

Evaluation of drug poisoning cases in pediatric emergency department

 Kazim Kutluturk¹,  Mehmet Aslan²

¹Department of Pediatrics, SBU Gulhane Hospital of Research and Education, Ankara, Turkey

²Department of Pediatrics, Faculty of Medicine, Inonu University, Malatya, Turkey

Copyright@Author(s) - Available online at www.annalsmedres.org

Content of this journal is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.



Abstract

Aim: This study aims to examine the demographic and clinical characteristics of childhood drug poisoning, review changes in diagnostic methods and treatments and identify factors affecting mortality to ultimately determine the present clinical picture. In doing so, more insight can be provided on the diagnosis, treatment, and prevention of poisonings.

Materials and Methods: The retrospective evaluation of 655 patients between ages 1 month-18 years who were admitted to the Pediatric Emergency Department of Turgut Ozal Medical Center between January 2009 and June 2016 with cases of drug poisoning (mean 44±18 months).

Results: Four hundred and nine female (62.4%) and 246 male patients (37.6%) were evaluated for a total of 655 cases. Drug poisoning cases were found to account for 1.08% of all visits to the emergency department. It was discovered that 62.1% of the poisonings were accidental, whereas 33% were suicide attempts and 4.9% therapeutic mistakes. 94.8% of drug poisonings occurred at households, while 5.2% occurred in non-household environments. Drug poisonings presented differences in terms of gender (62.4% female, 37.6% male). The number of drug poisoning cases were found to be higher in the months of summer and spring. The number of female cases peaked in the 13-18 age group (211 cases) and were higher than the same age group of males (30 cases).

Conclusions: In our present study, we highlighted the profile of pediatric drug poisoning cases admitted to the Pediatric Emergency Service.

Keywords: Intoxication; pediatric emergency; poisoning

INTRODUCTION

Poisoning cases are significant reasons for visits to the emergency department; <6 yr old childhood poisonings account for more than 50% of all poisoning cases (1). According to the National Poison Control of Refik Saydam Hygiene Institute; 43939 cases of patients aged 0-18 were reported from all regions of Turkey between the years 2000-2004 in which 71.4% were found to be drug poisonings (2).

There are currently many toxicology centers all around the world. These toxicology centers work in coordination with emergency centers to provide successful treatments for childhood poisonings. All cases of drug poisonings must be regularly reported to national poison control centers of the countries as they enable them to offer more effective services. In this study, we examined the patients who were admitted to our pediatric emergency department with drug poisonings from all districts of Malatya province in Eastern Anatolia in the past seven years. Subsequently, we had

analyzed the clinical manifestations of drug poisonings and the risk factors that make people susceptible to it.

MATERIALS and METHODS

This study was approved by the Malatya Clinical Research Ethics Committee. Our study included 655 cases of drug poisonings varying between ages 1 month-18 years that were admitted to our Pediatric Emergency Department between January 2009 and June 2016. The patients were divided into 4 age groups; 1 month-2 years, 2-7 years, 7-13 years, and 13-18 years old. The patient profiles were evaluated retrospectively. The drug poisoning cases reported in the emergency department were classified statistically as following: causative drug, pre-existing chronic disorder, gender distribution, season of admission, date of admission, environment of drug exposure, whether the national poison control had been notified, whether signs of poisoning are present upon admission and what they are, categories and subcategories of drugs, route of exposure, reason for exposure, whether the patient is

Received: 06.08.2020 **Accepted:** 17.09.2020 **Available online:** 24.06.2021

Corresponding Author: Kazim Kutluturk, Department of Pediatrics, SBU Gulhane Hospital of Research and Education, Ankara, Turkey

E-mail: drkazimkutluturk@gmail.com

receiving intensive care, treatment methods used in the emergency department, laboratory test results, and the outcome of the cases.

Statistical Analysis

The software program used in the statistical evaluation of research data was SPSS for Windows, version 17.0. Categorical data is represented by number (n) and %. The test for homogeneous distribution was specified according to the mean. Descriptive statistics are used to describe the features of our data in this study.

