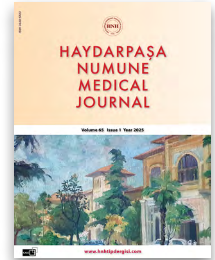
HAYDARPAŞA NUMUNE MEDICAL JOURNAL

DOI: 10.14744/hnhj.2025.57442
Haydarpasa Numune Med J 2025;65(4):327–332



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ORIGINAL ARTICLE

Socio-Demographic Evaluation of Patients Admitted to the Pediatric Emergency Department and Outpatient Clinic With A Diagnosis of Intoxication

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Abstract

Introduction: This study aims to retrospectively analyze the demographic, sociocultural, and clinical characteristics of childhood poisoning cases. The study evaluates the types of substances causing poisoning, their distribution by age group, hospital admission times, and treatment approaches.

Methods: Poisoning cases in individuals under 18 years of age who presented to the Pediatric Emergency Department of Haydarpaşa Numune Training and Research Hospital in 2017 were retrospectively examined. Patients' age, gender, cause of poisoning, treatment methods, and clinical data were recorded. The NCSS 2007 program was used for statistical analyses.

Results: The study included 112 children. Poisoning occurred at home in 94.6% of cases; 58.0% were suicide attempts, and 42.0% were accidental. The most common toxic substances were antidepressants (18.8%) and analgesics (17.9%). Poisoning involved self-administration in 41.1% of cases and others' medications in 53.5%. Depression was the most common comorbid condition (27.4%).

Discussion and Conclusion: Poisoning is a significant health issue, particularly in children under five years of age and those over twelve. Education for families, psychological support, and early intervention are essential. Teaching young children not to taste unknown substances, encouraging adolescents through confidence-building and problem-solving strategies, increasing adolescent health centers, and restricting over-the-counter drug sales could reduce poisoning incidents.

Keywords: Childhood poisoning; suicide attempts; toxic substances.

The concepts of poison, poisoning, and treatment have existed throughout human history. Hippocrates (460–377 BC), who is generally considered the father of medicine, described many poisons and their treatments and was the first to mention the principles of clinical toxicology. However, the term "poison" was first used in English literature around the 1230s to describe air or drugs with deadly contents [1].

Mid-20th-century analyses by the American Academy of Pediatrics highlighted that poisoning was one of the most common medical emergencies in children, emphasizing the seriousness of the issue and leading to the implementation of necessary preventive measures [2]. Worldwide, poisoning cases constitute a significant proportion of emergency department admissions, particularly among children [3,4]. In developed countries, the annual incidence of poisoning

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Submitted Date: 04.12.2024 **Revised Date:** 02.08.2025 **Accepted Date:** 16.08.2025
Haydarpaşa Numune Medical Journal

ranges between 0.02% and 0.93%, while in our country, this rate is between 0.46% and 1.57% [5,6].

In our country, the most common causes of poisoning are medications, household chemicals, toxic gases, foods, plants, and poisonous animals [7]. According to the 2008 National Poisoning Center report, products used for human health (such as medications) rank first among poisoning agents, with a rate of 69.74% [8]. According to 2016 data from the AAPCC (American Association of Poison Control Centers), the number of reported poisoning cases was 2,159,032, of which 62.82% were in individuals under the age of 18 and 31.79% were in children under 5 years old [9].

Altered consciousness, sudden arrhythmias without known heart disease, the sudden onset of symptoms and signs, or similar symptoms observed in multiple individuals not associated with any diagnosed illness should raise suspicion of poisoning [3]. The time between the poisoning incident and hospital admission, the type and amount of poison, and the child's age are important for diagnosis and treatment [10]. For this reason, each country should take its own precautions and develop a poisoning management approach based on regional risks [11]. Especially in developing countries like Türkiye, considering that poisoning in children is associated with high mortality, this is a significant issue and needs to be addressed. Poisoning is a global problem affecting children worldwide and is one of the most common reasons for emergency room visits [12].

The regional distribution of poisoning cases, the causes of poisoning, and their clinical reflections by age group provide important information for public health and form the basis for shaping health policies.

In our study, we aimed to retrospectively examine the demographic, socio-cultural, and clinical findings of pediatric poisoning cases who applied to and were hospitalized at Haydarpaşa Numune Training and Research Hospital throughout 2017. Additionally, we aimed to contribute to the poisoning database in our country.

