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# Differences in acute childhood poisoning: A single center experience

# Çocuklarda akut zehirlenmelerde farklılıklar: Tek merkez deneyimi

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ABSTRACT

**Introduction:** Characteristics of acute childhood poisonings may change over time in the same populations. The aim of this study is to compare the demographic characteristics of poisoning children presenting to the same center at different times.
**Methods:** This study was conducted among children aged 0-16 years who presented with the complaint of poisoning to our center in 2010 and 2016.The demographic characteristics of the poisoning cases were evaluated from the emergency records and the findings of both years were compared with each other. **Results:** The mean age of 404 cases in Group 2010 and 398 cases in Group 2016 were 6.5 ± 5.1 years and 4.7 ± 4.6 years, respectively (p = 0.001). Drug poisonings were in the first place in both groups, the group was 61.6% in 2010 and 49.7% in 2016 (p = 0.001). Gas poisoning was observed at a rate of 19.2% in the Group 2010 and 10.1% in the Group 2016 (p = 0.0001). When Group 2010 and Group 2016 were compared, poisoning with corrosive substances was observed with a frequency of 13.8% in Group 2010 and 29.4% in Group 2016. The rate of accidental poisoning cases was 77.3 % in Group 2010 and 81.9 % in Group 2016 (p = 0.001). **Conclusions:** There was a decrease in drug and gas intoxications, but an increase in intoxications with caustic substances. It is thought that the increase in accidental poisoning can be prevented by increasing the awareness and education of the society on this issue.
**Key words:** children, poisoning, gas poisoning

ÖZET

**Giriş:** Çocuklukta akut zehirlenmelerin özellikleri aynı toplumlarda zaman içinde değişebilmektedir. Bu çalışmanın amacı aynı merkeze farklı zamanlarda başvuran zehirlenme olgularının demografik özelliklerini karşılaştırmaktır.**Yöntemler:** Bu çalışma merkezimize 2010 ve 2016 yıllarında zehirlenme şikayetiyle başvuran 0-16 yaş arasındaki çocuklar arasında yapıldı. Zehirlenme olgularının demografik özellikleri acil kayıtlarından değerlendirildi ve her iki yılın bulguları birbiriyle karşılaştırıldı.**Bulgular:** Grup 2010'da 404, Grup 2016'da ise 398 olgunun yaş ortalaması sırasıyla 6,5±5.1yaş ve 4,7±4.6 yaş idi (p=0.001). İlaç zehirlenmeleri her iki grupta ilk sıradaydı, Grup 2010'da %61.6 ve Grup 2016'da %49.7 sıklığında idi (p=0.001). Gazlarla olan zehirlenmeler Grup 2010'da %19.2 ve Grup 2016'da %10.1 oranında gözlendi (p=0.0001). Grup 2010 ile Grup 2016 karşılaştırıldığında Grup 2010'da %13.8 Grup 2016'da ise %29.4 sıklığında korroziv maddelerle zehirlenme gözlendi. Kaza sonucu zehirlenme olguları ise Grup 2010'da % 77.3 iken Grup 2016'da % 81.9 idi (p = 0,001). **Sonuçlar:** İlaç ve gaz ile olan zehirlenmelerde azalma, ancak kostik maddelerle olan zehirlenmelerde artış görülmüştür. Kaza ile olan zehirlenmelerdeki artışın toplumun bu konuda farkındalığının artması ve eğitilmesi ile önlenebileceği düşünülmektedir.
**Anahtar kelimeler:** Çocuklar, zehirlenmeler, gaz zehirlenmeleri

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## 1.INTRODUCTION

Poisoning occurs when potentially harmful toxic substances get into the body through inhalation, ingestion, injection, or dermal contact. Although the toxic substance taken in often follows a moderate course, it occasionally may cause morbidity and/or mortality depending on the dose and the type of the substance.[1] In the USA, 45.2% of all poisoning cases are reported in children under five years old.[2]Acute poisoning cases account for 0.27 to 0.47% of all pediatric emergency visits in several centers worldwide.[3-5] The characteristics of the poisoning cases vary in different time periods depending on age, gender, country, geographical region, sociocultural level of the society, and even the change of life and needs of the society in the same region.[2-4,5]

Most poisonings are actually preventable cases, and knowing the epidemiological features in the community can help take necessary measures. This study aims to reevaluate the characteristics of children presenting to our pediatric emergency clinic for acute poisoning in two different time periods (2010 and 2016) and to compare the frequency of poisoning cases, demographic characteristics of children substances, causes of poisoning, presentation patterns, and clinical results for both years.

