



## Medico-legal Approach to Poisoning Cases in the First Decade of Life

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ORIGINAL  
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### ABSTRACT

**Objective:** In developing countries such as Turkey, high mortality rates associated with childhood poisonings are an important problem that needs to be solved. This study aims to discuss the points to be considered about the medico-legal approach to childhood poisoning cases in emergency services and to provide regional data about childhood poisoning cases.

**Materials and Methods:** Patient files (n=62,999) belonging to patients who applied to the Ege University, Faculty of Medicine, Pediatric Emergency Unit between January 01, 2012 and June 30, 2013 were examined retrospectively. Demographic data, poisoning type and location, physical examination findings, consultations, and the decisions about treatment and hospitalization belonging to 271 poisoning cases aged between 0 and 9 years were evaluated.

**Results:** From a total of 271 first decade childhood poisoning cases, 145 were females and 126 were males. The mean age was 2.78±1.83 years. The first application reason to the emergency service was taking/doubt about taking medications (n=141, 52.0%). One hundred and eighty-one cases were discharged from the emergency service after the examination process, 56 (20.7%) cases were hospitalized, 29 cases (10.7%) refused the treatment, and five cases (1.8%) left the hospital without permission.

**Conclusion:** Childhood poisoning cases are still a problem in Turkey. In addition, governmental centers for preventing poisoning are required. For both managing the legal case and planning the treatment, performing detailed systemic examination and collecting information about the poisoning are the most important steps. Moreover, increasing the awareness of parents about their protection obligations and informing them about child neglect and precautionary warnings could be for the benefit of families and the society.

Keywords: Medico-legal, poisoning, child neglect, emergency unit

### INTRODUCTION

Poisoning occurs when cells are injured or destroyed by consuming a chemical, physical, or an organic substance accidentally or intentionally by inhalation, ingestion, injection, or absorption (1, 2). It is observed in each age group but is more commonly observed in childhood. Childhood poisonings are mostly preventable situations; however, they cause serious complications, morbidities, and mortalities. Therefore, childhood poisonings take an important place in Pediatric Emergency Services and need an urgent approach. Therefore, obtaining a detailed history of the child is most important. Performing detailed systemic examination; collecting information about the nature and the dose of the poison when it was taken, type of exposure and symptoms, performed treatments, and other poisoned cases if there are; and obtaining detailed patient's personal history are important for both managing a legal case and planning the treatment (2-9).

In Turkey, childhood poisonings are the fourth most common reason of accidents after traffic accidents, falls, and burns (7). In developed countries, traffic accidents and poisonings are placed at the top as the cause of death under 14 years of age. However, childhood poisonings come after respiratory system and gastrointestinal system diseases in developing countries such as Turkey (4, 5, 7, 9, 10).

Factors that cause poisoning could change according to age, gender, society, traditions and customs, and education of the child and his/her family. Thus, each community or even each region's properties about poisoning should be determined and preventions should be taken based on these properties (4-8, 10, 11).

In developing countries such as Turkey, high mortality rates associated with childhood poisoning are an important problem that needs to be solved (12). In addition, childhood poisonings, like all poisoning cases, are the feature of legal cases and also poisonings in this age group are important with respect to child abuse and neglect. This study aims to present the properties of first decade childhood poisonings, who applied to the Ege University Pediatric

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Emergency Service, to state regional preventions and to discuss the points to be considered about the medico-legal approach to childhood poisoning cases. It is thought that this study is important for considering childhood poisonings from a child neglect perspective and providing regional data about childhood poisonings, particularly to pediatrics and physicians working in the emergency services.

## MATERIALS and METHODS

After obtaining permission from the Ethical Committee of the Ege University, Faculty of Medicine, 62,999 patient files were retrospectively examined. The files belonged to the patients who applied to the Ege University Faculty of Medicine, Pediatric Emergency Unit between January 01, 2012 and June 30, 2013. It was determined that 552 (0.9%) patients applied to the Pediatric Emergency Service because of poisoning; 271 (48.1%) of them were aged between 0 and 9 years.

