# Intoxication Cases Under Two Years of Age Monitored By Pediatric Emergency Room of İstanbul Şişli Etfal Education and Research Hospital

## İstanbul Şişli Etfal Eğitim ve Araştırma Hastanesi Süt Çocuğu Kliniğine Getirilen İki Yaş Altındaki Zehirlenme Olguları

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## Abstract

**Objective:** We aimed to investigate the demographic, clinical characteristics and treatment results of acute intoxication cases that were followed in pediatric clinics.
**Materials and Methods:** Acute intoxication cases (<2 two years of age) who applied to the Pediatric Emergency Department of Şişli Etfal Education and Research Hospital between January 2006 and December 2006 were evaluated retrospectively.
**Results:** A total of 239 patients were included in the present study. Of patients, 132 were (55.2%) male, whereas 107 (44.8%) were female. Of cases, 47% were between 19-24 months of age and 35% were between 13-18 months of age. The most common cause of intoxication (64%) was cleaning materials. Seventy-nine (33.1%) cases applied to the hospital within the first 2 hours. 220 (92.1%) cases were discharged with good recovery.
**Conclusions:** In this study, household cleaning and chemical substances were determined as the main cause of intoxication rather than drugs among children between 0-2 years of age.
**Key words:** Clinic pediatric, intoxication, emergency department, cleaning substances

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## Özet

**Amaç:** Pediatri kliniğinde izlenen akut intoksikasyon olgularının demografik, klinik özellikleri ve tedavi sonuçlarını araştırmayı amaçladık.
**Gereç ve Yöntem:** Ocak 2006-Aralık 2006 tarihleri arasında Şişli Etfal Eğitim ve Araştırma Hastanesinin Süt Çocuğu kliniğine getirilen iki yaş altındaki akut intoksikasyon olguları retrospektif olarak değerlendirildi.
**Bulgular:** Toplam 239 hastanın 132 (%55.2)'si erkek, 107 (%44.8)'i kızdı. Olguların %47.7'ini 19-24 ay, %35'ini 13-18 ay çocuklar oluşturmaktaydı. Zehirlenmelerin en sık nedeni temizlik maddelerine (%64) bağlı idi. Zehirlenme vakalarından 79 olgunun ilk iki saat içinde hastaneye başvurduğu, 220 (%92.1) olgunun iyileşme ile taburcu edildiği gözlendi.
**Sonuçlar:** Bu çalışmada ev halkının kullandığı toksik ve kimyasal maddelerin 0-2 yaş grubundaki çocuklarda intoksikasyonun ana nedeni olarak belirlenmiştir.
**Anahtar kelimeler:** Çocuk kliniği, intoksikasyon, acil bölümü, temizlik maddeleri

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## Introduction

Acute intoxication is one of the most important reasons for child emergency applications requiring immediate diagnosis and treatment (1, 2). The age at which intoxication occurred relates to the mechanism and cause of intoxication. Children are a group with increasing physical and mental development and distinct differences between each other regarding the reasons and means of intoxication (3). In 2004, more than 2.4 million cases of poison exposure were reported to the American Association of Poison Control Centers (AAPCC). Of the 2.4 million cases of poison exposure reported, 65% involved "pediatric patients," defined as persons younger than 20 years. Children younger than 6 years accounted for 51.3% of the reported cases (4). The main reason for the frequent occurence among this age group is that children are energetic, curious and tend to recognize objects by bringing all the new materials to their mouth (5, 6). In this study we aimed to investigate the demographic, clinical characteristics and treatment results of acute intoxication cases followed in pediatric clinics because there is not enough data on intoxication occurring during the first two years."

## Material and Methods

Two hundred and thirty-nine patients aged below two years who applied to the Pediatric Emergency Room of Şişli Etfal Education and Research Hospital between 1st January 2006 and 31st December

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2006 were included in the study. These cases were etrospectively evaluated in terms of age, gender, kind of ingested toxic agent, application season and time of day, the duration between the start of intoxication symptoms and application to the hospital, duration of hospitalization, recorded intoxication signs and symptoms, signs occurring in the hospital, the treatment method, entrance route of the substance that led to intoxication, the precautions taken by family members before reaching the hospital, and the causes of discharge. The cases were hospitalized in the emergency service aiming at parenteral nutrition and endoscopic examination. 6 (2.5%) patients were consigned to surgical service, as esophageal ulcer and stickiness had been determined after endoscopy.. It was observed that 1 patient was operated on due to an esophageal stricture. After obtaining approval of the City Health Authority, acute intoxication cases were evaluated retrospectively. Data were provided by percent values and chi square test.