Materials and Methods

This study was designed as a retrospective analysis of the medical records of all patients under the age of 18 who were diagnosed with poisoning and admitted to the Pediatric Emergency Department of Haydarpaşa Numune Training and Research Hospital, University of Health Sciences, between January 1 and December 31, 2017. Data obtained from the patients' archived files included age, gender, presenting symptoms, Glasgow Coma Score, complications, treatments applied, whether gastric lavage or activated charcoal was administered, location of the poisoning, time elapsed before hospital presentation, type and classification of the toxic substance, whether the substance belonged to the patient or another individual, the cause of poisoning (suicide or accident), treatment method, need for intensive care, presence of comorbidities, and length of hospital stay. These data were analyzed statistically.

Statistical Analysis

Statistical analyses were performed using the NCSS (Number Cruncher Statistical System) 2007 software (Kaysville, Utah, USA). Descriptive statistics, including mean, standard deviation, median, frequency, percentage, minimum, and maximum values, were used to summarize the data. The distribution of continuous variables was assessed using the Shapiro–Wilk test. Since most of the data did not conform to a normal distribution, nonparametric tests were applied. The Mann–Whitney U test was used for comparisons between two independent groups, as it does not require normally distributed data. For comparisons involving three or more groups, the Kruskal–Wallis test was applied, and if significant differences were found, Bonferroni–Dunn post hoc analysis was conducted to determine which groups differed. Relationships between categorical variables were assessed using the Pearson chi-square test when appropriate, while Fisher's exact test and Fisher–Freeman–Halton test were used in cases of small sample sizes or low expected frequencies. A p-value of <0.05 was considered statistically significant. The application of these statistical methods ensured accurate interpretation of the data and enhanced the reliability of the study findings.

Ethical approval for the study was granted by the Ethics Committee of Haydarpaşa Numune Training and Research Hospital, University of Health Sciences, on February 6, 2018 (Decision No: 127). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

The study was conducted with 112 children diagnosed with intoxication who were admitted to the Pediatric Health and Diseases Clinic of Haydarpaşa Numune Training and Research Hospital between January 1, 2017, and December 31, 2017. Of the patients, 67.9% (n=76) were female and 32.1% (n=36) were male. The age range of the children was 0.8 to 17.4 years, with a mean age of 10.64±6.40 years. In terms of age distribution, 34.8% (n=39) were 5 years old or younger, 6.3% (n=7) were between 6 and 11 years old, and 58.9% (n=66) were 12 years or older. Comorbid conditions were present in 19.6% (n=22) of the patients, with depression being the most common, observed in 27.4% (n=6) of these cases (Table 1).

The duration of observation and hospitalization ranged from 6 to 130 hours, with a mean of 33.34±23.68 hours. Poisonings occurred at home in 94.6% (n=106) of the cases and outside the home in 5.4% (n=6). Regarding the cause, 58.0% (n=65) of the children were cases of intentional poisoning (suicide attempt), while 42.0% (n=47) were accidental.

The most frequently ingested toxic substances were antidepressants (18.8%, n=21), analgesics (17.9%, n=20), non-steroidal anti-inflammatory drugs (8.9%, n=10), antipsychotics (8.0%, n=9), antibiotics (6.3%, n=7), antihistamines (5.4%, n=6), antidiabetics (5.4%, n=6), and ACE inhibitors (4.5%, n=5). Other substances (42.9%, n=48) included antispasmodics, anticoagulants, ethanol, mushrooms, corrosive agents, herbal products, leukotriene antagonists, antiemetics, and carbon monoxide.

In terms of substance ownership, 41.1% (n=46) of children used their own medications, 53.5% (n=60) used medications belonging to others, and 5.4% (n=6) ingested non-medicinal substances. The time from poisoning to hospital admission ranged from 0.2 to 61 hours (Table 2).