### Statistical analysis

In this study, poisoning cases' (who were in their first decade of life) data about poisoning type and location, the way they came to the emergency department, physical examination findings, consultations, the decisions about treatment/hospitalization, as well as demographic data were entered in a spreadsheet (Excel 2007, Microsoft, Richmond, USA) and were analyzed using a statistical analysis software (SPSS version 16.00, Chicago, IL, USA).

## RESULTS

A total of 271 first decade poisoning cases comprising 145 (53.5%) female and 126 (46.5%) male subjects aged between 0 and 9 years were evaluated. The mean age was  $2.78 \pm 1.83$  years. It was determined that 95.2% (n=258) of cases were under 6 years of age (Table 1).

The first three reasons for applying to the emergency service were taking or doubt about taking drugs (n=141, 52.0%), drinking or doubt about drinking caustic substances (n=65, 23.9%), and

carbon monoxide poisoning (n=23, 8.5%). Poisoning causes of cases according to age groups are shown in Table 2.

There was no record about the origin of the events in the patient files. There were 187 first decade childhood poisoning applications in 2012 and 84 applications in the first 6 months of 2013 (Figure 1).

It was determined that patients were applied to the emergency service mostly (n=136; 50.2%) between 16:01 and 00:00 h. There were 101 (37.2%) applications between 08:01 and 16:00 h and 34 (12.6%) applications between 00:01 and 08:00 h.

It was identified that 25.8% (n=70) of poisoning cases were brought to the emergency service by an ambulance, and a patient (0.4%) was brought to the hospital by a taxi. However, there was

**Table 1.** Distribution of cases according to age and gender

Age Groups	Male	Female	Total
0 year*	5	2	7
1 year	30	33	63
2 years	36	38	74
3 years	25	32	57
4 years	11	16	27
5 years	11	7	18
6 years	4	8	12
7 years	1	4	5
8 years	2	2	4
9 years	1	3	4
Total	126	145	271

\*In age group 0, the patients of ages ranging from 0.00 to 0.99 were involved and so on

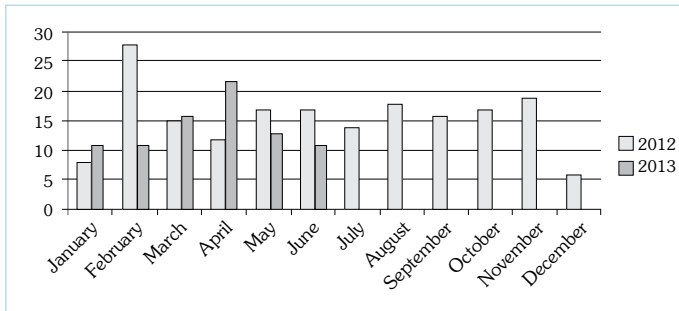
**Table 2.** Distribution of poisoning causes according to age groups

Causes of poisoning	Age Groups (year/s)										Total	
	0*	1	2	3	4	5	6	7	8	9	n	%
Drugs <sup>1</sup>	2	18	51	35	17	10	5	2	1	-	141	52.0
Caustic substance <sup>1</sup>	2	28	12	9	4	3	4	1	1	1	65	24.0
CO poisoning	3	2	1	6	1	4	2	2	1	1	23	8.5
Other chemicals <sup>2</sup>	-	5	6	5	3	-	-	-	-	-	19	7.0
Insect sting	-	5	1	-	1	-	1	-	-	2	10	3.7
Pesticide poisoning	-	4	3	2	-	1	-	-	-	-	10	3.7
Mushroom poisoning	-	1	-	-	-	-	-	-	1	-	2	0.7
Not specified	-	-	-	-	1	-	-	-	-	-	1	0.4
Total	7	63	74	57	27	18	12	5	4	4	271	100.0

\*In age group 0, the patients of ages ranging from 0.00 to 0.99 were involved and so on.

<sup>1</sup>In most of patients' files, it was not mentioned which drugs or caustic substances were taken. Recorded drugs were analgesics, antidiabetics, and antihypertensives; and recorded caustic substances were household bleach, descaling agent, oil solvent, and fabric softeners.