## Results

239 (19.3%) of the 1239 patients who applied to the Pediatric Emergency Room of Şişli Etfal Education and Research Hospital in 2006 were evaluated in this study. Of the cases, 132 (55.2%) were male and 107 (44.8%) were female. The male/female ratio was 1.23: 1. 47.7 % of cases were 19-24 months old (Table 1). Seasonal distribution of the intoxication cases was as follows: 90 (37.7%) occurred in autumn, 61 (25.5%) occurred in spring, 50 (20.9%) occurred in summer, and 38 (15.9%) occurred in winter. When considering the time of day, it was determined that 121 (50.6%) cases occurred in the evening (21.00-23.59), 52 (21.8%) cases occurred around midday (16:00-20:59), 33 (13.8%) cases occurred in the afternoon (12:00-15:59, and 33 (13.8%) cases intoxicated at night (24:00-05:59).

Causes of intoxication comprised fat solvent in 77 (32.2%) patients, and lime in 3 (1.2%) cases (Table 2). When we evaluated clinical findings in the study group, we determined that 130 (54.4%) patients had no signs or symptoms, (Table 3). When we examined the time of day for consulting the hospital, we found 111 (46.4%) cases taken to hospital within the first 3 to 5 hours, 79 (33.1%) cases within 0-2 hours, 41 (17.2%) cases within 6-12 hours and 8 (3.3%) cases later than 13 hours. Durations of hospitalization were 1 to 3 days in 183 (76.6%) cases, 4 to 7 days in 39 (16.3%), and 8 days or longer in 17 (7.1%) cases. The average time of stay at the hospital was 3.05±2.2 days. The route of entrance into the body for the intoxicating agent was examined and we determined that 223 (93.3%) cases ingested the agent orally, 7 (2.9%) patients were exposed via both oral and transdermal routes, 6 (2.5%) patients were exposed via inhalation and 3 (1.3%) cases were exposed to the agent transdermally.

In our study, 33 patients were discharged from hospital without any medical observation. It was observed that 206 (86.1%) cases were hospitalized for follow up, 24 (10.4%) patients had been vomitted by their family before they came to the hospital. 27 (11.3%) cases had applied and active coal and 6 (2.5%) patients were consigned to surgical service following determination of esophageal ulcers and stickiness after endoscopy. It was observed that 1 patient was operated on due to esophageal stricture. In this study, while 181 patients were discharged from the emergency service; 6 (2.5%) patients were hospitalized in the surgical service. 19 (7.9%) patients were discharged against medical advice due to the wishes of the patients' families. None of the patients died.

## Discussion

In this study, household cleaning and chemical substances were determined as the main cause of intoxication rather than drugs among children between 0-2 years. Intoxications occuring by accident are seen frequently among 1-5 years old children who have increasing liveliness and curiosity for investigation (7). Intoxications during the first year usually results from mistakes of parents or babysitters. The number of intoxication cases are in this period (3).

As children grow and learn to become independent, they are compelled to investigate new and interesting items, places, and objects. The influence of growth and development upon unintentional poisonings becomes especially important during the toddler and preschool years. During the toddler years, children are refining gross and fine motor skills. Additionally, they are testing their behavior against the reactions of adults in control. Toward the end of the toddler period, children are using experimentation, accompanied by previously learned skills, as a way of dealing with new situations. This experimentation, a part of normal growth and development, can cause serious consequences if dangerous behaviors go unnoticed by adults. Toddlers' sense of taste is not well-defined, so they may ingest larger quantities of what adults would consider unpalatable products (8). In our study, 114 (47.7%) of the 0-2 age group intoxication cases comprised of children between 19-24 months of age. Despite advances such as childproof caps on medications, childproof packaging, increased educational efforts, and increased awareness of commonly ingested substances, deaths due to unintentional poisonings still occur. Unintentional poisonings are an unfortunate and usually preventable cause of death and disability in infants and chil-

