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EVALUATION OF FORENSIC CASES ADMITTED TO THE PEDIATRIC EMERGENCY SERVICE OF A HOSPITAL

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ABSTRACT

Objective: In this study, it was aimed to investigate forensic cases admitted to the pediatric emergency department of a hospital. **Material and Method**: The present study was carried out at the Mersin Peripheral Obstetrics-Gynecology and Pediatrics Hospital. All the cases who presented to the hospital emergency service in January, April, July and October 2016 comprised the study population. Of the study population, those considered as forensic cases were included in the study sample. According to patient records of the hospital, there were 5675 forensic cases in these months, and all these cases were included in the study. Data collection was conducted between November 01, 2016 and November 14, 2016. Descriptive statistics were used to describe the data. **Results**: Of the pediatric patients admitted to the emergency department (n = 86752), 6.54% were forensic cases. The mean age of the forensic cases was 6.4±4.8 (min = 0, max = 18). Of the forensic cases, 453 (8.0%) were repeated admissions, 354 (6.2%) were hospitalized and 482 (8.5%) presented with a forensic report. Of the forensic cases, 4300 (75.8%) presented due to injuries/falls, 378 (6.7%) due to poisonings and 302 (5.3%) due to burns. **Conclusions**: In the present study, the majority of the forensic cases were related to injuries, falls and poisonings. In less than one-tenth of the cases, forensic reports were written. Almost one-tenth of the forensic admissions were repeated admissions. All forensic cases should be identified by the physician.

KEYWORDS: Emergency, child, forensic, injury, poisoning.

INTRODUCTION

A forensic case refers to a case in which a personis physically or psychologically injured or harmed by another person's or other persons' deliberate, negligent, imprudent or reckless behavior(s). All injuries caused by someone else's deliberate, imprudent, inattentive behavior, being battered, sharp object injuries, explosive and firearm injuries, traffic accidents, falls, workplace accidents, poisonings, suspectedintoxication cases, illegal substance use, self-inflicted injuries or attempted suicides, burns, electric shocks, lightning strike injuries, foreign body ingestion, any suspicious death, violations of human rights, allegations of torture, injuries in detention and prison, animal bites / scratches / stings, mechanical asphyxia, neglect and abuse carried out by older or youngerfamily members are all forensic cases.

According to the Convention on the Rights of the Child, every human being below the age of eighteen years unless majority is attained earlier is accepted as child.[2] According to the World Health Organization (WHO), in 2015, injuries are the cause of deaths in 6% of the children aged1 to 59months.[3] The mortality rate due to injuries in 0-19-year-old childrenvaries between 5 and 35 per100.000 children in various countries.[4]

According to the American Centers for Disease Control and Prevention (CDC), in 2014, congenital anomalies were the leadingcause of deathsin children under 1 year while injuries took the lead in the 1-18 age group.[5] According to a report published in the United States, the leading causes of morbidity and mortality among children are burns, drowning, falls, poisoning and traffic accidents. In this report, it is stated that each year more than 12.000 people between the ages of 0 and 19 die due to injuries, and more than 9.2 million people are treated in emergency services due to injuries not resulting in death.[6]

Childhood poisonings constitute a significant part of forensic cases. Approximately two thirds of all poisoning cases occur in the pediatric age group, and children under 6 years of age constitute 80% of pediatric poisoning cases. Approximately one out of fivepoisoning cases occursin children under 2 years of age.[7] The frequency of deaths due to poisoning in various countries in the WHO European Region varies from 0.2 to 3.2 per 100.000.[4] In the US, every day, more than 300 children are treated for poisoning, and about 2 of the cases result in death.[8] In studies conducted in Turkey, most of the

pediatric forensic cases admitted to emergency services were due to falls, poisonings and traffic accidents.[9-12]

Abuse is the exposure of children to non-accidental circumstances perpetrated by their mothers, fathers, caregivers or other adults, which depressed their physical, emotional, mental or sexual development, and cause harm to their physical or mental health.[13] According to data by WHO, one out of four adults reportsthat they were exposed to physical abuse during their childhood.

In addition, one out of every 5 women and one out of every 13 mensay that they were exposed to sexual abuse as a child.[14] According to the CDC data, in 2014, 702.000 children were exposed to neglect and abuse, and one in every four children is neglected or abused at least once in their lifetime.[15] In Turkey, children are also subjected to violence, abuse and/or neglect to various extents depending on their age, gender and social conditions.[16] According to a study conducted in Turkey in 2008, of the children in the 7-18 age group,51% were subjected to emotional abuse within the last year, 43% to physical abuse, 23% to neglect and 3% to sexual abuse of any kind.[17]

Illnesses and injuries also lead to school absenteeism in children. In the United States, of the school-age children 29.5% miss 1-2 days of school, 25.9% miss 3-5 days, 8.6% miss 6-10 days, and 3.6% miss 11 days and more due to illness or injury.[18]

In this study, it was aimed to investigate forensic cases who admitted to a pediatric emergency department of a hospital.