RESULTS

Our study included 655 cases varying between ages 1 month- 18 years (mean 44 ± 18 months). 62.4% of total drug poisonings occurred in female patients, while 37.6% occurred in males. The highest incidence rate was in the 2-7 age group and the lowest in the 7-13 age group. Male incidences were more common between the ages of 1 month- 7 years, while ages 7-18 mostly included female incidences; particularly the 13-18 age group which demonstrated an 87.6% distribution of female incidence (Table 1).

Table 1. Cases according to demographic distribution

Age Groups		Gender		Total
		Female	Male	
1 month-2 years	n	18	22	40
	%	45	55	6.11
2-7 years	n	161	181	342
	%	47.2	52.8	52.21
7-13 years	n	19	13	32
	%	59.4	40.6	4.89
13-18 years	n	211	30	241
	%	87.6	12.4	36.85
Total	n	409	246	655
	%	62.4	37.6	100

Most of the cases were not accompanied by a pre-existing chronic disorder (88.4%). Psychiatric disorders affected 7% of the cases, making them the most prevalent pre-existing chronic disorder. Epilepsy was the second most frequent, affecting 2.1% of the cases. Taking into consideration all cases included in our study between 2009 and 2016, the highest incidence of poisoning had 113 cases in the 2013 year (Figure 1).

The season with the highest rate of occurrence was summer and consisted of 31.8% of cases. Most poisonings took place in a household environment. The national poison control was notified in 87.2% of cases.

78.6% of cases did not exhibit signs of poisoning upon initial examination. Among the symptoms observed, the most common findings were that of the central nervous system, while the most frequent symptom was vomiting.

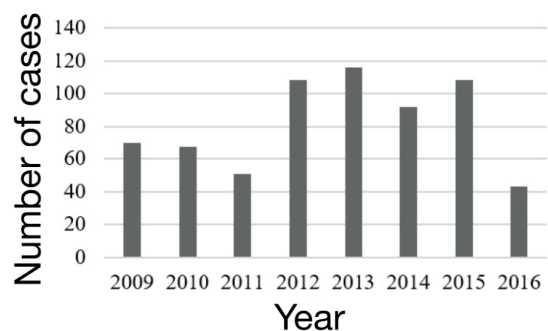


Figure 1. Number of drug poisoning cases according to year

It was determined that NSAIDs were responsible for most drug poisonings, accounting for 37.1% of all the cases included in our study (Table 2). Drugs of the central nervous system were the second most common, followed by poisoning due to cardiovascular drugs. A total of 243 cases showed the use of analgesic, anti-inflammatory, and/or antipyretic drugs. The most common among the analgesics were paracetamol, accounting for 16.5% of the total. Antidepressants were responsible for most poisonings due to drugs affecting the central nervous system; the most common antidepressants were selective serotonin reuptake inhibitors (SSRIs). Among the cardiovascular system drugs, the most frequently encountered were calcium channel blockers, accounting for 5% of the total. Drugs of the cardiovascular system were found to be the cause of 14% of all poisonings.

Table 2. Details of the incident reported upon initial visit

Details of the incident reported upon initial visit	n	%
Environment of the incident		
Household	621	94.8
Non-household environment	23	3.5
Healthcare Facility	1	0.2
Unknown	10	1.5
Signs of poisoning upon initial examination		
No sign of poisoning upon initial examination	515	78.6
Signs of poisoning are present initial examination	140	21.4
Category of drug taken		
One or more analgesic/anti-inflammatory/antipyretic	243	37.1
One or more antidepressants	102	15.6
One or more anti-epileptics	71	10.8
Drugs affecting the cardiovascular system	92	14
Antibiotics	64	9.8
Other drugs	83	12.7
Route of drug entry		
Oral	651	99.4
IM/IV	2	0.3
Nasal	2	0.3
Type of incident		
Accident	405	61.9
Suicide	216	32.9
Therapeutic error	32	4.9
Unknown	2	0.3
Total	655	100

99.4% of drug poisonings occurred as a result of oral intake. Most poisonings were a result of accidental intake (Table 2). 32% of cases admitted were a result of a suicide attempt. It was discovered that suicide attempts were most frequently seen in the 13-18-year-old age group of females.