**Table 1.** Gender of cases according to age groups

| | | | Age | | | | Total |
|---|---|---|---|---|---|---|---|
| | | | 0-6 month | 7-12 month | 13-18 month | 19-24 month | |
| Gender | Female | n | 6 | 10 | 40 | 51 | 107 |
| | | % | 5.6% | 9.3% | 37.4% | 47.7% | 100.0% |
| | Male | n | 6 | 19 | 44 | 63 | 132 |
| | | % | 4.5% | 14.4% | 33.3% | 47.7% | 100.0% |
| Total | | n | 12 | 29 | 84 | 114 | 239 |
| | | % | 5.0% | 12.1% | 35.1% | 47.7% | 100.0% |
| $p>0.05$, $X^2$: 1,650 | | | | | | | |

**Table 2.** The cause of intoxication according to age groups

| | | | Age | | | | Total | $X^2$ | p |
|---|---|---|---|---|---|---|---|---|---|
| | | | 0-6ay | 7-12ay | 13-18ay | 19-24ay | | | |
| **Cause of intoxication** | Drugs | n | 2 | 2 | 10 | 20 | 34 | 43.48 | 0.023 |
| | | % | 5.9% | 5.9% | 29.4% | 58.8% | 100.0% | | |
| | Tooth paste | n | 1 | | 1 | 3 | 5 | | |
| | | % | 20.0% | | 20.0% | 60.0% | 100.0% | | |
| | Shiner | n | 4 | 1 | 5 | 6 | 16 | | |
| | | % | 25.0% | 6.3% | 31.3% | 37.5% | 100.0% | | |
| | Fat solvent | n | 2 | 10 | 25 | 40 | 77 | | |
| | | % | 2.6% | 13.0% | 32.5% | 51.9% | 100.0% | | |
| | Bleach | n | 2 | 6 | 23 | 28 | 59 | | |
| | | % | 3.4% | 10.2% | 39.0% | 47.5% | 100.0% | | |
| | Insecticide | n | 1 | 4 | 5 | 7 | 17 | | |
| | | % | 5.9% | 23.5% | 29.4% | 41.2% | 100.0% | | |
| | Washing detergent | n | | 3 | 10 | | 13 | | |
| | | % | | 23.1% | 76.9% | | 100.0% | | |
| | Thinner | n | | 3 | 2 | 6 | 11 | | |
| | | % | | 27.3% | 18.2% | 54.5% | 100.0% | | |
| | hydro chloride | n | | | 2 | 2 | 4 | | |
| | | % | | | 50.0% | 50.0% | 100.0% | | |
| | Lime | n | | | 1 | 2 | 3 | | |
| | | % | | | 33.3% | 66.7% | 100.0% | | |
| **Total** | | n | 12 | 29 | 84 | 114 | 239 | | |
| | | % | 5.0% | 12.1% | 35.1% | 47.7% | 100.0% | | |

$p<0.05$, $X^2$: 43,4

**Table 3.** The distribution of clinical signs and symptoms

| Clinical signs and symptoms | n | % |
|---|---|---|
| No symptom | 130 | 54.4 |
| Vomiting and Diarrhea | 92 | 38.5 |
| Cough | 8 | 3.3 |
| Mouth frothing | 2 | 0.8 |
| Tendency to sleep-somnolence | 2 | 0.8 |
| Vomiting diarrhea+cough | 2 | 0.8 |
| Vomiting-diarrhea+mouth frothing | 1 | 0.4 |
| Mouth frothing+tendency to sleep-somnolence | 1 | 0.4 |
| Mouth frothing+cough | 1 | 0.4 |

dren (9). In a study by Watson et al. on children younger than 6 years, the most frequent cause of intoxication was cosmetic products, the second cause was cleaning products (6). In the 1998 year report of USA Center for Poison Control, drug intoxications were number one, with a rate of 40% (10). In our country, the sealed lid is not prevalent as there is no regulatory obligation. Many studies from our country verified that drugs are the most common reason for intoxication (11, 12). In our study group, we determined that the most common cause of intoxication was cleaning substances. This may be because the study population was limited to the under two age group. There are also distinct, age-associated gender differences in poisoning rates. In the 0-to 6-year-old age group, the number of boys poisoned exceeds that of girls. Between the ages of 13 and 19, the number of girls poisoned exceeds that of boys (6).