MATERIALS AND METHODS

This descriptive study was conducted at the Mersin Peripheral Obstetrics-Gynecology and Pediatrics Hospital in Mersin, Turkey. The hospital is a state hospital, and only pediatric patients and women who have obstetrical-gynecological problems or are to give births are admitted to the hospital. The bed capacity of the hospital is 306. Every day, about 700 patients present to the pediatric emergency department.[19]

To conduct the study, approvals were obtained from the Mersin University Ethics Committee for Clinical Investigations, and the General Secretariat of the Mersin Public Hospitals Association.

All the cases who presented to the Mersin Peripheral Obstetrics-Gynecology and Pediatrics Hospital Emergency Service in January, April, July and October 2016 comprised the study population. These months were selected to represent the four seasons of the year. Of the study population, those considered as forensic cases were included in the study sample. The study data were obtained from the patients' medical records kept on the computer. The records of all the patients (n=86752) admitted to the pediatric emergency department during the aforementioned 4 months in 2016 were investigated. Of them, those who were regarded as forensic cases were included in the study, and the others were excluded from the study. Both the patients with and without forensiccase reports were included in the study. In the aforementioned months, 5675 forensiccases were admitted and all of them were included in the study.

The following cases are regarded as medicolegal cases

1. All injuries caused by someone else's deliberate, imprudent, inattentive behavior (e.g. a person's slipping and becoming injured after the floor is mopped but not dried out).
2. Being battered.
3. Sharp object injuries.
4. Explosive and firearm injuries.
5. Traffic accedents.
6. Falls.
7. Workplace accidents.
8. Poisonings.
9. Suspected intoxication cases.
10. İllegal substance use.
11. Self-inflicted injuriesor attempted suicides.
12. Burns.
13. Electric shocks, lightning strike injuries.
14. Foreign body ingestion.
15. Any suspicious death.
16. Violations of human rights, allegations of torture.
17. Injuries in detention and prison.
18. Animal bites/scratches/stings.
19. Mechanical asphyxia.
20. Neglect and abusecarried out by older or younger family members.[1,7]

In the present study, drug intoxication, chemical poisoning, substance use, carbon monoxide (CO) poisoning, food poisoning, alcohol poisoning, pesticide poisoning wereall regarded as poisoning. Poisonings that occur as a result of being exposed to a toxic chemical substance are chemical poisonings. In the present study, poisonings caused by paints, corrosive substances, organic solvents, soaps and detergents were regarded as chemical poisoning.[20]

The study data were collected between November 01, 2016 and November 14, 2016. In the study, all the data available in the patient files were obtained. The dependent variable of the study is the frequency of the forensic cases. The independent variables of the study are age, gender, nationality, social security status, admission month, admission hour, the number of the patient's admissions, hospitalization, length of hospital stay, forensic report.

The participants were assigned into 3 groups in terms of their ages: 0-6, 7-12 and 13-18 years of age. In terms of right to social security, the participants were assigned into the following 3 groups: (1) the General Health Insurance Group which includes the members of Social

Insurance Institution(SSK) – (workers employed under a service contract), Bag-Kur (social security organization for artisans and the self-employed), Retirement Fund of Civil Servants, and Green Card Owners (citizens who are incapable to pay for Health Care Services), (2) the State Protection Group including those kept in detention centers or prisons, abandoned children looked after by the Turkish Social Service and Children Protection Institution, and any child under the age of 18 with no social security, and (3) the Temporary Protection Law Group including Syrian refugees and other foreigners.

In terms of the number of the patient's admissions, the participants were assigned into 2 groups: those admitted once and those admitted more than once. In terms of the patient's admission time, the participants were assigned into 4 groups: (1) 12 midnight-05.59 a.m., 06.00 a.m.-11.59 a.m., 12.00 noon-5.59 p.m., 6.00 p.m.-11.59 p.m. In terms of the length of hospital stay, the participants were assigned into 3 groups: (1) one day, (2) two days and (3) ≥3 days.

After the quality control of the data was performed, descriptive statistics (means, percentages) were used to summarize the data.