## 2.METHODS

### 2.1 Study Population and Design

This retrospective descriptive study was carried out in the Pediatric Clinic of Health Science University, Okmeydani Training and Research Hospital. In this study, 812 children aged between 0 to 16 presented to the Department of Pediatric Emergency for poisoning were included. The poisoning cases presented between 01January 2010 and 31 December 2010 were classified as Group2010, and those presented between 01 January 2016 and 31 December 2016 were classified as Group 2016.The medical histories of the patients were retrieved from electronic medical records and emergency department observation charts and then evaluated by the researchers. Food-borne poisonings, animal bites, vaccinations and incomplete records were excluded from this study. Before the initiation of any research protocols, written approval for this study was obtained from the ethics committee of the hospital. This study was conducted in accordance with the Helsinki Declaration. Informed consent was obtained from all patients(19.03.2019/1186).

The parameters evaluated within the scope of this study included patient's age, gender, route of exposure, history of poisoning, route of administration, duration of exposure, the time interval between exposure and admission, poisoning agent, type of drug (if any), cause of poisoning (mode). Also, clinical findings, treatments administered, duration of stay in the emergency service, hospitalization, and intensive care requirement were recorded. The results of Group 2016 were compared to Group 2010.

### 2.2 Statistical analysis

Statistical analysis was performed using the statistical package SPSS software (Version 25.0, SPSS Inc., Chicago, IL, USA). All numerical data were expressed as median values (minimum-maximum) or as proportions. The categorical variables between the groups were analyzed using the Chi-square test. Comparisons between groups were applied using Mann Whitney U test or Kruskall Wallis test was used for the data not normally distributed. Values of $p < 0.05$ were considered statistically significant.

## 3.RESULTS

A total of 129.536 patients presented to the pediatric emergency service between 1 January 2010 and 31 December 2010, while this figure rose to 227.693 patients between 01 January 2016 and 31 December 2016.In Group 2010,11 and in Group 2016, 9 poisoning cases were excluded from this study due to incomplete records. The remaining 414 patients (0.32%) in Group 2010 and 398 patients (0.17%) in Group 2016 were included in this study. The patient age ranged between nine months and 16 years in Group 2010 with a mean age of $6.5 \pm 5.1$ years, while in Group 2016, it ranged between two months and 16 years with a mean age of $4.7 \pm 4.6$ years, which was significantly lower than that of 2010 ($p = 0.001$). Children aged 0-5 were the most frequent victims of poisoning, with an incidence rate of 54.6% in Group 2010 and 72.4%in Group 2016. In Group 2016, a statistically significant increase was observed in poisoning cases in the 0-5 age range compared to Group 2010, while a decrease was observed in the other age ranges ($p = 0.001$). Although the number of poisoning cases was slightly higher in girls in both years, there was no statistically significant difference ($p = 0.361$) (Table 1).

**Table 1.** Demographic distribution of poisoning cases in Group 2010 and Group 2016

| | Group 2010 (n=414) | | Group 2016 (n=398) | | Total (n=812) | | p |
|---|---|---|---|---|---|---|---|
| | Mean± SD, Med (min-max) | | Mean± SD, Med (min-max) | | Mean± SD, Med (min-max) | | |
| **Age, years** | 6.5±5.1 | 4(0.8-16) | 4.7±4.6 | 2(0.1-16) | 5.6±4.9 | 3(0.1-16) | 0.0001* |
| | **n** | **%** | **n** | **%** | **n** | **%** | |
| <5 | 226 | 54.6 | 288 | 72.4 | 514 | 63.3 | |
| 5-10 | 69 | 16.7 | 42 | 10.6 | 111 | 13.7 | 0.0001* |
| >10 | 119 | 28.7 | 68 | 17.1 | 187 | 23.0 | |
| **Gender** | | | | | | | |
| Girl | 229 | 55.3 | 207 | 52,0 | 436 | 53.7 | 0.361 |
| Boy | 185 | 44.7 | 191 | 48.0 | 376 | 46.3 | |

Independent T Test (Age years); Chi-Square Test,*p<0.05, SD: Standart deviation, Med: Median, Min: minimum; max: maximum

While the incidence of poisoning cases in Group 2010 was high in winter, most cases of poisoning were found to occur during summer months in Group 2016, and this difference was statistically significant (p = 0.001). In Group 2016, the shortest time interval between poisoning and presentation to hospital was nine minutes, and the longest time was 48 hours. In Group 2010, the shortest time interval was 10 minutes; the longest time was 25 hours. There was no statistically significant difference between the two groups concerning the time interval between poisoning and admission to the hospital (p = 0.502). As for the time of admission to hospital, the rate of patients presenting to the hospital between 06:00 and 11:59 was significantly higher in Group 2016 as compared to Group 2010 (Table 2).