Similar results were found in many studies from Turkey (13-17). We determined the male/female ratio as 1.23:1 in this study. In 1997, According to the data from 38 health centers all around the Turkey, 5077 pediatric intoxication cases were evaluated and it was found that these cases comprised 0.9% of all emergency cases (18). In our study, the rate of intoxication was 19.3% (239 cases) among the whole 1239 patients who applied to infant clinics.

There may be seasonal variations in admissions of intoxication cases to emergency room. Krenzelok et al. reported that most of the childhood intoxication cases occurred during summer months (19). It is reported in different studies from different parts of our country that intoxication cases increase in spring and summer (13, 17, 20). In a study by Aji et al. there was no difference among the causes of intoxication and seasons; however, hydrocarbon, cleaning substances, and food intoxications were seen mostly in summer, carbon monoxide intoxication occurred in winter, insecticide intoxications mostly in summer and autumn; on the other hand, drug intoxications showed no seasonal differences (21). In our study, when we consider seasonal distribution of intoxication cases, although it is not statistically significant, the busiest (90, 37.7%) season was autumn. When the causes of intoxication were examined, fat solvent in 32.2%, were determined. Especially during painting houses in seasonal shifts,

cleaning and washing up or moving make it easy to reach cleaning chemicals left around in water bottles. Recent technologic developments have increased the number of different kinds of chemicals used at home.

In most of the intoxication cases, the oral route is the dominant entrance route (12, 22-24). Dermal contact is the second most common route of exposure, but inhalation is the number 2 cause of death. Other means of exposure include parenteral, ocular, otic, rectal, and vaginal routes (25). Even though the very young deliberately put substances in their mouths, these exposures are nonetheless considered accidental because the young child has no concept of the potential consequences of his or her action (6). In our study, the intoxicating agent affected the body via the oral route in 93.3% of cases.

Most of the substance ingestions due to searching curiosity in little children under 6 are accepted as non-toxic (26). It is expected that ingestion of these substances would not lead to symptoms, and mild symptoms are generally limited to gastrointestinal complaints. The main treatment modalities issued in intoxication cases are decontamination procedures (gastric lavage, active charcoal, antidotes), non-specific interventions such as supportive treatments and symptomatic therapies (2, 27, 28). In our study, 206 (86.1%) patients were under medical observation with oxygen and intravenous liquid support. 24 patients (10.4%) had been vomited by their family before they came to the hospital. It was observed that 27 (11.3%) cases had gastric lavage and active coal. 6 (2.5%) cases were consigned to surgical service after endoscopic investigation. When the interval up to admission to hospital is assessed, it is determined that only 79 (33.1%) cases were taken to hospital within 0-2 hours. Thus, although gastric lavage is indicated, such an intervention cannot be performed and be effective on other cases. Family members should be informed of the symptoms of intoxication and should take their children to hospital as soon as possible.

While the mortality due to intoxication in developed countries is 1%; it was reported that is between 3-5% for developing countries . According to sources in our country; the mortality due to intoxication ranges between 0-5.7% (13, 15, 29, 30). In our study, none of the intoxication cases died. Absence of dead cases in our study may be due to the small size of the study population.

Although the incidence of exposure to toxic agents among children is high, deaths resulting from intoxication are fairly low. An important part of the home accidents occurring during pre-school childhood period comprises of intoxication cases resulting from ingestion of potentially toxic substances (25). The components of the various products ingested vary. Most, however, have an unpleasant taste and therefore are consumed only in small amounts. Effects of unintentional poisonings are typically dose dependent, therefore, as children grow and their sense of taste becomes more defined, the risk of large dose unintentional poisonings decreases because they can r discriminate the unpleasant tastes better (9).

In conclusion, the number of unintentional poisonings of children continues to warrant an increased awareness among healthcare providers. Parents and healthcare providers must have a high index of suspicion when children have signs or symptoms indicative of ingestion of toxic substances. As general mortality due to acute intoxications is lower than 1%, the main difficulty facing the physician is the need for aggressive intervention based on careful monitoring and symptomatic treatment in most of the patients.

**Conflict of Interest**

No conflict of interest is declared by the authors.

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