Table 1. Distribution of demographic characteristics

Demographic characteristics	**n**	**%**
Age (years)		
Min-max (median)	0.8-17.4 (14)	
Mean±SD	10.64±6.40	
≤5 years	39	34.8
6-11 years	7	6.3
≥12 years	66	58.9
Gender		
Female	76	67.9
Male	36	32.1
Comorbid disease		
None	90	80.4
Present	22	19.6
Depression	6	27.4
ADHD	3	13.6
Epilepsy	2	9
Bipolar disorder	2	9
Anxiety	2	9
Anorexia nervosa	1	4.5
Other (asthma, acute bronchitis, atopic dermatitis, upper respiratory tract infection)	6	27.4

SD: Standard deviation; ADHD: Attention deficit hyperactivity disorder.

Symptoms developed in 15.2% (n=17) of the children, with nausea and vomiting being the most common (23.6%, n=4). Glasgow Coma Scale (GCS) scores were 13 in 2.7% (n=3), 14 in 2.7% (n=3), and 15 in 94.6% (n=106) of the cases. Complications were observed in 1.8% (n=2) of patients and included hypoglycemia and QT prolongation.

Regarding treatment, 0.9% (n=1) of the children received akineton, 92.8% (n=104) received hydration therapy, 1.8% (n=2) received hydration with N-acetylcysteine, 0.9% (n=1) received hydration with bicarbonate, 2.7% (n=3) received hydration with ranitidine, and 0.9% (n=1) received hyperbaric oxygen therapy. Gastric lavage was performed in 43.7% (n=49), and activated charcoal was administered in 69.6% (n=78) of the cases. Intensive care unit (ICU) indication was present in 2.7% (n=3) of the children (Table 3).

Table 2. Distribution of characteristics related to intoxication incidents

Intoxication characteristics	**n**	**%**
Location of intoxication incident		
Home	106	94.6
Outside the home	6	5.4
Mode of intoxication		
Suicide	65	58.0
Accident	47	42.0
Toxic substances ingested		
Antidepressant	21	18.8
Analgesic	20	17.9
NSAIDs	10	8.9
Antipsychotic	9	8.0
Antibiotic	7	6.3
Antihistamine	6	5.4
Antidiabetic	6	5.4
ACE Inhibitor	5	4.5
Other (vitamin, beta agonist, decongestant, gastroprotective agent, antihypertensive, leukotriene antagonist, antiemetic, carbon monoxide (co), antispasmodic, ethanol, antihyperlipidemic, anticoagulant, mushroom, corrosive substance, plant extract)	48	42.9
Ownership of the drug used		
Own medication	46	41.1
Non-own medication	60	53.5
Non- drug (Ethanol, CO, Mushroom, Plant extract, Drain cleaner)	6	5.4
Time to arrival at hospital (hours)		
Min-max (median)	0.2-61 (2)	

CO: Carbon monoxide; ACE: Angiotensin-converting enzyme; NSAIDs: Nonsteroidal anti-inflammatory drugs.

Table 3. Distribution of in-hospital characteristics

In-Hospital characteristics	n	%
Symptoms		
None	95	84.8
Present	17	15.2
Dizziness	2	11.7
Altered Consciousness	2	11.7
Nausea-Vomiting	4	23.6
Other (fainting, jaw clenching, toothache, fatigue, hallucination, diarrhea, speech difficulty)	9	53
Vital Signs		
GCS 13	3	2.7
GCS 14	3	2.7
GCS 15	106	94.6

GCS: Glasgow coma scale.

When data were analyzed by age group, the presence of comorbid conditions differed significantly across age categories (Fisher–Freeman–Halton test, p=0.003). Comorbidities were more common in children aged ≥12 years (30.3%) than in those aged ≤5 years (5.1%) and 6–11 years (0%).

Antidepressant use also varied significantly by age (p=0.03). Post hoc analysis showed that children aged 6–11 years (42.9%) and ≥12 years (22.7%) had higher rates of antidepressant use than those aged ≤5 years (7.7%).

The rate of using one's own medication was significantly higher in the ≥12 years group (59.1%) compared to the ≤5 years (17.9%) and 6–11 years (0%) groups (p<0.001).