**Table 2.** Comparison of seasonal distribution, admission duration and admission time of poisoning cases

| | Group 2010 (n=414) | | Group 2016 (n=398) | | p |
|---|---|---|---|---|---|
| | n | % | n | % | |
| **Season** | | | | | |
| Spring | 89 | 21.5 | 100 | 25.1 | |
| Summer | 76 | 18.4 | 137 | 34.4 | 0.001* |
| Autumn | 102 | 24.6 | 98 | 24.6 | |
| Winter | 147 | 35.5 | 63 | 15.8 | |
| **Admission duration (hour)** | | | | | |
| <2 | 296 | 71.5 | 288 | 72.4 | |
| <2-6< | 89 | 21.5 | 74 | 18.6 | 0.512 |
| 6-24 | 28 | 6.8 | 33 | 8.3 | |
| >24 | 1 | 0.2 | 3 | 0.8 | |
| **Admission time** | | | | | |
| 06:00-11:59 | 56 | 13.5 | 99 | 24.9 | 0.001* |
| 12:00-17:59 | 145 | 35.0 | 140 | 35.2 | |
| 18:00-23:59 | 148 | 35.7 | 138 | 34.7 | |
| 24:00-05:59 | 65 | 15.7 | 21 | 5.3 | |

Chi-Square Test,*p<0.05

Apart from gas poisonings, all poisoning agents were taken into the body through ingestion. In Group 2016, 351 (88.2%) of the patients were exposed to the poisoning agent in their home, but no such data were available for patients in Group 2010. When the poisoning agents were analyzed, we found that the rates of drug and gas poisonings were statistically higher in Group 2010 than in Group 2016 (p = 0.001; p = 0.0001). Children in Group 2016 were poisoned through the ingestion of caustic substances at a higher rate than children in Group 2010 (p = 0.0001) (Table 3).

**Table 3.** Distribution of poisoning agents in Group 2010 and Group 2016

| | **Group 2010 (n=414)** | | **Group 2016 (n=398)** | | **Total (n=812)** | | |
|---|---|---|---|---|---|---|---|
| **Agents** | n | % | n | % | n | % | p |
| Drugs | 254 | 61.4 | 198 | 49.7 | 452 | 55.6 | 0.001* |
| Gas | 79 | 19.1 | 40 | 10.1 | 119 | 14.7 | 0.0001* |
| Costic substances | 57 | 13.8 | 117 | 29.4 | 174 | 21.5 | 0.0001* |
| Pesticides | 8 | 1.9 | 2 | 0.5 | 10 | 1.2 | 0.124 |
| Insecticides | 2 | 0.5 | 1 | 0.3 | 3 | 0.4 | 0.238 |
| Hydrocarbons | 1 | 0.2 | 14 | 3.5 | 15 | 1.8 | 0.001* |
| Cosmetics | 5 | 1.2 | 11 | 2.8 | 16 | 2.0 | 0.82 |
| Unclassified (Alcohol, tobacco, toy..) | 8 | 1.9 | 15 | 3.8 | 23 | 2.8 | 0.11 |

Chi-Square Test,*p<0.05

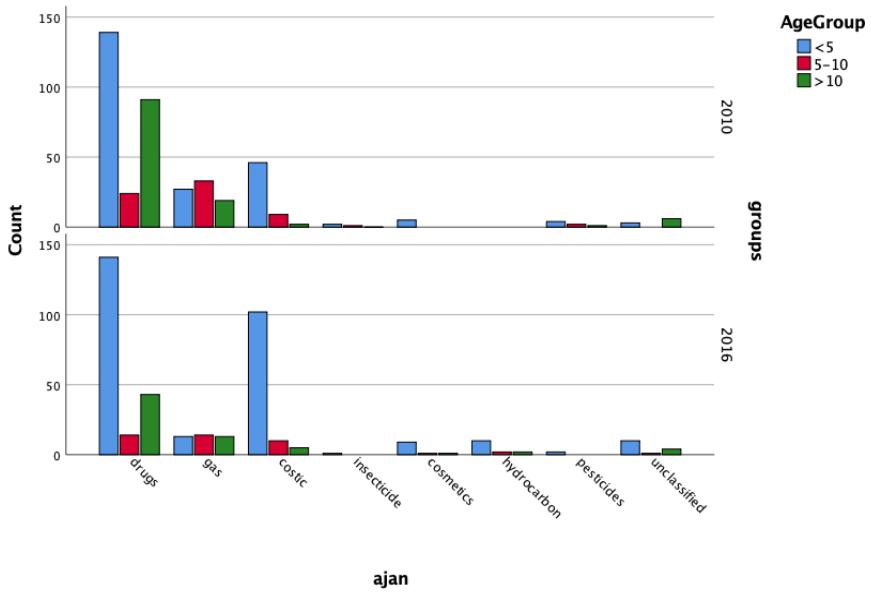


**Figure 1.** Distribution of the poisoning agents by age range

In Group 2016, the rate of poisoning due to caustic substances was lower in children under five, while the rate of drug-related poisoning was lower in children over 10 (Figure 1).

