# Emergency Medicine Admissions of Pediatric Intoxicated Cases

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## Abstract

**Objective:** In this study, we aimed to analyze the demographic features and mortality rates of pediatric patients admitted to the emergency department and diagnosed with intoxication.

**Material and Methods:** Patients admitted to the pediatric emergency department and diagnosed with intoxication between December 01, 2009 and December 31, 2010 were included in the study. Patients were evaluated through the examination of registration forms and hospitalization files. The characteristics, including age, sex, admission type to the emergency department, treatment before admission, time passed before admission, consciousness level at the time of admission, cause of poisoning, toxic agent, treatment administered after admission, outcome, and mortality rates, were recorded.

**Results:** In our study, 1029 cases were included; 66.47% of the patients were female, and the female/male ratio was found to be 1.98/1. Poisoning was most frequently seen in the group of 13-18-year-old patients (56.17%). Patients were admitted mostly in the spring. The most frequent cause of poisoning was administration of drugs (81.8%), among which paracetamol was the most common and antidepressants were the second most common drugs. Suicide rate was 56.07%, and 54 patients (5.2%) had attempted suicide for the second time. Also, 85.71% of the patients were admitted to the emergency room within the first 2 hours.

**Conclusion:** In order to minimize the rate of poisoning cases, preventive measures, education of the family, more secure storage of drugs, more prudent production of drugs in boxes by pharmaceutical companies, and prevention of childhood poisoning by regional epidemiological studies should be promoted.*(JAEM 2014; 13: 67-70)*

**Key words:** Emergency, intoxication, pediatrics

## Introduction

Intoxication is defined as damage to an organism due to intake of toxic substances or overdose of non-toxic substances through respiration, circulation, oral ingestion, or skin (1). Poisoning is commonly seen worldwide; however, it is more frequent and more fatal in children (2). In developing countries, the most common cause of death in the age group of 1-14 years is accidents and poisoning cases (3). In our country, childhood intoxication cases follow traffic accidents, falling, and burn cases (4, 5). Easy accessibility to toxic agents is increasing the socio-economic, socio-cultural, and health problems caused by intoxication day by day (3, 6).

Intoxication cases require urgent intervention, and diagnosis and treatment procedures are conducted in the emergency departments of hospitals. The physicians working in the emergency departments should be more educated and experienced on toxicology because of the fact that poisoning cases are seen in children more often and can be fatal (5). Therefore, for accurate diagnosis and treatment, it is important to establish standard intoxication protocols and to evaluate intoxicated children by the emergency team using these protocols. Identifying demographic features of the patients admitted to the emergency department is an essential step for developing these protocols.

In this study, we aimed to evaluate the analysis of the demographic features and prognosis of intoxicated patients who were admitted to the emergency department of a training and research hospital.

## Material and Methods

This retrospective study involved 0-18-year-old patients who were admitted to the emergency department because of poisoning between December 1, 2009 and December 31, 2010. After records with ICD 10 codes in the hospital's automation system were provided, demographic data of the intoxication cases were evaluated through the observation forms, including age, gender, admission date to the emergency department, medical history, the type of toxic substance and intoxication type (suicide, accident), if it was a suicide, the num-

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ber of suicide attempts, time until admission, consciousness level at the time of admission, hospitalization duration, and outcomes (discharge, hospitalization, death).

According to the toxic substances contacted by the patients, the cases were classified as drugs (non-steroidal anti-inflammatory drugs (NSAIDs), antibiotic, vitamin, antiepileptic, antidepressant, paracetamol, antipsychotic, salicylate, oral contraceptive, iron preparations, antihistaminic, antiaritmic, gastric drug, antiasthmatic, antihypertensive, myorelaxant, antiemetic, antidiabetic, spasmolytic), organophosphate, rodenticide, corrosive substance, mushroom, carbon monoxide intoxication, and substance abuse. The patients intoxicated by other drugs were put into the group of multiple drug intoxication. Toxic agents for some patients could not be identified, and they were evaluated in the group of unknown drugs. Snake, insect, spider, scorpion, and bee stings and food poisoning, except mushroom, were excluded from the study.