Methods of treatment used in external facilities before admission and the pediatric emergency department are subsequently listed. Gastric lavage was used in 58% of cases, making it the most frequently used method of treatment. According to list of treatments used in our pediatric emergency department, the preferred method used in 70.5% of cases, was supportive care and monitoring, 27.1% of patients were admitted to the pediatric intensive care unit (Table 3).

Table 3. The treatment methods applied to patients		
Treatment methods applied	n	%
Treatment methods applied in external facilities		
Gastric lavage	380	58.0
Activated charcoal	377	57.6
Supportive care	121	18.5
Induce vomiting	24	3.7
Yogurt/milk	12	1.8
Antidote	6	0.9
Treatment methods applied in the pediatric emergency department		
Supportive care	462	70.5
Activated charcoal	164	25.0
Gastric lavage	122	18.6
Antidote	50	7.6
Induce vomiting	2	0.3
Diuresis	1	0.2

DISCUSSION

Acute pediatric drug poisoning is a common cause of admission to the Pediatric Emergency Services. The aim of our study was to determine the etiological and demographical characteristics of acute pediatric drug poisoning. We think that this will provide more information on the diagnosis, treatment and prevention of poisonings.

According to the 2014 National Poison Data System (NPDS) report by the American Association of Poison Control Centers (AAPCC), 35.6% of all reported cases (approximately 2.2 million cases) were reported to be under 3 years old and 47.7% were under 6 years of age. This report demonstrated that pediatric poisonings were more common in males under the age of 13, and females within the older age group (3). Ozdemir et al found that poisoning was more frequently seen in males under the age of 5 and females over the age of 13 (4). Our study showed that 1.08% of all admissions to our hospital were due to cases of drug poisoning. 62.4% of total drug poisonings were in females and 37.6% were in males. In our study, the highest percentage of poisonings (52.2%) occurred in the 2-7 age group, while the lowest percentage of poisonings (4.8%)

occurred in the 7-13 age group. While the number of male cases (181 persons) was higher than the number of female cases (161 persons) in the 2-7 age group, the number of female cases (211 persons) in the 13-18 age group was higher than the number of male cases (30 persons).

Gungorer et al reported that 14 patients (17%) in the intensive care unit had an additional disorder; of the 14 patients, nine had a diagnosis of depression, three drug addiction, and two Familial Mediterranean Fever (5). In our study, most cases were not accompanied by an additional chronic disorder (88.4%). Psychiatric disorders were the most common pre-existing chronic disorders and affected 7% of cases. Epilepsy was present in 2.1% of cases, making it the second most common disorder.

As stated by the 2014 NPDS report of the AAPCC, the number of deaths in poisonings was found to be 1173 in all age groups. Eighty seven of these deaths were childhood poisonings (%7.6) (3). In our study, the number of deaths due to drug intoxication was 2, making the mortality rate 0.3%.

According to the 2008 records of the National Poison Control, drug poisoning most commonly occurs in summer months (6). In our study, poisoning with drugs was found to have an occurrence of 31.8% in summer and 26.3% in spring. There are various reasons for the increase of poisoning cases in the summer and spring; the increase in temperature makes it easier for children to leave the house, or children living in rural areas can freely roam inside or outside while their parents are busy with agriculture.