In both groups, analgesics were the most common drugs to cause poisoning at rates of 31.9 % and 30.8%. Paracetamol ranked first among all analgesics in Group 2010 (n = 35, 13.8%), with a

higher frequency in Group 2016 (n = 43, 21.7%), and there was a statistically significant difference between the groups (p = 0.036). The decrease in poisoning cases due to the ingestion of acetylsalicylic acid (ASA) was not statistically significant (p = 0.084). Drugs acting in the central nervous system (CNS) were the second most common poisoning agents in both groups. In addition, there was a statistically significant difference between Group 2010 and Group 2016 in poisonings due to antihistamine and respiratory system drugs (p = 0.408; p = 0.046; p = 0.046, respectively) (Table 4).

Considering the causes of poisoning, accidental poisoning was the most common type in both groups, a statistically significant increase was found in accidental poisoning, and the frequency of suicide attempts was statistically lower in children in Group 2016 as compared to children in Group 2010 (p = 0.0001; p = 0.0001) (Table 5). In Group 2010, 86.7% (n: 78) of suicide attempts by self-poisoning occurred among girls, whereas this rate showed a slight decrease, to 85.1% (n: 40) in Group 2016. All of the patients attempting suicide by poisoning in both groups were over 10 years of age (Figure 2).

**Table 4.** Distribution of drugs as poisoning agents in Group 2010 and Group 2016

| | **Group 2010 (n=254)** | | **Group 2016 (n=198)** | | **Total (n=452)** | | |
|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | p |
| Analgesics | 81 | 31.9 | 61 | 30.8 | 142 | 31.4 | 0.949 |
| Central nervous system | 44 | 17.3 | 47 | 23.7 | 91 | 20.1 | 0.116 |
| Antibiotics | 22 | 8.7 | 11 | 5.6 | 33 | 7.3 | 0.286 |
| Cardiovascular | 21 | 8.3 | 20 | 10.1 | 41 | 9.1 | 0.611 |
| Respiratory systems | 20 | 7.9 | 6 | 3.0 | 26 | 5.8 | 0.046* |
| Hormones | 13 | 5.1 | 10 | 5.1 | 23 | 5.1 | 0.853 |
| Gastrointestinal system | 9 | 3.5 | 8 | 4.0 | 17 | 3.8 | 0.974 |
| Antihistamines | 8 | 3.1 | 1 | 0.5 | 9 | 2.0 | 0.046* |
| Hematologic | 7 | 2.8 | 6 | 3.0 | 13 | 2.9 | 0.924 |
| Vitamins | 6 | 2.4 | 7 | 3.5 | 13 | 2.9 | 0.647 |
| Dermatologic | 5 | 2.0 | 6 | 3.0 | 11 | 2.4 | 0.674 |
| Anticholinergic | 3 | 1.2 | 4 | 2.0 | 7 | 1.5 | 0.739 |
| Mix drugs | 8 | 3.1 | 10 | 5.1 | 18 | 3.9 | 0.314 |
| Miscellaneous | 7 | 2.8 | 1 | 0.5 | 8 | 1.8 | 0.064 |
| **Total** | **254** | | **198** | | **452** | | |
| **Multiple drugs** | | | | | | | |
| Positive | 47 | 18.5 | 43 | 21.7 | 90 | 19.9 | 0.408 |
| **Kind of analgesics** | | | | | | | |
| Paracetamol | 35 | 13.8 | 43 | 21.7 | 78 | 17.3 | 0.036* |
| Acetylsalicylic acid | 15 | 5.9 | 4 | 2.0 | 19 | 4.2 | 0.084 |
| **Others** | **31** | **12.2** | **15** | **7.5** | **46** | **10.2** | **0.148** |

Chi-Square Test,*p<0.05

Table 5. Comparison of the mode of poisoning in Group 2010 and group 2016

| | Group 2010 (n=414) | | Group 2016 (n=398) | | Total (n=812) | | |
|---|---|---|---|---|---|---|---|
| **Mode of poisoning** | **n** | **%** | **n** | **%** | **n** | **%** | **p** |
| Accident | 320 | 77.3 | 345 | 86.7 | 665 | 81.9 | 0.0001* |
| Suicide attempt | 90 | 21.7 | 47 | 11.8 | 137 | 16.9 | 0.0001* |
| Therapeutic error | 4 | 1.0 | 6 | 1.5 | 10 | 1.2 | 0.709 |

