



Clinical Spectrum of Acute Poisoning Cases Admitted to the Pediatric Emergency Department

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Abstract

Introduction: Pediatric poisoning is a common emergency worldwide. Routine surveillance is necessary for public health officials and physicians to update strategies for pediatric poisoning prevention and management. In this study, we aimed to investigate the epidemiology of poisoning among children admitted to the emergency department.

Methods: In this study, the epidemiological features of 110 cases of poisoning brought to Malatya Training and Research Hospital Pediatric Emergency Service between March 2020 and December 2021 were retrospectively reviewed and examined.

Results: Hospital admissions are most frequently seen in the age groups of 1–3 (52.7%) and 12–18 (23.6%) years. Of 110 poisoning cases, 56.4% were drug poisoning and 54.5% of them were girls. While there are no symptoms in 74.5% of the cases, the most common symptom is abdominal pain with 40.7%. 92.7% of the patients needed intensive care. Only 45.5% of the cases were followed up and gastric lavage was performed with activated charcoal in 23.6% of them.

Discussion and Conclusion: Childhood poisoning has an important place among the reasons for admission to the hospital. Early detection of poisonings and appropriate approach are lifesaving. Parenting advice and protective safety measures are important.

Keywords: Drugs; intoxication; pediatric emergency.

Poison is, literally, the name given to any substance that can cause chemical, biochemical, or radioactive damage to cells and living tissues, and sometimes threaten life. Poisonings are among the most common causes of death as a result of accidents, following traffic accidents, burns, drowning, and falls^[1]. Frequently encountered in emergency services, poisoning cases require a serious approach and respond well to treatment when diagnosed early^[2]. Common in both developed and developing countries, childhood poisoning is a health problem which requires an emergency approach in terms of mortality and morbidity, and can be prevented^[3]. Thousands of

healthy children in our country and around the world face the danger of losing their health due to poisoning every year. According to the World Health Organization statistics, approximately 1 million children die every year as a result of injuries due to accidents^[4]. All diagnosis and treatment steps of poisoning are most generally carried out in the emergency departments of hospitals^[5]. Today's physicians are closely concerned about the fact that children take drugs and various household substances as a result of accident and carelessness, and that adolescents are poisoned using drugs and similar substances for the purpose of suicide and enjoyment^[6]. In order to diagnose

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and treat poisoning cases in emergency services, it is necessary to update the toxicology knowledge of emergency service personnel, provide toxicological diagnosis facilities and have monitoring and intensive care facilities and antidotes^[5]. There have been significant changes in the treatment and prevention of childhood poisonings in recent years. However, poisoning is still an important problem, especially in the pediatric group, in our country as well as all over the world^[7].

Materials and Methods

The population of the study consists of the patients admitted to the Malatya Training and Research Hospital Pediatric Emergency Service, and the sample consists of 110 pediatric patients who were brought with poisoning between March 2020 and December 2021 and conducted in accordance with the Declaration of Helsinki. Patients who were admitted to our hospital but then transferred to another center for various reasons were excluded from the study. The patients were evaluated in terms of their age, gender, year of admission, type of application, poisoning agent, need for intensive care, treatment and prognosis, the reasons for and the ways of drug intake, symptoms observed at admission, seasonal distribution, the treatment methods applied, clinical results (discharged patients, the number and duration of patients under observation, the number of hospitalized patients, the need for intensive care, and death cases), and stay duration. Cases were grouped according to their age such as 0–12 months (infancy), 1–3 years (toddler), 3–6 years (pre-school), 6–12 years (school age), and 13–18 years (adolescent). The study was approved by the Malatya Turgut Özal University Clinical Research Ethics Committee with the decision numbered 2022/6 on January 10, 2022. Data were evaluated with the Statistical Package for the Social Sciences 25.0 (IBM Company Chicago, Illinois, USA) statistical program.

Results

45.5% of the patients are male. Admissions are most frequently seen in the age groups of 1–3 (52.7%) and 12–18 (23.6%) years. 61.8% of the patients were admitted in 2021. Admissions were made most frequently in summer (36.4%) and least in winter (11.8%). 79.1% of the patients were admitted to the hospital on an outpatient basis (Table 1).

Only 25.5% of the admitted patients have symptoms. The most common symptom (40.7%, n=11) was abdominal pain, followed by other symptoms (29.6%, n=8) and palpitations (18.5%, n=5) (Table 2).

Table 1. Demographic data of patients

	n	%
Gender		
Female	60	54.5
Male	50	45.5
Age		
0–1 year	4	3.6
1–3 years	58	52.7
3–6 years	17	15.5
6–12 years	5	4.5
12–18 years	26	23.5
Admission year		
2020	42	38.2
2021	68	61.8
Admission season		
Spring	29	26.4
Summer	40	36.4
Fall	28	25.5
Winter	13	11.8
Admission year		
Outpatient	87	79.1
112	23	20.9

Table 2. Distribution of clinical findings of patients

	n	%
Symptoms		
Symptomatic	28	25.5
Asymptomatic	82	74.5
Type of symptoms (n=27)		
Abdominal pain	11	40.7
Nausea–vomiting	3	11.1
Palpitation	5	18.5
Others	8	29.6

Among the poisoning agents, drugs (56.4%) come first, followed by corrosive substances (25.5%). The most commonly taken drugs in drug groups are non-steroidal anti-inflammatory drugs (NSAIDs) (21.0%), analgesics (11.3%), antidepressants (9.7%), and vitamins (9.7%).