RESULTS

Of the 86752 pediatric patients admitted to the emergency department in January, April, July and October 2016, 5675 (6.54%) were forensic cases. The mean age of the forensic cases was 6.4±4.8 (min=0, max=18). Of them, 3421 (60.3%) were male, 5078 (94.8%) were Turkish citizens, 4914 (86.6%) had General Health Insurance, 1642 (28.9%) presented in April and 1635 (28.8%) in July, 2537 (44.7%) presented between 6.00 p.m. and 11.59 p.m., 453 (8.0%) were admitted more than once, and 354 (6.2%) were hospitalized. Of the hospitalized patients, 153 (43.2%) stayed in the hospital one day. A forensic report was kept for 482 (8.5%) of the patients, 260 of whom were hospitalized patients (Table 1).

Table 1: Socio-demographic and referral characteristics of the cases.

Characteristic	Number (n)	Frequence (%)
Age (n=5675)		
0-6	3402	59.9
7-12	1412	24.9
13-18	861	15.2
Sex (n=5675)		
Female	2254	39.7
Male	3421	60.3
Nationality (n=5375)		
Turkish	5078	94.8
Syrian	297	5.2
Social security (n=5675)		
General Health Insurance	4914	86.6
State Protection Group	464	8.2
Temporary Protection Law Group	297	5.2
Patient's admissions (n=5675)		
Once	5222	92.0
More than once	453	8.0
Admission month (n=5675)		
January	861	15.2
April	1642	28.9
July	1635	28.8
October	1537	27.1
Admission time (n=5675)		
12 midnight-05.59 a.m.	274	4.8
06.00 a.m.-11.59 a.m.	779	13.7
12.00 noon-5.59 p.m.	2085	36.8
6.00 p.m.-11.59 p.m	2537	44.7
Hospitalization (n=5675)		
Yes	354	6.2
No	5321	93.8
Length of hospital stay (n=354)		
One day	153	43.2
Two days	112	31.6
Three days and above	89	25.2
Forensic report (n=5675)		
Yes	482	8.5
No	5193	91.5

Of the 5675 forensic cases, 4300 (75.8%) presented due to injuries/falls, 378 (6.7%) due to poisonings, 302 (5.3%) due to burns, 3.8% due toforeign body ingestion, followed byanimal bites/scratches/stings, sharp object injuries and traffic accidents (Tablo 2).

Table 2: Distribution of diagnoses of thecases

Diagnoses of the cases	Number (n)	Frequence (%)
Injuries/falls	4300	75.8
Poisonings	378	6.7
Burns	302	5.3
Foreign body ingestion	216	3.8
Animal bites/scratches/stings	163	2.9
Sharp object injuries	160	2.8
Traffic accidents	82	1.4
Electric shock	24	0.4
Neglect / Abuse	23	0.4
Beating	17	0.3
Drowning	5	0.1
Suspicious death	5	0.1
Total	5675	100.0

Of the poisoning cases, 184 (48.7%) were drug intoxication, 98 (25.9%) were chemical poisoning and 21 (5.6%) were CO poisoning (Tablo 3).

Table 3: Distribution of causes of poisoning.

Type of poisoning	Number (n)	Frequence (%)
Drug intoxication	184	48.7
Chemical poisoning	98	25.9
Substance use	38	10.0
Carbonmonoxide poisoning	21	5.6
Food poisoning	15	4.0
Alcohol poisoning	15	4.0
Pesticide poisoning	7	1.8
Total	378	100.0

DISCUSSION

In the present study, of the patients admitted to the emergency department during the study period, 6.54% were forensiccases. In a study conducted in Pakistan, 6% of the patients were admitted to the emergency department due to childhood injuries.[21] In two studies conducted in Ankara, the capital of Turkey, this rate was 0.67% and 1.1%.[11,22] The higher rate determined in the present study can be explained by the fact that forensic cases not only with legal reports but also without legal reports were included.

In our study, 59.9% of the cases were in the 0-6 age group. The majority of the cases in the study in Ankara were in the 0-6 age group too and they comprised 60.5% of all the cases.[9] In a study conducted in Hatay, a province in the southern part of Turkey, of the cases, 45.9% were in the 13-18 age group and 33.3% were in the 0-6 age group.[12] In a study conducted in Şanlıurfa, a province in the southeastern part of Turkey, 5-9-year-old children constituted the largest group (33.3%) followed by the <5-year-old children (25.5%).[23] That the age groups vary from one study to anothersuggests that different regions have different child health problems.

In the present study, 60.3% of the cases were males. In the North West region in England, the number of male children who presented to the emergency departments of hospitals due to injuries and accidents was 1.6 times higher than that of the female children.[24] In a study conducted in Uganda, 60% of childhood injuries occurred in male children.[25] In a study conducted with patients admitted to a tertiary university hospital in India, 70.2% of the children were male.[26] In a study conducted in China, 67.4% of the childhood injury and poisoning cases were males.[27] Studies conducted in Turkey indicate that more of the cases admitted to the emergency departments were males[10,12,23], which may be due to the fact that boys are allowed to play out of home more than are girls.