**Statistical Analysis**

All data obtained were analyzed using Statistical Package for Social Sciences 15.0 (SPSS Inc., Chicago, IL, USA) software. Frequency distributions and crosstabs were used as the method of analysis. Then, these tables were converted into graphs with the same program. The values were accepted as significant if they were $p<0.05$.

## Results

During the study, 112,829 patients were admitted to the pediatric emergency department. Of these patients, 1029 were poisoning cases. The ratio of intoxicated patients to all patients was 0.91%. Of the 1029 registered cases, 395 (38.39%) were 0-6 years old, 56 (5.44%) were 7-12 years old, and 578 (56.17%) were 13-18 years old; 345 of the patients (33.53%) were male, and 684 (66.47%) were female. The female/male ratio was found to be 1.98/1 (Table 1). In terms of the toxic agent, of the cases admitted to the pediatric emergency department, 149 (14.4%) were corrosive substance poisoning, 14 (1.4%) were mushroom poisoning, 12 (1.2%) were organophosphate intoxication, 7 (.0.7%) were rodenticide intoxication, 5 (0.5%) were carbon monoxide poisoning, and 842 (81.8%) were drug intoxication (Table 2). The cases with drug intoxication included 204 multiple drug (24%), 95 antidepressant (11.2%), 94 paracetamol (11.1%), 77 NSAID (9%), 47 antibiotic (5.6%), 43 antipsychotic (5.1%), 37 antihypertensive (4.4%), 36 antihistaminic (4.3%), 24 antiepileptic (2.9%), 22 vitamin (2.6%), 14 cardiac drugs (1.6%), 11 salicylate (1.3%), 9 antidiabetic (1%), 8 oral contraceptive (OKS) (0.96%), 8 iron preparations (0.96%), 6 myorelaxant (0.72%), 5 antiasthmatic (0.6%), 4 gastric (0.48%), and 1 spasmolytic (0.12%) intoxication cases and 3 cases with substance abuse (0.36%). It was determined that other 94 patients (11.1%) were poisoned by a drug, but the type of the drug could not be identified. Paracetamol was the most common drug ingested by patients in the group of multiple drug intoxication. Of the cases, 199 patients (19.3%) were admitted to the pediatric emergency department in winter, 316 patients (30.7%) in spring, 293 patients (28.5%) in summer, and 221 patients (21.5%) in autumn. Further, 577 of the patients (56.07%) ingested toxic substances to commit suicide, and 452 (43.93%) patients were exposed to toxic substances by accident (Table 3). Of all cases, 54 (5.2%) had attempted suicide for the second time.

Considering the backgrounds of the patients, 19 patients (1.8%) had chronic disease, 171 (16.5%) had psychiatric disorders, and 6 (0.6%) had both chronic and psychiatric diseases. Regarding the route of the agent, 990 cases (96.2%) were poisoned through oral ingestion, 19 cases (1.8%) through inhalation, 2 cases (0.2%) parenterally, 1 case (0.1%) through the skin, 2 cases (0.2%) through both the skin and oral ingestion, and 15 cases (1.5%) through both the skin and inhalation. In terms of the time that passed before admission to the emergency department, 882 patients (85.71%) applied to the hospital within the first 2 hours after ingestion, 136 patients (13.22%) in 2-6 hours, 7 patients (0.68%) in 6-12 hours, and 4 patients (0.39%) in 13-24 hours. Also, 401 of the cases (39%) were brought to the emergency department by ambulance, and 628 patients (61%) came by their own means. Further, 928 patients (90.2%) applied directly to the emergency department, while 101 patients (9.8%) were referred to our hospital by other health centers; 69 of the referred cases (6.7%) had been exposed to gastric lavage and activated charcoal administration in the previous health center. At the time of admission, 121 cases (11.8%) were confused, 49 (4.8%) were in stupor, and 8 (0.8%) were in a coma. Other patients were conscious. Among 1029 intoxicated patients admitted to the emergency department, 411 patients (40%) were hospitalized, 583 patients (56.6%) were discharged, and 35 (3.4%) were referred to a university hospital due to lack of equipment. All patients who had attempted suicide twice and who had impaired consciousness were hospitalized. The mortality rate was 0%.