98.2% of the patients took these substances orally. The reason for taking the substances was suicide 21.8% and 77.3% of them accidentally took the substance that caused poisoning (Table 3).

92.7% of the patients needed intensive care follow-up. 45.5% of the patients were only followed up and 23.6% of them had gastric lavage with activated charcoal. 15.5% of them stopped oral intake and were followed up. Medica-

Table 3. Distribution of poisoning agents according to their types

	n	%
Poisoning agents		
Corrosive substance	28	25.5
Drugs	62	56.4
Abuse	17	15.5
Others	3	2.7
Poisoning agents: Drugs (n=62)		
Analgesic	7	11.3
Antihistamine	2	3.2
Antidepressant	6	9.7
Antipsychotic	2	3.2
NSAID	13	21.0
Vitamins	6	9.7
Antidiabetic	2	3.2
Cardiovascular drugs	4	6.5
Antibiotic	4	6.5
Others	16	25.8
Poisoning agent: Abuse (n=17)		
Analgesic	4	23.5
Antidepressant	6	35.3
Antipsychotic	3	17.6
Antidiabetic	1	5.9
Others	3	17.6

tion was applied to 5.5% of the patients. It was observed that the prognosis of all 108 patients who accepted treatment and follow-up was good.

Suicidal substance intake is more common in girls than boys ($p=0.001$). Poisoning with corrosive substances is more common in boys than girls, compared to drugs and abuse ($p=0.01$). More symptoms are seen in girls than boys at the time of admission to the hospital ($p=0.01$). Being over 6 years old in admissions with poisoning is more common in girls than in boys ($p<0.001$).

Outpatient admission is more common in children under 6 years of age than in children over 6 years of age ($p<0.001$). The symptoms are more common in children over the age of 6 years than in children under the age of 6 years ($p<0.001$). The need for intensive care is more common in children over the age of 6 years than in children under the age of 6 years ($p=0.003$). Suicidal substance intake is more common in children over 6 years of age than in children younger than 6 years old ($p<0.001$). Corrosive substance poisoning is more common in children under 6 years of age than in children over 6 years old ($p=0.003$).

Admissions through 112 in 2021 are higher than in 2020 ($p=0.007$). Admissions due to accident and carelessness in

summer and autumn are higher than admissions due to accident and carelessness in spring and winter ($p=0.01$).

The frequency of symptoms in patients admitted to the hospital through 112 was higher than those admitted as outpatients ($p<0.001$). The need for intensive care is higher in patients admitted by 112 compared to outpatients. Suicidal substance intake was higher in patients admitted by 112 compared to outpatients ($p<0.001$). Drug and abuse-related substance use was higher in patients admitted through 112 than in outpatients ($p=0.02$).

Discussion

Poisoning is a serious public health problem that is common in childhood and causes morbidity and sometimes even mortality^[8]. Acute poisonings are among the crucial reasons for child admissions to the emergency department because they require an urgent diagnosis and treatment approach^[9,10]. In many types of poisoning, with early intervention, the poison can be removed from the body without creating any toxic effect. This can be possible with early diagnosis and appropriate treatment. Poisoning cases are frequently encountered cases in emergency services which require a serious approach and respond positively to treatment when diagnosed early^[2,3].

As a result of the improvements in science and technology, various drugs, cosmetics, and chemicals have rapidly increased our quality of life, but on the other, they can lead to dangerous consequences as a result of misuse or accidents. Scores of studies are also being carried out in our country against this problem which is gaining importance in the world^[11,12].

While the majority (79.1%) of the patients in our study were admitted to our hospital individually, 20.9% of them were brought to our clinic by 112 emergency ambulances. In the study of Lee et al.,^[13] it was reported that 16.8% of the patients with poisoning cases were brought by ambulance, and 83.2% were admitted individually.

In our study, 50 (45.5%) of the poisoning cases were male and 60 (54.5%) of them were female, and the female/male ratio was 1.2. When the related literature was reviewed, it was found that poisoning is more common in boys in some studies, but in other studies, it is more common in girls^[14,15].

The age at which poisoning occurs has been found to be related to the mechanism and cause of poisoning^[16]. In various studies, it has been reported that 51.4–73.3% of all poisoning cases observed in our country include children under the age of 5 years^[17,18]. In some studies, it suggested

that poisoning has increased among the children aged between 6 and 12 years^[18].

In our study, poisonings are more common in girls only in the age group of 12–18 years in terms of gender. Poisoning in girls in this age group is more related to the drug intakes for suicidal purposes and is related to girls being more emotional, feeling more pressure, and experiencing more psychological conflicts during adolescence. Similar results were obtained in other studies conducted in our country^[18-20].