Chi-Square Test,*p<0.05

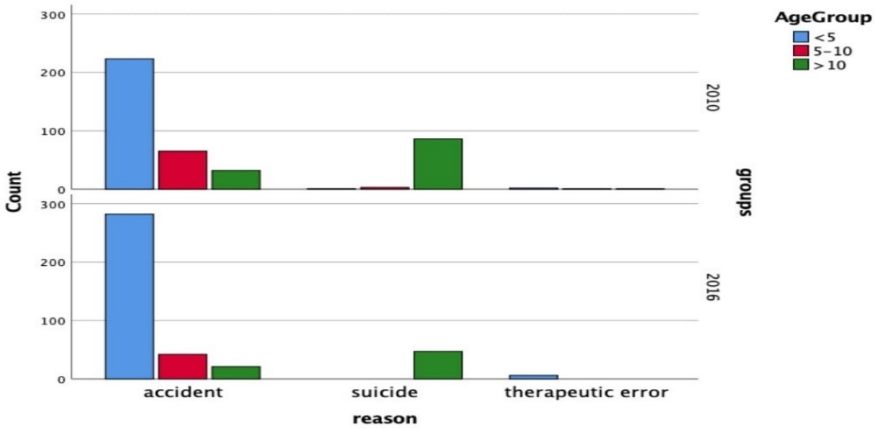


**Figure 2.** Distribution of the poisoning reasons by age range

In Group 2010, 323 (78.0%) patients were asymptomatic at the time of hospital presentation, and 288 (72.4%) cases were asymptomatic in Group 2016, and there was no significant difference between groups concerning the presence of clinical symptoms (p = 0.062). The observation time for poisoned patients in Group 2010 was 7.81 ± 5.31 (median: 6) hours and 11.61 ± 8.31 (median: 10) hours in Group 2016, and the observation time in Group 2016 was significantly longer (p<0.001). As for the clinical symptoms in Group 2016,68 (17.1%) patients experienced vomiting, 11 (5.0%), headache, 9(2.3%) clouding of consciousness, 8(2.1%), 3(0.8%) drowsiness, 4(1.0%)dizziness,2(0.5%) fainting,3(0.8%) burns in the mouth, 2(0.5%)redness in the body, 1 convulsion (0.3%),1(0.3%) mydriasis and 1(0.3%) dystonic reaction. In Group 2016,45 (11.3%) of the patients showed vomiting, and gastric lavage was performed in 154 patients, activated charcoal in 158 patients, hyperbaric oxygen in nine patients, vitamin K treatment in three patients and N-acetyl cysteine was administered to 11 patients as an antidote to paracetamol intoxication. In Group 2010, 82 patients (19.8%) were hospitalized, and 30 patients (7.2%) were administered intensive care, while in Group 2016, 73 patients (18.3%) were hospitalized, and 18 patients (4.5%) required intensive care. No statistically significant difference was found between Group 2010 and Group 2016 concerning hospitalization and intensive care requirement (p = 0.328 and p = 0.100, respectively). None of the patients died.

In Group 2016, besides symptomatic treatment, nine patients were also administered hyperbaric oxygen therapy, and 11 patients with paracetamol intoxication were treated using N-acetyl cysteine (NAC) therapy.

## 3.DISCUSSION

Comparison of poisoning cases in children in the same region at different times can indicate how effective the relevant measures have been in that community. A South Korean study examining

pediatric poisonings in two different years (2011and 2016) revealed an increase in poisoning cases over the years,[6] while a similar study from Greece comparing childhood poisonings in three different periods, including 1985-89, 1995-99, and 2005-09, showed a decrease by 20% in the last period as compared to the previous one.[7] Conducted in a university hospital in a different city of our country, Turkey, some studies that compared data spanning over 30 years have reported that the incidence of poisoning in children has been decreasing.[8,9] However, to our knowledge, there is no study in the current literature to investigate the historical course of pediatric poisonings in our city over such a long period.Our study, therefore, was performed a comparison of data concerning childhood poisonings in the same age group at the same center in two different time periods. Although there was an increase in the number of patients presenting to our pediatric emergency service for over six years, the incidence of poisoning cases showed a declining trend. It appears that increased public awareness has led people to take somewhat better measures and helped decrease the incidence of childhood poisonings, but these measures are not sufficient to fully prevent such cases.