Table 4. Evaluation of comorbid conditions and intoxication characteristics by age group

Variable	≤5 years (n=39)		6–11 years (n=7)		≥12 years (n=66)		p
	n	%	n	%	n	%	
Comorbid conditions	2	5.1	0	0	20	30.3	0.003[a]
Location of intoxication							
Home	38	97.4	7	100	61	92.4	0.598[a]
Outside	1	2.6	0	0	5	7.6	
Mode of intoxication							
Suicide	6	15.4	4	57.1	55	83.3	<0.001[a]
Accident	33	84.6	3	42.9	11	16.7	
Antidepressant use	3	7.7	3	42.9	15	22.7	0.03[a]
Ownership of medication							
Own	7	17.9	0	0	39	59.1	<0.001[a]
Not own	31	79.5	6	85.7	23	34.8	
Non-drug	1	2.6	1	14.3	4	6.1	
Hospital arrival time (hours), median (min–max)	24 (6–72)		33 (24–130)		24 (8–130)		0.002[d]

[a]: Fisher-Freeman-Halton test; [d]: Kruskal-Wallis test. *: p<0.05; **: p<0.01.

Table 5. Evaluation of hospital characteristics by age group

Variable	≤5 years (n=39)		6–11 years (n=7)		≥12 years (n=66)		p
	n	%	n	%	n	%	
Symptoms							
None	36	92.3	7	100	52	78.8	0.122[a]
Present	3	7.7	0	0	14	21.2	
Complications							
None	39	100	7	100	64	97	0.586[a]
Present	0	0	0	0	2	3	
Gastric lavage							
Not done	19	48.7	5	71.4	39	59.1	0.427[a]
Done	20	51.3	2	28.6	27	40.9	
Activated charcoal							
Not done	12	30.8	1	14.3	21	31.8	0.842[a]
Done	27	69.2	6	85.7	45	68.2	
ICU indication							
None	39	100	6	85.7	64	97	0.137[a]
Present	0	0	1	14.3	2	3	
Observation and admission duration (hours), median (min–max)	24 (6–72)		33 (24–130)		24 (8–130)		0.002[d]

[a]: Fisher-Freeman-Halton test; [d]: Kruskal-Wallis test. *: p<0.05; **: p<0.01. ICU: Intensive care unit.

Hospital arrival times also differed significantly by age group (Kruskal–Wallis test, p=0.002). Post hoc comparisons revealed that children aged 6–11 years had the longest delay in reaching the hospital, followed by those aged ≥12 years (Table 4). However, there were no statistically significant differences between age groups in terms of poisoning location, symptoms, complications, gastric lavage, or activated charcoal administration (all p>0.05).

Finally, the duration of hospital stay differed significantly across age groups (Kruskal–Wallis test, p=0.002). Post hoc analysis indicated that children aged 6–11 years had a longer median hospital stay (33 hours) than children in the other groups (median 24 hours) (Table 5).

Discussion

In our study, 34.8% of the cases (n=39) were children aged ≤5 years, 6.3% (n=7) were children aged 6–11 years, and 58.9% (n=66) were children aged ≥12 years. In another study, poisoning incidents were most commonly observed in children under 5 years of age, with 39.4% of cases occurring in children aged 13 months to 4 years and 21.7% in children aged 0–12 months [13]. In the study by Sümer et al. [14] conducted between 2003 and 2009, 73.8% of the 233 cases presenting to the Pediatric Emergency Department of Kahramanmaraş Sütçü İmam University Medical Faculty were children aged 7 months to 4 years. The predominance of cases in children aged ≥12 years in our study differs from many previous reports in which poisoning is more frequent among younger children. This difference may be explained by the higher risk of household accidents in younger children, whereas adolescents more frequently tend to experiment with substances or medications. This pattern may be associated with increasing curiosity and risk-taking behaviors with age. Although direct evidence in the literature is limited, observational findings support this interpretation.

Comorbidities were observed in 19.6% of the children (n=22), with depression being the most common comorbidity, present in 27.4% (n=6) of these cases. This finding suggests that children with psychological problems may be at a higher risk for poisoning. Psychiatric disorders, particularly depression, are known to be associated with suicide attempts and self-harming behaviors in children and adolescents. However, studies directly examining the relationship between psychiatric conditions and poisoning in pediatric populations remain limited. Therefore, further research is needed to clarify the impact of psychological factors on childhood poisoning.