<sup>2</sup>Synthetic thinner, mercury, firework cracker, battery, match, tooth paste, baby oil, anti-odor, drain opener, naphthalene.



**Figure 1.** Distribution of cases applied to the emergency service according to months

**Table 3.** Departments where consultation was requested

Departments	n	%
Not requested	195	71.6
Pediatric surgery	67	24.6
Pediatric neurology	3	1.1
Ophthalmology	2	0.7
Orthopedic surgery	1	0.4
Pediatric cardiology	1	0.4
Pediatric gastroenterology	1	0.4
Child psychiatry	1	0.4
Social pediatrics	1	0.4
<b>Total</b>	<b>272</b>	<b>100.0</b>

no information about how 200 patients came to the child emergency service.

In the patients' files, it was observed that systemic physical examinations were performed for all patients. In addition, ultrasound imaging was performed for one (0.3%) patient, chest X-Ray for 10 (3.1%), ECG for 84 (25.9%), hemogram and/or biochemistry observations for 144 (44.5%), and arterial blood gases measurements for 85 (26.2%) children. There were consultation requests for 76 (28.0%) children. For one child, there were two consultation requests. Consultation requests were mostly associated with the Department of Pediatric Surgery (n=67, 24.6%) (Table 3).

It was determined that six (2.2%) children were unconscious, 22 (8.1%) were confused, and 243 (89.7%) children were conscious when they arrived at the hospital. One hundred and eighty-one (66.8%) patients were asymptomatic and discharged from the emergency service after their examination processes, 56 (20.7%) children were hospitalized, 29 (10.7%) refused the treatment, and five (1.8%) left the hospital without permission. It was observed that 34 (60.7%) of 56 hospitalized cases were mostly hospitalized at the Department of Pediatric Surgery (Table 4). The comparison of the conditions of children's consciousness and their results of emergency service application are given in Table 5 (p<0.05).

## DISCUSSION

Currently, childhood poisonings are still a public problem and take an important place in Pediatric Emergency Services. The first step

**Table 4.** Departments where children were hospitalized

Departments	n	%
Pediatric surgery	34	60.7
Social pediatrics	10	17.8
Pediatric intensive care	9	16.1
Pediatric neurology	1	1.8
Pediatric cardiology	1	1.8
Pediatric gastroenterology	1	1.8
<b>Total</b>	<b>56</b>	<b>100.0</b>

to take in cases of poisonings applied to emergency services is to perform emergency medical intervention as soon as possible. Because of the difficulties in obtaining the intoxication-related history in childhood, appropriate and timely medical intervention delay, particularly in this age group, is required. On the other hand, most of the childhood poisoning cases remain asymptomatic (13). In this study, 181 (66.8%) childhood poisoning cases aged between 0 and 9 years were asymptomatic and discharged from the emergency service after their examination processes. Although most of them are asymptomatic, physical examination from head to foot and all necessary consultations should be performed. In the present study, it was observed that systemic physical examinations were performed for all patients, even if they were asymptomatic. In addition, consultations had been requested for nearly one-third of the children.

In the world report on child injury prevention, it was stated that boys had higher rates of poisoning than girls in all regions of the world, probably because of differences in socialization (14). In this research, the girls' percentage was higher than boys. The cause of this difference should be that this study's age group was limited to the first decade.

In some countries, poisoning death rates are highest in children under 1 year of age, whereas non-fatal poisonings are more common among children aged 1–4 years (14, 15). It was stated that unintentional poisoning was the second largest reason for hospital admission in young children under 5 years of age in Australia (16). In a childhood poisoning study, it was stated that the age group of most poisoning cases was <5 years of age and constituted 51% of all cases (17). In this study including first decade poisonings, it was determined that 95.2% (n=258) of cases were under 6 years of age. At these ages, children are curious but lacked judgment, do not recognize dangerous products and explore their world, and would put anything in their mouth. Because of these reasons, children are more likely to get poisoned.

