

ORIGINAL ARTICLE

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Evaluation of poisoning cases admitted to pediatric emergency department

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Abstract

In our study, it was aimed to compare the demographic and clinical characteristics of pediatric poisoning cases admitted to a university hospital with the literature and to discuss the problems encountered in forensic reports issued for such cases. Our study is a retrospective descriptive study. It consists of 715 children who were admitted to our university hospital between 2012 and 2018 due to poisoning. Poisoning is responsible for 36.0% of all pediatric forensic cases. 57.8% (n = 413) of 715 cases were male. The mean age was 7.38 ± 2.45 years. The most common causes of poisoning were drug intake with 55.5% (n = 397) and corrosive substance intake with 41.0% (n = 293), respectively. 3.2% (n = 23) of the cases had ingested drugs for suicidal purposes. Most frequent admissions to the hospital occurred during July and August. 26.2% (n = 187) of the cases were followed up in the intensive care unit. Most poisoning cases (41.4%, n = 296) occurred between 12:00 and 18:00. Comparison of the differences between the temporary and final forensic reports of our cases showed that there was a difference of 2.1% for life-threatening cases and 6.0% for cases that can be resolved with simple medical intervention. Poisoning constitutes a significant proportion of pediatric forensic cases. The majority of cases were poisoned accidentally. The ingestion of medicinal drugs and household cleaning products seems to be the most common cause of poisoning. Such medicines and cleaning products should be kept closed and out of the reach of children. The completion of the clinical and laboratory findings of the case should be awaited before reports of pediatric forensic cases are issued. This prevents the emergence of contradictory reports.

Keywords: Children, forensic case, poisoning, emergency department

Introduction

Poisoning is the impairment of body functions by ingestion of any toxic substance or by overdosing of a substance which is non-toxic at normal doses [1]. Poisoning remains to be an important public health problem in childhood, and every year thousands of children are evaluated in pediatric emergency departments due to accidental ingestion of a toxic substance, most of which is preventable [2]. The vast majority of childhood poisoning occurs as a result of the intake of cleaning materials, pesticides and medicinal products [3]. All poisoning instances are non-traumatic forensic cases. However, it has been reported that our physicians do not have sufficient knowledge on forensic medicine, especially in children [4-5].

Poisoning cases are one of the most problematic group among pediatric forensic cases in terms of issuing forensic reports. In our study, it was aimed to compare the demographic and clinical characteristics of pediatric poisoning with the literature and to discuss the problems encountered in forensic reports issued for such cases.

Material and Methods

Poisoning is the impairment of body functions by ingestion of any toxic substance or by overdosing of a substance which is non-toxic at normal doses [1]. Poisoning remains to be an important public health problem in childhood, and every year thousands of children are evaluated in pediatric emergency departments due to accidental ingestion of a toxic substance, most of which is preventable [2]. The vast majority of childhood poisoning occurs as a result of the intake of cleaning materials, pesticides and medicinal products [3]. All poisoning instances are non-traumatic forensic cases. However, it has been reported that our physicians do not have sufficient knowledge on forensic medicine, especially in children [4-5]. Poisoning cases are one of the most problematic

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group among pediatric forensic cases in terms of issuing forensic reports. In our study, it was aimed to compare the demographic and clinical characteristics of pediatric poisoning with the literature and to discuss the problems encountered in forensic reports issued for such cases.

Results

715 (36.0%) of 1981 forensic cases were admitted to our center due to poisoning. 57.8% (n = 413) of the cases were male. The mean age was 7.38 ± 2.45 (Table 1).

Table 1. Demographic data of children with poisoning.

	n	%
Gender		
Male	413	57.8
Female	302	42.2
Age (mean $\pm$ SD, yr old)	7.38 $\pm$ 2.45	
Age groups		
Preschool (0-6 year)	287	40.1
7-12 year	401	56.1
13-15 year	17	2.4
15+ year	10	1.4
Reasons for poison exposure		
Accidental	692	96.8
Intentional	23	3.2
Time intervals		
0-6	43	6.1
7-12	114	15.9
13-18	296	41.4
18-24	262	36.6
Hospitalization		
Intensive care	187	26.2
Emergency room	528	73.8
Season		
Spring	205	28.7
Summer	245	34.3
Autumn	147	20.5
Winter	118	16.5
Endoscopic grading in corrosive substance		
Degree 1	62	21.3
Degree 2-a	43	14.7
Degree 2-b	25	8.5
Degree 3	1	0.3
Degree 4	-	-
no finding	162	55.3
Temporary forensic reports		
Life threatening situation	109	15.3
Remedied with simple medical attention	487	68.1
Not remedied with simple medical attention	119	16.6
Final forensic reports		
Life threatening situation	123	17.2
Remedied with simple medical attention	444	62.1
Not remedied with simple medical attention	148	20.7
Total	715	100

The most common cause of poisoning was drug intake with 55.5% (n = 397) and corrosive substance intake with 41.0% (n = 293). While ingestion of corrosive substances was the most common (47.4%) in the 0-6 age group, drug ingestion was the most common (90.0%) above the age of 15.

