%) were female. When reviewing similar studies on the topic, it is observed that the male-to-female ratio in these studies ranges between 76.8% and 51.8%, which aligns with our findings [4-8]. This situation is believed to be related to cultural sex discrimination, with girls being more excluded from social activities than boys. Boys also tend to spend more time outside the home, engage in traffic-related activities, exhibit more risky behaviors, and are less supervised by parents compared to girls.

When the age distribution was evaluated within the pediatric cases, it was found that the largest group was the 0-6 age group, accounting for 43.2%. A review of similar studies revealed that our findings were consistent with other studies, including Bursal Durmaz et al. (2015) with a rate of 52.72%, and Demirdöken et al. (2023) with a rate of 69.9% [5,9-12]. However, when reviewing the literature, it was found that in several studies, the 15-17 age group constituted the majority: Karaaslan et al. (2012) 38.9%, Ersoy et al. (2020) 36.6%, Hüsrevoğlu and Doğan (2021) 37.94%, Sertdemir et al. (2020) (though not numerically stated, this range was mentioned as the most common among adolescents), and Yazıcı and Can (2019) 59.3% [4,6,13-15]. These studies are thought to have focused primarily on poisoning and suicide, which could explain the differences in the predominant age groups. Another reason for the discrepancy may be the differences in research centers and study designs.

In 64.4% of the cases, a report was requested by judicial law enforcement units. Similarly, in the study conducted by Ersoy et al. (2020) evaluating the reports received by the forensic medicine polyclinic, the rate of report requests from judicial law enforcement units was higher [6]. In a study conducted in Erzurum, where requests for forensic reports received by the Forensic Medicine Branch Directorate were evaluated, it was reported that 91.6% of these requests came from the Chief Public Prosecutor's Office [16]. The lower demand from judicial bodies in our study was attributed to the fact that judicial units typically obtain reports through judicial law enforcement units, and forensic medicine polyclinics in hospitals are not integrated into the National Judiciary Informatics System.

Numerous studies have shown that forensic cases are most frequently observed during the summer season [5,7,17,18]. Similar findings were observed in our study. The closure of schools during the summer and early autumn months, along with increased time spent outdoors due to the season, result in a larger area of movement, greater participation in social activities, and more communication in the external environment, which help explain the rise in accidents and other injuries. Furthermore, the increased workload and the nature of human interactions during the hot season contribute to the higher incidence of forensic cases, particularly traffic accidents and assaults.

Among the pediatric cases referred to the forensic medicine clinic, the largest group (37.1%) consists of traffic accidents. This finding is consistent with studies in the literature, where traffic accidents are the most common cause, with rates of 62.9% and 30.8% [6,7,17-20]. Generally, the majority of cases referred for evaluation, due to traffic accidents and assaults, are male, which aligns with the existing literature [9-11,20]. It is believed that this outcome may be related to the fact that boys spend more time outside the home and in traffic, and are more prone to risky behaviors due to sex norms and roles they are socialized into. The fact that traffic accidents are the most common among forensic cases highlights that traffic-related injuries and accidents remain a significant issue in our country.

When examining the age groups in relation to the types of incidents, assault incidents (33.3%) rank first in the 15-17 age group, followed by traffic accidents (27.3%). In the other age groups, traffic accidents are the most common, with the 0-6 age group showing nearly equal rates of traffic accidents and falls from heights. Similar results were reported in other studies when evaluating incident types by age range [4,6,8,18]. This can be attributed to the fact that during infancy and early childhood, children's self-protection mechanisms, such as muscle development, skeletal strength, and reflexes, are not yet sufficiently developed. Additionally, parents may not be able to fully meet their protective responsibilities. In the 15-17 age group (middle adolescence), adolescents are more prone to engaging in violent behavior.

Although injuries within the boundaries of the face were evaluated as aggravated injuries and analyzed separately, injuries affecting the head, neck, and face region account for 36.1% of the total injuries. Korkmaz et al. (2014) found the head-neck region to be the most frequently injured, with a rate of 30.1%, while Çınar et al. (2010) reported a rate of 28%, which supports the findings of our study. We believe that, particularly in the pediatric age group, the head occupies a larger proportion of the body, and the underdevelopment of self-protection mechanisms such as muscles, reflexes, and especially neck muscles increases the incidence of head, neck, and facial injuries.

It was determined that 62 of the cases had bone fractures, with 45.5% of them having moderate to severe effects on vital functions. The fact that nearly half of the cases with bone fractures had moderate to severe impacts on vital functions, and that approximately 53% of the cases presented a life-threatening risk, indicates the severity of the trauma. Our findings align with those of other studies [6,7,17,21].

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CONCLUSION

It is meaningful that the majority of pediatric forensic cases result from traffic accidents, falls, and assaults, as these injuries are preventable. To reduce traffic accidents with injuries, it is believed that certain protective measures are required, such as increasing the number of school buses, expanding safe playgrounds and parks, and implementing necessary traffic regulations and inspections. Furthermore, social awareness campaigns should be conducted, and programs aimed at preventing communication and interpersonal violence, particularly for adolescents, should be developed. Given that sex discrimination starts in childhood, awareness training on sex equality should be provided to both children and adults. It is also believed that safety measures for doors and windows in environments where children are present, to prevent falls from heights, should be made a legal requirement, with priority given to educating parents on this issue. Regardless of the cause, these traumatized children pose a significant risk of abuse. In this regard, forensic examinations and notifications should be carried out, and these children should be monitored by relevant institutions under the Child Protection Law, regulated by Law No. 5395. Families, educational institutions, and governments have important responsibilities in ensuring that children grow up healthy and minimizing their involvement in criminal cases, trauma, and violence.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
Ethics committee approval for our study was obtained from the İnönü University Health Sciences Non-Interventional Clinical Research Ethics Committee with the decision numbered 2024/6916.

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