**Table 1.** Distribution of poisoning cases according to age group

| Age | Male | % | Female | % | Total | % Total |
|---|---|---|---|---|---|---|
| 0-6 | 2.13 | 20.6 | 184 | 17.8 | 397 | 38.4 |
| 7-12 | 19 | 1.8 | 37 | 3.6 | 56 | 5.4 |
| 13-18 | 113 | 10.9 | 467 | 45.3 | 580 | 56.2 |

**Table 2.** Agents involved in childhood poisoning

| Toxic agent | Ratio (%) |
|---|---|
| Corrosive substance | 14.4 |
| Mushroom | 1.4 |
| Organophosphate intoxication | 1.2 |
| Rodenticide | 0.7 |
| Carbon monoxide | 0.5 |
| Medical drugs | 81.8 |

**Table 3.** Poisoning type according to age group

| Age | Suicide | Accident | Total |
|---|---|---|---|
| 0-6 | 2 (0.2%) | 395 (38.4%) | 397 (38.6%) |
| 7-12 | 16 (1.5%) | 40 (3.9%) | 56 (5.4%) |
| 13-18 | 559 (54.3%) | 17 (1.7%) | 576 (56%) |

## Discussion

In developing countries, like Turkey, mortality rates from intoxication are high, which has become an issue that needs to be handled urgently (6). When the studies performed in our country are reviewed for admission rates, it is seen that poisoning cases are ranked second after trauma cases, and in another study, they are ranked fourth (5,7).

Throughout Turkey, it was determined that the ratio of all childhood poisoning cases admitted to the emergency department to all emergency cases was 0.9% (8,9). This ratio was 0.91% in our study, and it was 1.6% in Trakya (10), 1.6% in İstanbul (11), 1.8% in Eskişehir (7), 2.3% in Elazığ (12), and 2.7% in Trabzon (13). Our findings were consistent with the country-wide results. This may be due to the fact that it is easy to reach our hospital and that the number of outpatients is high because of its being the only training and research hospital in the region.

In our study, 684 of the cases were female and 345 were male. The female/male ratio was found to be 1.98/1. This ratio was identified as 1/1.57 by Kösecik et al. (15), 1/1.4 by Aji et al. (14), 1.13/1 by Aygun et al. (12), 1/2.3 by Orbak et al. (16), and 1/1 by Uçar et al. (13). In most of the studies conducted with pediatric patient populations, the rate of poisoning in male patients was found to be higher. However, in our study, the rate of poisoning in females was higher. On the other hand, unlike other studies, the age group of 15-18 years was involved in our study. In a report of the National Toxicity Information Center (UZEM) in 2008, the male/female ratio was stated as 1/3.46 (17). It can be deduced that a great amount of family pressure on girls and their being exposed to more violence in adolescence increase suicidality in girls (7).

In the 2008 report of UZEM, the age group of 15-19 years was ranked second among poisoning cases (17). On the other hand, in pediatric studies, it was reported that intoxication was seen in the 0-6-year-old group more frequently. However, the patients involved in most of these studies were not more than 15 years old, and cases older than 15 years old were excluded. In fact, suicide attempt is seen more frequently in the age group of 15-18 years due to quarrels among family members, exam anxiety, problems with friends, and failure in school. In our study, when cases older than 15 years old were excluded, poisoning incidents were more common among 0-6-year-old children, which was consistent with other studies. This may have resulted from the family's incautiousness, keeping drugs in easily reachable places by children, and not following their children enough (7,14,18).

In our study, 56.7% of all intoxication cases resulted from suicide attempts. In similar studies, the rate of intoxication by accident was 85%-90%, and the rate of intoxication with the aim of committing suicide was 10%-15% (9,10). In our study, the rates of suicide and intoxication by accident were found to be close to each other, because 15-18-year-old cases, who ingested toxic substances with the aim of committing suicide more often, were included in the study (Table 3).

