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ORGINAL ARTICLE

Retrospective Analysis of Childhood Poisonings

Çocukluk Çağı Zehirlenmelerinin Geriye Dönük Olarak İncelenmesi

[1]Emine Beyaz, Sonay Gökçeoğlu[2]

[1]Muş Alparslan Üniversitesi, Sağlık Bilimleri Fakültesi, Hemşirelik Bölümü, Muş/ Türkiye

[2]Şanlıurfa İl Sağlık Müdürlüğü, Şanlıurfa/ Türkiye

Correspondence

Emine Beyaz, Muş Alparslan Üniversitesi, Sağlık Bilimleri Fakültesi, Hemşirelik Bölümü, Muş/ Türkiye

EMail: emine.egokceoglu@gmail.com

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ABSTRACT

Objective: The aim is to determine the extent of the types of poisoning and the factors influencing them.

Material and Methods: The study was carried out between January and July of 2019. Hospital records of 107 cases who had presented to the pediatric emergency department for poisoning were retrospectively reviewed. In the analysis, descriptive statistics and the chi-square tests from univariate analyses were used. The SPSS 20.0 package program was used to analyze the data.
Results: 49.5% of the cases were girls, and 5.6% were villagers. 51.4% of poisonings occurred in spring, 68.2% were oral, drugs (%51.4) were the most common poisoning agents. Poisoning of the drugs were observed 17.4% less frequently in the age group 6-12 years than in other age groups, 60.3% less frequently in those who lived in the city center than in those who lived in the district, and 75.3% less frequently in those who took the drug orally than by other means ($p<0.05$). Poisoning occurred in 33.6% between 12:00-17:59. When analyzed by age group, poisonings are most common in the age group 0-5 years with 62.6%. Symptoms developed after poisoning in 72.0% of cases. In cases of poisoning, supportive treatment was the most commonly applied method, with 79.4%. There was no mortality due to poisoning in any of the cases.
Conclusions: Drug poisoning was detected in the majority of the cases. The risk of drug poisoning was lower in children living in rural areas and the age group 6-12 years.
Keywords: Child, pediatric nursing, poisoning, prevention

ÖZ

Amaç: Zehirlenme tiplerinin düzeyini ve etkileyen faktörleri belirlemek amaçlanmıştır.
Gereç ve Yöntem: Araştırma Ocak ile Temmuz 2019 ayları arasında yapılmıştır. Çocuk acil servise zehirlenme nedeniyle başvuran 107 olgunun hastane kayıtları geriye dönük olarak incelenmiştir. Analizde tanımlayıcı istatistikler ve tek değişkenli analizlerden Ki-Kare testi kullanılmıştır. Veriler SPSS 20.0 paket programı kullanılarak analiz edilmiştir.
Bulgular: Olguların %49.5'i kız cinsiyet, %5.6'sı köy ikametlidir. Zehirlenmelerin %51.4'ü ilkbaharda, 68.2'si oral yolla, %51.4'ü ilaçlarla gerçekleşmiştir. İlaçlar ile zehirlenme 6-12 yaş grubunda %17.4 ile diğer yaş gruplarından daha az; merkezde yaşayanlarda %60.3 ile ilçede ikamet edenlerden, etkeni oral yolla alanlarda %75.3 ile diğer yollarla alanlardan daha fazla görülmüştür ($p<0.05$). Zehirlenmeler %33.6 ile en fazla 12.00-17.59 saatleri arasında gerçekleşmiştir. Yaş gruplarına göre incelendiğinde %62.6 ile en fazla 0-5 yaş grubu zehirlenmelerle karşılaşılmaktadır. Olguların %72.0'ında zehirlenme sonrası semptom gelişmiştir. Zehirlenmelerde %79.4 ile en fazla destekleyici tedaviye başvurulmuştur. Zehirlenme sonucu hiçbir olguda ölüm yaşanmamıştır.
Sonuçlar: Olguların çoğunluğunda ilaçlar ile zehirlenme görülmüştür. Kırsalda yaşayan ve 6-12 yaş grubunda olan çocuklarda ilaçla zehirlenme riski daha düşüktür.
Anahtar kelimeler: Çocuk, çocuk hemşireliği, zehirlenme, önleme

Introduction

Poisoning endanger public health that requires rapid diagnosis and treatment and can lead to death. They frequently occur in childhood (1,2). High sensitivity at a young age and incomplete neuromotor development make poisoning important in children (3-5).