2014 NPDS report by the AAPCC demonstrated that analgesics are the primary causative agent of drug poisoning. Salicylate was the most indicated drug in poisonings in previous years and has now been surpassed by paracetamol (3, 4, 7). Salicylate was initially responsible for a substantial amount of poisonings due to its common use; however, the Reye's Syndrome risk was mitigated and intoxication of salicylate decreased with time. In two studies spanning 20 years at Hacettepe University, Ihsan Dogramaci Children Hospital, it was reported that poisoning was mostly due to analgesics being the primary agent (4). A study in Trakya area showed that amitriptyline was the causative agent in most poisoning situations and was responsible for 30 cases (13.2%); following paracetamol with 17 cases (7.5%), imipramin and nimesulidin with 6 cases (2.6%) (8). In our study, analgesic drugs were shown to be the main cause of drug poisoning. Paracetamol poisoning was the most common with a 16.5% incidence.

According to the 2014 NPDS report by the AAPCC, approximately 94% of drug poisonings occurred in domestic environments (3). In 93.3% of drug poisoning cases reported to the National Poison Control Center in Ankara, the route of intoxication was oral intake. Our study showed that 99.4% of isolated drug poisonings occurred after oral intake and a majority of patients (78.4%) showed no signs of poisoning upon initial examination

at the emergency department. While the most common symptom was vomiting, the most common sign was associated with the central nervous system (CNS). In the patients that had symptoms, it was not possible to determine the onset of development as the patient files did not supply this information.

In our study, hydration and symptomatic treatment was the most common method of treating patients (70.5%). This was followed by activated charcoal (25%) and gastric lavage (18.6%) and in some cases, two or three treatment methods were used concomitantly. We can attribute this low rate to the fact that the majority of intoxicated patients were first treated at other health institutions in our city, and that consultation with the National Poison Control Center was found effective for 87.2% of patients.

In a study conducted in the Pediatric Emergency Department of Trakya University, patients who were hospitalized for poisonings between 1998 and 2003 were evaluated and 13.6% of the patients were given an antidote (8). Antidotes were given to 6.3% and 8.4% of the patients in emergency rooms of Eskisehir and Sakarya province, respectively, due to poisoning (10, 11). Our study showed that 7.6% of patients received antidote treatment of N-acetyl cysteine administration due to paracetamol poisoning.

In a study conducted in the Pediatric Emergency Department of Trakya University, patients who were hospitalized for poisonings between 1998 and 2003 were evaluated and 13.6% of the patients were given an antidote (8). Antidotes were given to 6.3% and 8.4% of the patients in emergency rooms of Eskisehir and Sakarya province, respectively, due to poisoning (10, 11). Our study showed that 7.6% of patients received antidote treatment of N-acetyl cysteine administration due to paracetamol poisoning.

Mintegi et al demonstrated that 83.3% of poisoned patients were discharged from the emergency department and 15.2% were hospitalized. It was reported that 1.5% admitted to the intensive care unit (12). Nalliah et al reported that 87% of patients diagnosed with poisoning were discharged from the emergency department (13). Gungorer et al found that 46% of the patients were admitted to the pediatric intensive care unit and then discharged (5). In the study by Oner et al, 4.4% of the cases were treated in the intensive care unit (8). Kondolot et al reported that the number of patients admitted to the intensive care unit was 5.7% of total cases (14). In our study, 27.1% of all drug poisoning cases were treated in the pediatric intensive care unit and 72.9% were hospitalized in the emergency department for monitoring and then discharged after this period.

According to a study done by Gurkan G. et al, 90.8% of intoxications were due to accidents and 7.5% were suicide attempts (15). A case study by Oner et al showed that accidents accounted for 216 cases (95.2%) and 11 cases (4.8%) were due to suicide attempts (8). A study by Akbay

et al reported that accidents were responsible for 85.8% of poisonings, suicide attempts 13.9%, and iatrogenic reasons 0.3% (10). In our study, 62.1% of cases presented with drug poisoning were accidental, 33% by a suicide attempt, and 4.9% by misuse of drugs.

Our study had certain restrictions. Patient data was obtained through the hospital database; some patient files lacked the necessary information to be included in this study. As a result, the number of patients included in the study was less than the expected number of drug poisoning cases. Our study was conducted in an individual location; therefore, it reflects a significant portion of cases of childhood drug poisonings in our area.