The duration of observation and hospitalization ranged from 6 to 130 hours, with a mean of 33.34±23.68 hours. In a previous study, hospitalization durations for poisoned patients ranged from 8 hours to 10 days, with a mean of 43.8±29 hours. Differences in hospitalization duration may be attributed to variations in patient characteristics, poisoning severity, and treatment approaches. In our study, 94.6% of poisonings (n=106) occurred at home, whereas 5.4% (n=6) occurred outside the home. The predominance of home-based poisonings indicates that access to harmful substances in the domestic environment poses a significant risk, underscoring the importance of preventive measures and increased awareness among families.

When examining toxic substances, the most frequently encountered substances were antidepressants (18.8%, n=21), analgesics (17.9%, n=20), nonsteroidal anti-inflammatory drugs (8.9%, n=10), antipsychotics (8.0%, n=9), antibiotics (6.3%, n=7), antihistamines (5.4%, n=6), antidiabetic drugs (5.4%, n=6), ACE inhibitors (4.5%, n=5), and other substances (42.9%, n=48). In the study by Bükülmez et al. [8], the most common cause of poisoning was corrosive substances, accounting for 51.4% of cases (148 cases), while 21.9% (63 cases) were related to drug poisoning. This difference may be attributed to variations in poisoning types and population characteristics.

Symptoms developed in 15.2% of the children (n=17), with nausea and vomiting being the most common symptoms, observed in 23.6% of cases (n=4). Another study reported that the most common symptoms included nausea and vomiting (14.1%), dizziness (13.3%), oropharyngeal hyperemia (9%), and loss of consciousness (8.5%) [14]. Our findings suggest that gastrointestinal symptoms are more common in children and provide an important clinical clue. The evaluation and management of symptoms such as nausea and vomiting may play a critical role in the recognition of this patient group.

Statistically significant differences in the presence of comorbidities were found across age groups. The prevalence of comorbidities was higher in children aged ≥12 years. This may be explained by longer exposure to stressors, environmental allergens, or infections in older children, which may facilitate the development of certain comorbidities over time. However, given the limited number of studies addressing this issue, long-term follow-up studies are needed to evaluate comorbidity rates across different age groups.

Antidepressant use was significantly higher in children aged 6–11 years and ≥12 years compared with children aged ≤5 years. The more frequent use of antidepressants in older children may be explained by higher diagnosis rates of psychiatric disorders such as depression and anxiety in these age groups and the increased use of antidepressants in their treatment. In addition, emotional and psychological fluctuations during adolescence may also contribute to this finding.

Gender differences were associated with the type of poisoning, with suicide rates being significantly higher in girls than in boys. Another study also reported that most suicide attempts were made by girls (73.8%) [15]. This finding may be related to the tendency of adolescent girls to internalize emotional and social problems more than boys. Such internalization may lead to difficulties in emotion regulation and increase engagement in risky behaviors. However, due to the limited literature on this topic, further studies are needed to investigate gender-based differences in emotional coping strategies.

Conclusion

Poisoning is an important public health issue because of its preventable morbidity and mortality. Although it can occur in all age groups, it is more frequently observed in children under the age of 5 years and those older than 12 years. Therefore, it is crucial for families with children in these age groups to receive preventive education on poisoning. In our study, the notably high rate of suicide attempts during adolescence highlights the need for targeted poisoning prevention education for this age group. Timely access to healthcare services and the quality of these services are critical during the treatment process. In addition, families and communities should be educated about poisoning, medications must be stored safely, children should be prevented from tasting unknown substances, and adolescents should be supported in developing self-confidence and problem-solving skills. The establishment of more adolescent health centers, restriction of over-the-counter medication sales, and the organization of nationwide awareness campaigns may help reduce poisoning incidents.

Ethics Committee Approval: The study was approved by University of Health Sciences, Haydarpaşa Numune Training and Research Hospital Ethics Committee (No: 127, Date: 06.02.2018).

Use of AI for Writing Assistance: Not declared.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept – H.A., T.G., Ç.N.; Design – H.A., T.G., Ç.N.; Supervision – T.G., Ç.N.; Materials – H.A., T.G.; Data collection &/or processing – H.A., T.G.; Analysis and/or interpretation – H.A., T.G., T.A., Ç.N.; Literature search – H.A., T.G.; Writing – H.A.; Critical review – T.G., Ç.N.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Disclosure: The authors declared that this study received no financial support.

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