In our study, the mean age was 5.95 ± 5.769 years. It was found that the majority of the cases were in the age groups of 1–3 ($n=58$, 52.7%) and 12–18 ($n=26$, 23.5%) years. The data we collected from the patients admitted to the pediatric emergency service are similar to previous studies. Ozdogan et al.^[18] reported that approximately half of the childhood poisoning cases were younger than 4 years of age.

It was found that most of the cases (77.3%) occurred as a result of accidents. Oral ingestion of tiny substances such as drugs may cause poisoning, especially in children aged 0–4 years^[21]. In our study, it was obtained that the patients in the age group of 0–18 years were mostly poisoned by drugs (56.4%) and corrosive substances (25.5%).

In the studies carried out in our country, it has been revealed that the majority of poisonings (from 75% to 95%) occur orally^[22,23]. In our study, it has been found that the major poisoning way was oral intake, too.

In general, 80–85% of child poisonings are accidental and 5–20% of them are suicidal^[11]. When all of our poisoning cases were evaluated, it was seen that 77.3% of the patients were poisoned as a result of accident and 21.8% of them were suicidal. It was revealed that almost all children between the ages of 0–12 years were poisoned as a result of accident. According to these findings, accidental poisonings are more common between the ages of 0 and 6 years, during which activity increases and curiosity about research and learning develops. Careless family elder members, who take inadequate precautions, generally leave medicines, corrosive substances, and other chemicals within the reach of children. In other words, the number of poisoning cases is much higher in children aged 0–6 years, due to the fact that these products are stored outside of their original containers and that the family elders cannot monitor their children sufficiently^[16,21,24].

In studies conducted around the world, it has been reported that the clinical severity of most poisoning cases is mild and the clinical sign and symptoms of poisoning can vary. It has also been stated that neurological and gastrointestinal symptoms may also be seen^[25]. The most

common symptoms observed were nausea and abdominal pain^[11]. In our study, 82 (74.5%) of the poisoning cases were asymptomatic at the time of admission, suggesting that the amount taken was small or that the admission was made before the symptoms appeared. Abdominal pain was found in 11 (40.7%) of our cases. Other findings included palpitations, nausea–vomiting, and other symptoms. When the symptoms and findings seen on admission to the hospital are evaluated, in case of complaints such as sudden vomiting, abdominal pain, and restlessness, poisoning should be considered in the differential diagnosis even if it has not been mentioned in the patient's medical history^[23,26].

The treatments applied in studies evaluating childhood poisonings in our country vary. 45.5% of the patients admitted to our emergency service were only followed up. Gastric lavage with activated charcoal was applied to 23.6%, and oral intake was discontinued in 15.5%. Medication was administered to 5.5% of the patients. Kendirci et al.^[11] used oxygen inhalation (48.6%) most frequently in the treatment of poisoning cases, followed by gastric lavage and activated charcoal (25.1%). They acted in line with the recommendations of UZEM (National Poison Solidarity Center) in their treatment approaches. Activated charcoal and gastric lavage were seen to be the most frequently used methods in different researchers^[21,27].

In various studies examining childhood poisonings, the need for intensive care was found at different rates. In a study conducted by Erguven et al.,^[28] it was reported that 148 poisoning cases were followed over a period of approximately 2.5 years. In our study, 92.7% of the patients needed intensive care follow-up. The need for intensive care is more common in children over the age of 6 years than in children under the age of 6 years.

Age group, hospital admission duration, type, and amount of poisoning agent are the most important factors affecting mortality in childhood poisoning cases^[29].

No mortality was observed in our study, which suggests that the good prognosis of pediatric poisoning cases may be due to accidental small amounts in most of the poisoning cases.

When a comparison is made in terms of seasons, it is seen that 36.4% of the hospital admissions were made in the summer months and 26.4% in the spring months. The least number of admissions were made during the winter months (11.8%). We think that the reason for this is that most of our poisoning cases occur with drugs and there are no seasonal differences in drug poisonings.

In our study, the most common poisoning agent was found to be drugs. Among the drug subgroups, NSAID (21.0%) was the most common. The reason for this may be the increase in the prescription rate of NSAID group drugs and their not being stored in safe places. According to other studies in which pediatric poisoning cases were examined in our country, drugs are usually the first cause for poisoning^[30].

Limitations of the Study

There are some limitations in this study. The patients' information was obtained using the hospital's file registry system. However, since some patients were excluded from the study due to insufficient data, the number of patients included in the study was found to be lower than the expected poisonings in the same period.

Conclusion

Childhood poisonings are common health problems. Hundreds of poisoning events occur each year in our country, especially in children aged 0–3 years. Children under 6 years of age are active and they are at the age of exploration. These features lead to accidental poisoning as a result of the carelessness of parents. The vast majority of cases occur in the child's own home, and many of them result from placing drugs outside of their original containers or in areas within the child's easy reach. We believe that determining the characteristics of childhood poisonings in our country with more comprehensive studies and attracting the attention of the society will contribute significantly to the prevention of childhood poisonings.

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