Poisoning in children does not usually differ according to gender, but it is more common in boys under the age of five and girls over the age of ten.[1-9] Most poisoning incidents (80-93.3%) occur accidentally in the home.[1,3,4,8]In our study, poisonings occurred most frequently in this age group, but six years later, an increase in poisoning cases was found in the same age group. Although the overall incidence of poisonings has decreased, the increase in this age group suggests that the measures taken at home are not sufficient. In pediatric poisoning, the second age group to experience poisoning appears to include adolescents above 10 years of age. In this period, intentional self-poisoning cases (suicide attempt) tend to peak, especially in girls.[2-4,8,9]A slightly higher incidence was observed in girls in both of our groups. However, in the study we performed in the same center to evaluate the poisonings in children aged 0-13 over 2.5 years since 1995, the rate of poisonings was slightly higher in boys.[10] It is thought that the higher incidence of poisonings in girls during the adolescent period could be a determinant factor in this finding.

In addition to age groups and gender, pediatric poisonings may also vary depending on the country, geographical region, society or climate in the same region. In the autumn and winter seasons, there is an increase in gas poisonings, mainly from exposure to carbon monoxide.[9,11]In our study, it was observed that while the overall incidence of poisonings peaked in winter due to gas poisoning cases in 2010, six years later, the summer season was the time when most poisonings occurred due to a decrease in gas poisonings, which could be resulting from the recent change towards the use of natural gas for heating in winter.

Generally, families tend to bring their children to a health center as quickly as possible when they think their children are poisoned. Usually,50-70.8% of the patients was presented to the hospital in the first two hours, and 82.4-95.7% was presented within the first six hours.[9,11] In both of our groups, approximately 70% of our cases was presented to the hospital in the first two hours and 90% in the first six hours, and there was no difference between groups. Removal of the toxic substance from the body and the chance of treatment increase when patients immediately present to a healthcare center. These results show that the sensitivity of families on this issue continues.

The most common time to present to emergency service was reported as 06.00 and 12.00 hours in differentstudies.[4,5] In our study, while the most common hospital presentation time was between 12.00 and 23.59 hours in both groups, there was an increase in the number of hospital presentations between 06.00 and 12.00 hours in Group 2016. This could be related to that working parents leave their children under the supervision of other adults at home or receive daycare in settings outside their home.

Although they may vary depending on the geographical region, the most frequent poisoning agent is pharmaceutical agents, accounting for 42.7-91.8% of the cases.[3,4,7,8,12,13] In our study, it was observed that despite a decrease in the incidence of drug-related poisonings over six years, they were still in the first place. Poisoning related to household cleaning products, mostly containing caustic, corrosive substances, accounts for 22.1-26.8% of the cases in children under the age of five, and its incidence has been on the rise across the globe.[2,3,8]In our study, household cleaning products containing caustic substances were the third most common poisoning agents after gas poisonings in Group 2010, which rose to second place in 2016. Based on the results of our 2.5-year study carried out in the same center since 1995, we can argue that there is a constant increase in poisoning with caustic substances.[10] It has been reported that this results from that 20% of the parents do not store their home cleaning products in their original package as in medicines, and 30% of such products are placed in areas accessible to children.[4] Home cleaning products generally contain caustic, corrosive content and oral intake of which may result in permanent

esophageal damage.[8,9] Thus, it is recommended that families and administrations take more effective and comprehensive measures in this regard.

Studies conducted in different centers report that pesticides account for 5-10% of childhood poisonings, cosmetics 5.0-8.0%, hydrocarbons 5-7%, and alcohol or illicit substances 0.3-8.6%, depending on the rural or urban lifestyle.[4,5] In our study, there were a limited number of poisoning cases due to agents like cosmetics, hydrocarbons, pesticides, such as insecticides, rat poison, alcohol and plants, and there was no difference between the incidences of such cases.

Among the causes of pediatric poisoning, accidental poisonings occur at the rate of 73-78% in children under the age of five.[1-3,4,6-15] A study conducted with preschool children showed that the risk of poisoning in children who received education decreased. Suicide attempts are observed to account for 15.5-47% of poisoning cases, especially in girls over 10 years of age.[16-19] Multiple drug use is observed with a frequency of 33-59%, especially in suicide attempts during the adolescent period.[9,17,18] In our study, it was observed that the rate of accidental poisonings increased, while the proportion of suicide attempts decreased. Accidental poisonings in young children can be prevented to a large extent by parents paying more attention to proper storage and placement of toxic substances.