Regarding the distribution of poisoning events according to the months in our study, it was found that they were mostly seen in spring (30.7%) and then in summer (28.5%). These results are consistent with other studies (7, 15, 19). The reasons for more frequent poisoning incidents in spring and in summer can be an increase in moving during these seasons, not storing drugs in safe places, not following children enough, and an increase in the number of reachable drugs due to buying more medications for colds in spring (19,20).

Similar to many other studies, our study revealed that poisoning agents were mostly taken orally (96.2%) (20-22). Also, the majority of the cases was intoxicated by drugs. In studies conducted in various regions of Turkey in the last decade, drugs are responsible as the first intoxication agent (10, 18, 23-27). In our study, multiple drug intake was most common among drugs causing intoxication, and paracetamol was the drug most frequently ingested in the multiple drug group. The reasons for the frequent incidence of paracetamol intoxication are considered to be its availability in combination in many preparates, its easy accessibility without prescription, and being prescribed by physicians frequently due to its being an effective, safe, and cheap analgesic and antipyretic. Antidepressants, NSAIDs, antibiotics, and antipsychotics followed paracetamol in the list of frequency. Analgesics in the studies of Biçer et al. in 2003, 2005, and 2006 (18, 23, 24); analgesic-anti-inflammatory drugs in the study of Kırel et al. (28); analgesics in the study of Andıran et al. (9); central nervous system drugs in the studies of Aji et al. (14) and Orbak et al (16); and acetylsalicylic acid in the study of Ergur et al. (29) are on the top of the list. Our results were consistent with the literature.

One of the major factors affecting prognosis in intoxicated patients is the duration that has passed until the initiation of treatment (6). Some other factors influencing this duration are particularly socio-economic conditions, knowledge level of families and their attention to their children, means of transportation to the place of the health institution, and geographical features (7). In our study, considering the time that passed until admission to the emergency department, it was seen that most of the patients applied to the hospital within the first 2 hours (85.71%). In the study by Kondolot et al. (20), the time that passed until admission to the hospital ranged from 15 minutes to 4 days (mean 6.6 ±15 hours), and 21.6% of the poisoning cases applied in the first hour, 35.8 % in the first 2 hours, 51.7% in 6 hours, and 61.1% in 24 hours. In our study, the reason for the earlier admission of patients to hospitals compared to other studies can be that our hospital is located in the city center, which makes it easy to reach.

The most frequent treatments administered to the cases in our study, like other studies, (47.6%) were gastric lavage and activated charcoal administration (20, 21). This treatment method has almost become a conventional method due to the lack of antidote or specific antidote of every drug in every hospital, insufficient knowledge of physicians, and easy usability of gastric lavage and activated charcoal. In our study, 411 of the cases (40%) were hospitalized, 583 patients (56.6%) were discharged from the emergency department, and 35 patients (3.4%) were referred to a university hospital because of technical incompetence. Hospitalized patients were then discharged with good health condition. In the studies by Biçer et al. (18, 23, 30), the rates of discharge from the emergency department were stated as 85%, 59.5%, and 73.5%. Moreover, no mortality rate was reported in our study. The reason for this can be that severe cases were referred to university hospitals due to technical incompetence.

## Conclusion

This study demonstrated that intoxication was more frequently seen in the age group of 13-18 years and more frequently in females than males; poisoning incidents with the aim of committing suicide were more common in the age group of 13-18 years; intoxication occurred mostly through oral ingestion of drugs, and of these drugs, paracetamol was the most frequently ingested drug, and antidepressants were ranked second. In order to decrease the rate of intoxication cases to a minimum level, it is necessary to take preventive measures, to educate families, to store drugs in safer places, and to avoid childhood poisoning cases by regional epidemiological studies, and pharmaceutical companies must produce drugs in more protected boxes.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Adana Training and Research Hospital.

**Informed Consent:** Due to the retrospective nature of this study, informed consent was waived.

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