It was observed that bleach (35.8% n = 105) was the most ingested corrosive substance. No injury was observed in the esophagus and stomach in the endoscopy of 162 cases.

Poisoning cases most frequently occurred in July and August.

26.2% (n = 187) of the cases were followed up in the intensive care unit. No death was observed. 3.2% (n = 23) of the cases had taken drugs for suicidal purposes.

Most poisoning cases (41.4%, n = 296) occurred between 12:00 and 18:00 hours.

Life-threatening conditions were reported in 17.2% (n = 444) of the final reports of the cases. The most life-threatening condition was seen in cases who used pesticides. Drug ingestion cases were the least life-threatening form of poisoning cases. 79.4% (n = 315) of drug ingestion cases had injuries that could be resolved by simple medical intervention (Table 2).

Table 2. Types of toxic substances.

Categories of poisons	n	%
Pharmaceutical substances		
Colored-coated and tablets	280	70.5
Noncolored coated and tablets	52	13.1
Syrup	31	7.8
Unknown	34	8.6
Total	397	100.0
Non-pharmaceutical substances		
Cleansing products	257	80.8
Industrial products	36	11.3
Rat poison	20	6.3
Pesticides	5	1.6
Total	318	100.0

Discussion

Childhood poisoning remains to be an important public health problem worldwide [7]. Poisonings are one of the most prevalent causes of home accidents [8]. In many studies examining childhood poisoning, the genders of the cases were reported at similar rates. In the study conducted in Nigeria, 49.6% of the cases were reported as male and in the study conducted by Jung Lee et al., 53.2% were reported as male [9,10]. Similarly, 57.8% of the cases in our study were male. It is stated that these rates are due to the similar curiosity about objects in both genders during childhood. It is seen in the literature that most of the pediatric poisonings are under 5 years old [11,12]. In the study conducted by Yan-Ren et al. [9], it has been reported that poisonings were most common (32.2%) in the preschool period. In our study, it was observed The majority of cases were pre-school period and between the ages of 7-12.

This is due to the higher rate of taking medications for suicidal purposes under the age of 18 abroad compared to our region. While percentage of suicidal poisoning was 3.2% (n = 23) in our study, it was 60.9% (n = 53) in Nigeria. We think that social and religious suicidal poisoning is less in our region.

It is seen that the most common cause of poisoning in pediatric cases is drugs used for treatment. In the study conducted by

Santiago et al., it has been reported that 45.2% of the cases were caused by therapeutic drugs in a multi-center study including 1749 cases [13]. In our study, the most common cause of poisoning was drugs used for treatment with 55.5%. 70.5% (n = 280) of drug poisonings were due to the digestion of drugs in the form of colored-coated and tablets. We believe that having such medicines at home arouses curiosity in children.

In our study, no case died. The majority of cases were treated in the emergency department on an outpatient basis. Studies have reported that mortality due to pediatric poisoning is very rare, and most of them recover with outpatient treatment in the emergency department [14,15]. In particular, in cases where drugs used for treatment are ingested or kept in the mouth by children, it is observed that the drugs are not consumed in toxic doses and that families bring their children to the emergency department due to concerns about them.

Poisoning appears to be a method used for suicidal purposes [16]. 7.2% of pediatric poisoning cases in Saudi Arabia and 6.6% in Spain were reported to be brought to the emergency room due to drugs consumed for suicide [13,17]. Suicide is still one of the leading causes of death for adolescents [17]. In our study, the use of drugs for suicidal purposes was very low. We think it is due to the cultural and religious beliefs of societies.

Studies have reported that poisoning decreases in summer months, and most frequently occurs between 18:00 and 24:00 in the afternoon since carbon monoxide poisoning occurs more frequently in cold weather [14]. In our study, poisoning cases most frequently occurred during the summer. Because poisoning cases caused by inhalation were excluded from our study. In the afternoon, poisoning cases were more common. Because the children were not at home for reasons such as daycare and school, greater rate of poisoning occurred when they were at home in the evening. It has been reported that physicians working in emergency services do not have sufficient knowledge on forensic medicine related to children, and they especially need education [18]. When the temporary and final forensic reports of our cases were compared, it was determined that there was a difference of 2.1% for life-threatening cases and 6.0% for cases that can be resolved with simple medical intervention. Preparing forensic reports of poisoning cases is one of the difficulties in forensic medicine practices since the effect of the toxic substance taken into the body can occur in a certain period. Especially in cases of corrosive substance intake, reports issued in the early period without endoscopy results are less consistent.