Analgesics and central nervous system drugs, such as antidepressants, are the most common agents in pediatric poisoning cases.[8,9,13]Moon et al. reported that cardiovascular drugs are more common in accidental poisonings, and acetaminophen and psychotropic drugs are more common in suicide attempts.[6]Analgesics are reported to cause 23.7-40% of all drug-related poisonings, with paracetamol being the poisoning agent in 30-45% of such cases.[4,6,9,12,13,20] Among the psychotropic drugs, tricyclic antidepressants, benzodiazepines and methylphenidate are also frequently encountered agents.[3,4,8] In our study, analgesics were in the first place in both groups, followed by antiepileptic drugs and tricyclic antidepressants. Among analgesics, the incidence of paracetamol-related poisonings was higher in both groups than those of acetylsalicylic acid (ASA) and other anti-inflammatory agents. Although the use of ASA is restricted in children after it has been linked with Reye's syndrome and the rate of pediatric poisonings due to ASA has been declining, there are still ASA-related poisoning cases because it is still prescribed for cardiovascular diseases in adults.[9] Digoxin poisoning, which was frequently observed in the past, has not been reported recently as it has been replaced by new cardiovascular drugs. Proper support from the child's school environment and other members of the society, as well as parental support, will help prevent behaviors like suicide attempts.

Many of poisoning patients (48.3-70%) are generally clinically asymptomatic.[4,8] Clinical findings may include nausea-vomiting, diarrhea, headache, dizziness, drowsiness, tachycardia, sweating, syncope, lethargy, clouding of consciousness, convulsion, and coma.[4,8,9,19-22] The most common symptom in our groups was vomiting, asymptomatic patients accounted for 78.0% in Group 2010 and 72.4% in Group 2016, and there was no difference in the presence of clinical findings in both groups. Treatments for poisoning agents commonly include intravenous fluid replacement, gastric lavage, activated charcoal receiving, oxygen support, and specific antidotes, while gastric lavage is recommended for patients presenting to the hospital within the first hour of poisoning.[23] If an appropriate or specific antidote is available, it is recommended in an emergency situation.[1,8,9] In cases of carbon monoxide (CO) intoxication, if the patient's carboxyhemoglobin (COHb) levels are higher than 25%, hyperbaric oxygen therapy is indicated.[8] In Group 2016, patients with elevated COHb levels were administered hyperbaric oxygen therapy, and an antidote was used for poisoning by paracetamol. Approximately 17.2% of the patients presenting to emergency services have been reported to result in hospitalization, and 3-3.6% of these cases are admitted in pediatric intensive care unit.[8,9,24] In our study, no difference was found concerning hospitalization and intensive care requirement in both groups. Although mortality in pediatric poisonings varies across different centers, it is reported to be at 0.02-6%, with colchicine and tricyclic antidepressants being the deadliest agents.[6,8,9, 25]The absence of any mortality in our cases could be attributed to early hospital presentation and early treatment.

## CONCLUSION

Although the rate of presentations of poisoning cases in all pediatric emergencies has decreased in recent years, poisoning is still a critical public health issue. While relatively younger children experienced poisoning compared to the previous period, the frequency of drug and gas poisonings decreased, and the incidence of poisonings with caustic substances increased. Although a decline is seen in the rate of attempted suicide by self-poisoning, the incidence of accidental poisonings are increased, especially in younger children. Parents can help prevent these unwanted incidents by storing medicines and household cleaning products in places away from

children and keeping them out of reach of children. We believe that raising awareness over this issue and educating the society about proper measures will afford huge benefits in preventing morbidity and mortality due to poisoning

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**REFERENCES:**


1. Peden M, Oyegbite K, Ozanne-Smith J, Branche C, Rahman A.K.M.F, Rivara F. World Health Organization; Geneva: 2008. World report on child injury prevention. Available from:https://www.ncbi.nlm.nih.gov/books/NBK310641/ accessed: 19.10. 2020

2. Gummin DD, Mowry JB, Spyker DA, Brooks DE, Osterthaler KM, Banner W, et al. 2017 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 35th Annual Report. Clin Toxicol (Phila). 2018; 56 (12): 1213-1415. doi: 10.1080/15563650.2018.1533727

3. Mintegi S, Azkunaga B, Prego J, Qureshi N, Dalziel SR, Arana-Arri E, et al. Pediatric Emergency Research Networks (PERN) Poisoning Working Group International Epidemiological Differences in Acute Poisonings in Pediatric Emergency Departments. Pediatr Emerg Care. 2019;35(1):50-57. doi: 10.1097/PEC.0000000000001031

4. Berta GN, Di Scipio F, Bosetti FM, Mognetti B, Romano F, Carere ME, et al. Childhood acute poisoning in the Italian North-West area: a six-year retrospective study. Ital J Pediatr. 2020 11;46(1):83. doi: 10.1186/s13052-020-00845-0

5. Lee J, Fan NC, Yao TC, Hsia SH, Lee EP, Huang JL, et al. Clinical Spectrum of Acute Poisoning in Children Admitted to the Pediatric Emergency Department. Pediatr Neonatol. 2019;60 (1):59-67. doi: 10.1016/j.pedneo.2018.04.00

6. Moon J, Chun B, Cho Y, Lee S, Jung E. Characteristics of Emergency Department Presentations of Pediatric Poisoning Between 2011 and 2016: A Retrospective Observational Study in South Korea. Pediatr Emerg Care. 2018 14. doi: 10.1097/PEC.0000000000001668

7. Tsalkidis A, Vaos G, Gardikis S, Kambouri K, Tripsianis G, Mantadakis E, et al. Acute poisoning among children admitted to a regional university hospital in Northern Greece. Cent Eur J Public Health. 2010;18(4):219-223.