Poisoning cases also account for a significant proportion of emergency department admissions. According to the American Poison Control Center, more than two million children contact pediatric emergency services each year due to poisoning (6). Drug intoxication is the most common cause of poisoning. While the negative effects of drugs in adults are due to the use of drugs for suicidal purposes, they are due to accidents in the age group 1-5 years (7-9). Caustic/corrosive substance poisoning, particularly with cleaning products, is also frequent in children under five years of age (10). The most common causes of accidental poisoning are that the chemicals and medicines in the house are easily accessible to children, that there are too many medicines in the house, that some medicines are marketed in flashy colors and styles, that the people taking care of the child are not adequately trained, that chemical products used in agriculture are applied without adequate knowledge and that stoves and water heaters are used carelessly (11).

In cases of poisoning, early diagnosis is important to maintain a good general condition and prevent death. Therefore, a differential diagnosis of poisoning should be established when unexplained signs and symptoms are present in one-year-old infants (12). When taking the medical history in poisonings, the toxic agent kind, amount, method, and time of administration, pre-existing disease status, poisoning symptoms, treatment modalities, and the cause of poisoning (accident, suicide) should be emphasized (13). Although children presenting with poisoning are usually asymptomatic, life-threatening findings can rarely be observed (14). In poisonings, the fundamental approach is to avoid or minimize the toxic substance's absorption, alter its metabolism, accelerate its excretion, administer systemic antidotes, and provide symptomatic treatment (15).

The causes, forms, and agents of poisoning may be influenced by age, gender, sociocultural characteristics, months, and seasons (16). This study aimed to determine the extent of the types of poisoning and the factors influencing them.

Method

Research design

The study has a descriptive design. It was conducted at State Hospital between January and July 2019. The study examined 107 children aged 0-18 years who were admitted to the hospital with a diagnosis of poisoning (excluding suicides) between January and July 2019. Due to missing data in the file records, 43 cases could not be included in the study. A structured information form was used to acquire data from hospital records.

Data collection

The information form examined age, gender, place of residence, the season of admission to the hospital, time of exposure (from 00:00 at night, divided into 6-hour periods), time of complaints, time of admission to hospital, type of toxic substance intake, agent of poisoning, presence of symptoms of poisoning, methods of treatment.

Study variables

The dependent variable of the study is the type of poisoning in the cases. Independent variables are age, gender, place of residence, the season of admission to the hospital, time of the poisoning, and route of ingestion of toxic substances.

Statistical analysis

Descriptive statistics (number, percentage) and the chi-square test from univariate analyses were used in the study. The SPSS 20.0 package program was used to analyze the data.

Ethical approval and cost

The Ethics Committee of University (issue 28/03/2019-E.7185) and the relevant hospital (issue 20/06/2019-5220) gave written approval for the study. The ethical principles of "Confidentiality and Protection of Confidentiality" and "Respect for Autonomy" were met. The researcher bore all costs of the study.

Results

62.6% of the cases were in the age group 0-5 years, 49.5% were girls, and 50.5% were boys. 72.9% of patients lived in the city center, 27.1% lived in villages and districts. 51.4% of poisonings were observed in the spring season. Autumn data could not be assessed in the study because they were not contained in patient records. Poisoning occurred in 33.6% between 12:00-17:59. It was found that the time elapsed between exposure to the agent (the time of poisoning) and the onset of symptoms was (0- min). Admission to the hospital was made within an average of 100.4 minutes after poisoning. At the earliest, the admission to the hospital was made after 5 minutes at the earliest and 1440 minutes at the latest. 68.2% of cases were exposed to toxic substances orally, 30.8% by inhalation, 0.9% by the skin and mucous membranes.

48.6% of poisonings were non-pharmacological; pharmacological agents caused 51.4%. Poisoning of drugs are observed 17.4% less frequently in the 6-12-year-old age group than in the other age groups, 60.3% in those living in the city center and more frequently in those living in the district, 75.3% in those taking the agent orally than in those receiving it by other means ($p<0.05$) (Table 1).

The most common three agents in the distribution of drug poisonings are analgesics-antipyretics with 32.7%, cardiac drugs with 18.2%, and antibiotics with 10.9% (Table 2).

Table 2. Distribution of drug poisoning

Drugs	N	%
Analgesic-antipyretic	18	32.7
Antiepileptic	4	7.3
Cardiovascular	10	18.2
Psychiatric drugs	5	9.1
Respiratory system drugs	1	1.8
Antihypertensives	1	1.8
Iron preparations	3	5.5
Oral antidiabetics	2	3.6
Multiple drug poisoning	1	1.8
Antibiotics	6	10.9
Antiemetic	2	3.6
GIS drugs	3	5.5
Vitamin	3	5.5
Hormone	4	7.3

*Some people have been poisoned with more than one drug.

Among the non-pharmacological forms, poisoning by CO and caustic-corrosive substances was observed most frequently (Table 3).