Conclusion

Poisoning is one of the leading causes among pediatric forensic cases. The majority of poisonings occurs accidentally. The

consumption of medicinal drugs and household cleaning products seems to be the most common cause of poisoning. Closed and inaccessible places should be created in homes for the storage of such medicines and cleaning products. While preparing the reports of pediatric forensic cases, the completion of the clinical and laboratory findings of the case should be awaited. This prevents the emergence of contradictory reports.

Conflict of interests

We declare that we have no conflict of interest.

Financial Disclosure

This study received no financial support.

Ethical approval

Firat University Ethical Board 2018/04, decision no: 19.

References

1. Lee VR Connolly M, Calello DP. Pediatric poisoning by ingestion: developmental overview and synopsis of national trends. *Pediatr Ann.* 2017;46:443-8.
2. Mowry JB, Spyker DA, Brooks DE, McMillan N, Schauben JL. 2014 annual report of the American Association of Poison Control Centers' national poison data system (NPDS): 32nd annual report. *Clin Toxicol (Phila).* 2015;53:962-1147.
3. Kendrick D, Majsak-Newman G, Benford P, et al. Poison prevention practices and medically attended poisoning in young children: multicentre casecontrol study. *Inj Prev.* 2017;23:93-101.
4. Ashtekar CS, Hande A, Stallard E, Tuthill D. How much do junior staff know about common legal situations in paediatrics ? *Child Care Health Dev.* 2007;33:631-4.
5. Wiler JL, Bailey H, Madsen TE. The need for emergency medicine resident training in forensic medicine. *Ann Emerg Med.* 2007;50:733-8.
6. Türk Ceza Kanunu'nda Tanımlanan Yaralama Suçlarının Adli Tıp Açısından Değerlendirilmesi Rehberi. <https://www.atk.gov.tr/tckyaralama24-06-19.pdf> (Erişim tarihi: 21.09.2020)
7. Mbeledogu CN, Cecil EV, Millett C, et al. Hospital admissions for unintentional poisoning in preschool children in England; 2000-2011. *Arch Dis Child.* 2015;100:180-2.
8. Aşirdizer M, Yavuz MS, Albek E, et al. Infant and adolescent deaths in Istanbul due to home accidents. *Turk J Pediatr.* 2005;47:141-9.
9. Lin YR, Liu TH, Liu TA, Chang YJ, Chou CC, Wu HP. Pharmaceutical poisoning exposure and outcome analysis in children admitted to the pediatric emergency department. *Pediatr Neonatol.* 2011;52:11-7.
10. Lee J, Fan NC, Yao TC, et al. Clinical spectrum of acute poisoning in children admitted to the pediatric emergency department. *Pediatrics and Neonatology.* 2019;60:59-67.
11. Kazanasmaz H, Kazanasmaz Ö, Çalık M. Epidemiological and sociocultural assessment of childhood poisonings. *Turk J Emerg Med.* 2019;19:127-31.
12. Bacha T, Tilahun B. A cross-sectional study of children with acute poisoning: A three-year retrospective analysis. *World J Emerg Med.* 2015;6:265-9.
13. Santiago P, Bilbao N, Martinez Indart L, et al. Epidemiology of acute pediatric poisonings in Spain: a prospective multicenter study from the Spanish Society of Pediatric Emergency Medicine. *Eur J Emerg Med.* 2020;27:284-9.
14. Mintegi S, Azkunaga B, Prego J, et al. International epidemiological differences in acute poisonings in pediatric emergency departments. *Pediatr Emerg Care.* 2019;35:50-7.

15. Mintegi S, Fernández A, Alustiza J, et al. Emergency visits for childhood poisoning: a 2-year prospective multicenter survey in Spain. *Pediatr Emerg Care*. 2006;22:334-8.
16. Hawton K, Witt KG, Salisbury TLT, et al. Interventions for self-harm in children and adolescents. *Cochrane Database Syst Rev*. 2015;21 81-8.
17. Tobaiqy M, Asiri BA, Sholan AH, et al. Frequency and management of acute poisoning among children attending an emergency department in Saudi Arabia. *Pharmacy (Basel)*. 2020;14;8:189.
18. Wiler JL, Bailey H, Madsen TE. The need for emergency medicine resident training in forensic medicine. *Ann Emerg Med*. 2007;50:733-8.