CONCLUSION

Drug poisonings are a significant and preventable cause of morbidity in childhood. Drugs are the most prominent factor of poisoning below the age of 5 and in the adolescent age group, which happen as a result of accidents and suicide attempts, respectively. Drug poisonings frequently happen due to medications that are commonly used in the general population and certain age groups. It is vital to know the clinical and epidemiological components of every age group as this will allow for faster diagnosis and treatment and increase the likelihood of prevention, thereby lowering future incidences.

Facts regarding poisoning must be brought to light in every country to lower risk factors and eliminate potential hazards to make prevention more achievable; our study reflects the epidemiological characteristics of childhood drug poisoning cases in Eastern Anatolia so we are optimistic that the path to prevention will be easier. This study reflects only a portion of the drug poisoning cases in Turkey. Observations on poisoning cases at the many health facilities across the country must be shared through standardized forms and studies must be conducted allowing the most widespread causes to be brought to light.

Competing interests: The authors declare that they have no competing interest.

Financial Disclosure: There are no financial supports.

Ethical approval: This study was approved by the Ethics Committee of Inonu University, Faculty of Medicine (2016/121).

REFERENCES

- O'Donnell KA, Ewald MB. Poisonings. In: Kliegman R, Stanton BF, Geme JW, eds. Nelson Textbook of Pediatrics 19th edition. Philadelphia: Elsevier Saunders 2011;250.
- Gecim N, İkinçioğulları D, Harmancı N. Evaluation of childhood poisoning cases on National Poison Center of Turkey: 5 years retrospective study. Turk. Klinikleri J Pediatr Sci 2006;2:1-4.
- Mowry JB, Spyker DA, Brooks DE, et al. 2014 Annual Report of the American Association of Poison Control Centers' National Poison Data System: 32nd Annual Report. Clinical Toxicol 2015;53:962-1147.

4. Ozdemir R, Bayrakci B, Teksam O, et al. Thirty-three-year experience on childhood poisoning. Turk J Pediatr 2012;54:251-9.
5. Gungorer V, Yildirim NK. Evaluation of poisoning cases hospitalized in our newly opened second level pediatric intensive care unit. Turkish Pediatrics Archive 2016;51.
6. Ozcan N, Central İDUZD study report summary. Turk Hij Den Biyol Derg 2009;66:29-58.
7. Hincal F, Hincal AA, Muftu Y, et al. Epidemiological aspects of childhood poisonings in Ankara: a 10-year survey. Hum Toxicol 1987;6:147-52.
8. Oner N, İnan M, Vatansever U, et al. Childhood Poisoning in Trakya region. Turkish Pediatrics Archive 2004;39.
9. Uziel Y, Adler A, Aharonowitz G, et al. Unintentional childhood poisoning in the Sharon area in Israel: a prospective 5-year study. Pediatr Emerg Care 2005;21:248-51.
10. Akbay Onturk Y, Ucar B. Retrospective evaluation of childhood poisonings in Eskisehir. Cocuk Sagligi Hast Derg 2003;46:103-13.
11. Soyucen E, Aktan Y, Saral A, et al. Retrospective evaluation of childhood poisonings in Sakarya . Cocuk Sagligi Hast Derg 2006;49:301-6.
12. 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;22:334-408.
13. Nalliah RP, Anderson İM, Lee MK, et al. Children in the United States make close to 200,000 emergency department visits due to poisoning each year. Pediatr Emerg Care 2014;30:453-507.
14. Kondolot M, Akyildiz B, Gorozen F, et al. Evaluation of poisoning cases admitted to the pediatric emergency department. Cocuk Sagligi Hast Derg 2009;52:68-4.
15. Genc G, Avni Sarac D, Ertan U. Evaluation of Poisoning Cases Admitted to Children's Hospital Emergency Service. Evaluation-US 2007;74:8.