8. Andiran N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara: what has changed in twenty years? Turk J Pediatr. 2004;46(2):147-152.

9. Ozdemir R, Bayrakci B, Tekşam O, Yalçin B, Kale G. Thirty-three-year experience on childhood poisoning. Turk J Pediatr. 2012;54 (3):251-259.

10. Türkmenoğlu Y, Berna Gümüşoğlu BA, Sarıtaş Ü, Yılmaz B, Arat C, Şafak E, et al. Update Glance on Childhood Intoxication. Okmeydanı Tıp Dergisi 2015;31(2):82-91. doi:10.5222/otd.2015.082

11. Sahin S, Carman KB, Dinleyici EC. Acute poisoning in children; data of a pediatric emergency unit. Iran J Pediatr. 2011;21(4):479-484.

12. Alghadeer S, Alrohaimi M, Althiban A, Kalagi NA, Balkhi B, Khan AA. The patterns of children poisoning cases in community teaching hospital in Riyadh, Saudi Arabia. Saudi Pharm J. 2018;26 (1): 93-97. doi: 10.1016/j.jsps.2017.10.007

13. Santiago P, Bilbao N, Martinez-Indart L, Mintegi S, Azkunaga B; Intoxications Working Group of the Spanish Society of Pediatric Emergencies. 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(4):284-289. doi: 10.1097/MEJ.0000000000000661

14. Bell JC, Bentley JP, Downie C, Cairns R, Buckley NA, Katelaris A, et al. Accidental pharmacological poisonings in young children: population-based study in three settings. Clin Toxicol (Phila). 2018;56(8):782-789. doi: 1.1080/15563650.2017

15. Bacha T, Tilahun B. A cross-sectional study of children with acute poisoning: A three-year retrospective analysis. World J Emerg Med. 2015;6(4):265-269. doi: 10.5847/ wjemj.1920-8642.2015.04.003

16. Balcı AS, Kolaç N, Kocabaş S, Yaşar S, Gürsoy T. The effect of personal safety training program for pre school children. TJFMPC. 2020; 14(3): 414 – 419.

17. Ulseth ET, Freuchen A, Köpp UMS. Acute poisoning among children and adolescents in southern Norway. Tidsskr Nor Laegeforen. 2019 23;139(13). doi: 10.4045/tidsskr.17.1116

18. Mathias TL, Guidoni CM, Girotto E. Trends of drug-related poisoning cases attended to at a poison control center. Rev Bras Epidemiol. 2019 1;22: e190018. doi: 10.1590/1980-549720190018

19. Ram P, Kanchan T, Unnikrishnan B. Pattern of acute poisonings in children below 15 years--a study from Mangalore, South India. J Forensic Leg Med. 2014; 5:26-9. doi: 10.1016/j.jflm.2014.04.001

20. Kesaplı M, Çelik A, Isı I. Characteristic Features of Childhood and Adolescent Poisonings, in the Mediterranean Region over 6 Years. Iran J Public Health. 2018;47 (11):1667-1674.

21. Carreiro S, Miller S, Wang B, Wax P, Campleman S, Manini AF. Clinical predictors of adverse cardiovascular events for acute pediatric drug exposures. Clin Toxicol (Phila). 2020;58(3):183-189. doi: 10.1080/15563650.2019.1634272

22. Nistor N, Frasinariu OE, Rugină A, Ciomaga IM, Jităreanu C, Ştreangă V Epidemiological study on accidental poisonings in children from northeast Romania. Medicine (Baltimore). 2018; 97(29): e11469. doi: 10.1097/MD.0000000000011469

23. Powers KS. Diagnosis and management of common toxic ingestions and inhalations. Pediatr Annals 2000;29: 330-342.

24. Maior MDCLS, Osorio-de-Castro CGS, Andrade CLT. Demographics, deaths and severity indicators in hospitalizations due to drug poisoning among children under age five in Brazil. Rev Bras Epidemiol. 2020 (9);23: e200016. doi: 10.1590/1980-549720200016

25. Duramaz BB, Yıldırım HM, Kıhtır HS, Yeşilbaş O, Şevketoğlu E. Evaluation of forensic cases admitted to pediatric intensive care unit. Turk Pediatri Ars. 2015; 50 (3): 145-150.doi: 10.5152/TurkPediatriArs.2015.2399