In most of the studies, drugs come first in childhood poisonings (1-4, 6, 8, 10, 11, 13). In a study conducted in Turkey from 1985 to 2008, nearly two-thirds (64%) of cases were drug-related, whereas 36% were non-drug-related (18). In another study about pediatric poisonings conducted in the east Karadeniz region, the main toxic agent was drugs (70.2%), followed by foods (8.8%), rodenticides (7%), insecticides/pesticides (4.9%), and carbon monoxide (4.7%) (17). In the present study, prescription drugs were also the first reason for first decade childhood poisonings. In addition, household

**Table 5.** The comparison of the conscious condition of child and emergency service application results

Condition of Conscious	Emergency Service Application Results				Total
	Discharged	Hospitalized	Refused the treatment	Left the hospital without permission	
Consciousness	167	44	28	4	243
Confused	14	6	1	1	22
Unconscious	-	6	-	-	6
<b>Total</b>	<b>181</b>	<b>56</b>	<b>29</b>	<b>5</b>	<b>271</b>

cleaning products was the second reason and carbon monoxide poisoning was the third reason. In a study conducted in Istanbul, household cleaning products, and in another study conducted in Izmir, consuming corrosive substances had been identified as the most common cause of poisoning (4, 15). In a study about the children admitted to the Pediatrics Emergency Department for carbon monoxide intoxication between 2007 and 2009, it was stated that carbon monoxide poisonings have taken an important place in pediatric emergency services in Turkey (19). These studies and the presented study show that preventable causes come to the forefront in childhood poisonings. In particular, parents and caregivers should be more conscious about the responsibility of protective custody obligations to their children. Therefore, physicians particularly working in emergency services also need to consider the subject of child neglect while evaluating childhood poisonings. In our study, the presence of only one social pediatrics consultation request made us think that there was only one suspicion of child neglect.

Another subject in this study is the limit of the parents making decisions about their children's treatments. Parents have rights to make decisions about their children's treatments. However, if the medical intervention is mandatory and parents of the child refuse the treatment, the judicial authorities should be notified immediately (20). This behavior of the parents would be a type of child neglect. In this study, it was determined that 29 (10.7%) parents of children refused the treatment and five (1.8%) left the hospital without permission. However, there was no information in the patient files whether they were reported to the judicial authorities or not. Because of all poisoning cases being legal cases, medical records must be kept carefully and regularly for accurate medico-legal assessment of these cases and also for protecting the physician himself/herself against claims that medical malpractice occurred. These medical records are important at least for medical interventions.

Increasing the awareness and improving the supervision of parents and caregivers about their protection obligations to their children, informing them about child neglect and precautionary warnings, improving simple and cheap methods in the treatment of poisonings, and generalization of poisons information centers should be for the benefit of both families and the society. In addition, the mortality and morbidity risk of poisonings and the financial burden of poisonings on families and governments show the importance of precautions once again. Although, the treatments of poisoning are improving day by day, the most effective method for treatment of poisoning is still to take prevention precautions.

In our country, there is a poisoning information center (114 National Toxicity Information) that provides assistance, including what to do after poisoning. However, there is no governmental center to prevent poisoning. There is also no poisoning prevention program at our hospital. If there is a recurrent intoxication application to the Pediatric Emergency Service, this is reported to Child Protecting Center of the University. In addition, although the development stages of infants and children are examined in the policlinics of pediatric hospitals, verbal information could be provided to high risk families in this regard. However, this is not a routine practice. It is thought that preparing poisoning prevention brochures and handing out these brochures, particularly in family practice centers and the policlinics of pediatric hospitals, could be a beginning for preventing childhood poisoning.

Thus, considering that household poisonings are very frequent in childhood poisonings, storing all medications and household cleaning products in their original packages and also out of sight and out of reach of children or in locked cabinets is very important. These are basic but important measures.

## CONCLUSION

This research is a cross-sectional research that analyzed the childhood poisoning cases in a tertiary healthcare provider. Therefore, the present study provides regional information about childhood poisoning cases.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Ege University Faculty of Medicine.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Authors' contributions:** Conceived and designed the experiments or case: AK, EÖA. Performed the experiments or case: AK, OM. Analyzed the data: AK, OM, EUS. Wrote the paper: AK. All authors have read and approved the final manuscript.

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