In the present study, most of the cases presented to the hospital in April (28.9%) and July (28.8%). In Demir et al.'s[10] study and Severet al.'s[23] study, most of the admissions to emergency department were in the summer. That the forensic cases occur more often in the summer months may be due to the fact that children are allowed to play out of the home more because of the appropriate weather conditions. On the other hand, in Gündüzet al.'s[11] study, most of the admissions were in the winter (30.6%). That admission period differs from one study to anothercan be explained by the differences in the sociocultural structure of the regions where the studies were conducted.

In the present study, 44.7% of the admissions took place between 6.00 p.m. and 11.59 p.m.

As in the present study, in Demir et al.'s[10] study, the majority of the admissions were in the evening hours.[10]

In Gündüzet al.'s[11] study too, a high number of admissions (34.75%) occurred between 6.00 p.m. and 11.59 p.m.[11] The above studies demonstrate that most of the cases presentedto the hospital outside of working hours. This suggests that although forensic cases may have occurred at any time, families and other responsible persons may have brought children to the emergency service after leaving work outside the working hours, and that a considerable portion of forensiccases may not have been brought to the hospital in time.

In the present study, 6.2% of the cases were hospitalized. In studies conducted in Turkey, hospitalization rates in forensic cases range between 9.2% and 45.9%.[10,12,22,23,28] The low hospitalization rate in the present study may be due to the fact that all the forensic cases whether reported or not were included in the study. On the other hand, about three-fourths of the hospitalized casesstayed in the hospital for 1-2 days, whereas one-fourth of them stayed three or more days. A significant part of the hospitalized cases needed a long-term follow-up and treatment.

In our study, forensic reports were written in 8.5% of the cases. Although some of the cases did not present a serious clinical picture or were admitted due to unintended causes, the rate of the patientsfor whom a forensic reportwas not prepared was high. This suggests that the physicians were unwilling to write forensic reports.

In the present study, 8.0% of the admissions to the emergency services were repeated ones, which suggests that these children may have been neglected by the family or other persons responsible for them.

In the present study, of the presentations to the emergency department, 75.8% were due to injuries and falls, 6.7% due to poisoning, 5.3% due to burns and 3.8% due to ingestion of foreign bodies. In the CDC's report, it was emphasized that the leading causes of injuries not resulting in death in children were falls, foreign body ingestion and animal bites/scratches/stings.[6] In the North West region of England, of the children who presented to the hospital due to accidents and injuries, 45.5% presented due to falls, 17.8% due to exposure toa mechanical force and 7.1% due to poisoning[24] In a study conducted in China, the leading causes of childhood injuries were falls (49.2%), and cuts and burns (18.6%).[27] In a study conducted in Africa, 40.6% of hospital presentations weredue to falls, 19.1% due to burns and 14.3% due to traffic accidents.[29] In the study conducted in Ankara, of the forensic cases, 32.8% were due to burns, 17.9% due to poisoning and 11.6% due to falls.[9] Sever et al's study[23] showedthat, most of the hospital presentations were due to traffic accidents (32.5%), falls from height (16.9%) and sharp object injuries (6.8%).

In our study, causes of poisoning cases were drug intoxication (48.7%), chemical poisoning (25.9%) and substance use (10.0%). In a study conducted in India, the leading causes of childhood poisonings were exposure to kerosene (27.9%), drugs (19.8%) and insecticides (11.7%).[30] In a study conducted in İzmir, the third largest city in Turkey, causes of about half of the poisoning cases (50.6%) were drug intoxication, exposure to corrosive substances (20.1%) and CO exposures (16.6%).[31] In a study conducted in Istanbul, the biggest city in Turkey, the most common poisoning was drug intoxication followed by food poisoning.[32] The fact that most of the poisoning cases are drug intoxication suggests that parents do not keep drugs in places where children cannot reach.

CONCLUSIONS

It was observed that about three-fourths of forensic cases were injuries and falls, followed by poisonings. Nearly half of the poisonings were caused by drug intoxication. About one-tenth of the admissions were repeated admissions. Childhood injuries and poisonings are of great importance since they are preventable health problems and are among the leading causes of deaths and disabilities. In order to reduce these cases, preventive precautions should be taken In the present study, legal reports were written in less than one-tenth of the forensiccases. Health workers should notify the police officers of all forensiccases after carrying out the necessary medical interventions, and they should also prepare forensic reports forsuch cases.

In the present study, some of the forensic cases presented to the emergency service more than once, which suggests that these children may have been neglected or exposed to abuse.

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