Table 3. Distribution of non-pharmacological poisonings by agents

	N	%
Caustic-corrosive	10	19.2
CO poisoning	33	63.5
Scorpion sting	1	1.9
Pesticide	6	11.5
Food	2	3.8
Total	52	100

Symptoms were observed in 65.5% of drug poisonings. In nonpharmacological poisonings, the degree of symptom development is 78.8%. GIS findings (nausea, vomiting, abdominal pain) were the most common, with 43.9% cases. This is followed by general symptoms (weakness, fatigue, etc.) with 43.0%, CNS findings (alteration of consciousness, impaired concentration, drowsiness) with 30.8%, the respiratory system with 16.8% (respiratory distress, dyspnea), skin with 14.0%, and oral findings with 6.5%. In cases of poisoning, more than one method of treatment was preferred at the same time. Supportive treatment was used most frequently with 79.4%. Gastric lavage was performed in 38.3% of cases, the activated charcoal in 27.1%, nasal oxygen in 25.2%, antidote in 5.6%, and vomiting in 0.9%. There was no mortality due to poisoning in any of the cases.

Discussion

The study was conducted in a semi-rural city where socioeconomic and educational levels have improved in recent years. The majority of the studied poisoning cases are children under five years of age living in the city center of Mus.

This study observed drug poisoning more frequently (51.4%) than non-pharmacological poisoning (48.6%). Studies have supported this finding. Araz et al. (2016) attributed 62.0% of poisoning to pharmacological factors and Ozkaya et al. (1996) 62.5% (11,12).

The study examined several factors that influenced the type of poisoning. The groups under five years of age were the most affected by poisoning, and drug poisoning was found to be less frequent in the age group 6-12 years than in other age groups ($p<0.05$). Similar to this study, in a study conducted in Spain, the most common cases were encountered under the age of five. It was found that 67.0% of the 2.157 poisoning cases followed up were children under four years of age (17). This study hypothesized that the positive situation in the 6-to 12-year-old age group was due to several reasons. The first is that the psychological fluctuations in adolescence have not completely started in this age range, which can also be called the intermediate period. This is because the onset of puberty increases the incidence of poisoning from drug-induced suicide attempts in children over 12 years of age. Other reasons include better neuromotor development in children at 6-12 years of age and a reduction in time spent at home with school (18,19). Children who spend time at home, especially children under five, have a great risk of finding drugs and chemicals in an accessible place. Children are most often poisoned by drugs that are easily accessible and used by themselves (20). In fact, this study found that children were most often poisoned with analgesic-antipyretic medications. The

Table 1. Distribution of sociodemographic characteristics by type of poisoning

	Poisoning Type						
	Drug Poisoning		Non-pharmacological Poisoning				
Characteristics	**N**	**%***	**N**	**%***	**%****	**X^2**	**P**
Age							
0-5 years	44	65.7	23	34.3	62.6		
6-12 years***	4	17.4	19	82.6	21.5		
13-18 years	7	41.2.	10	58.8	15.9	16.82	**<0.001**
Gender							
Girl	30	56.6	23	43.4	49.5		
Boy	25	46.3	29	53.7	50.5	0.76	0.383
Place of residence							
Town	8	27.6	21	72.4	27.1		
City center	47	60.3	31	39.7	72.9	7.77	**<0.001**
Admission season							
Spring	33	60.0	22	40.0	51.4		
Summer	10	43.5	13	56.5	21.5		
Winter	12	41.4	17	58.6	27.1	3.37	0.185
Way of getting toxic substance							
Oral	55	75.3	18	24.7	68.2		
Respiratory and Cutaneous mucous- membranes	0	0.0	34	100.0	31.8	49.73	**<0.001**
Poisoning time							
00:00-05:59	5	33.3	10	66.7	14.0		
06:00-11:59	17	47.2	19	52.8	33.6		
12:00-17:59	14	56.0	11	44.0	23.4		
18:00-23:59	19	61.3	12	38.7	29.0	3.63	0.303

*Row percentage, **Column percentage, ***Differential group

fact that these drugs, which doctors often prescribe, can be purchased without a prescription means that they are found in abundance in households and are considered innocent more than necessary (11). On the other hand, the carelessness of families and leaving their children alone leads to poisoning by cleaning products (2,4,11). In this study, caustic-corrosive substances were identified as one of the two most common causes of nonpharmacological poisoning (1). The other factor is CO poisoning, which is assumed to be associated with the families' low socioeconomic status and the negative environmental-warming conditions (21,22).

The way the active substance is taken during poisoning also influences the type of poisoning. In the study, drug poisonings were mostly caused by oral ingestion of the agent ($p<0.05$). The literature also supports the finding (23-25). The fact that medicines commonly used at home are mostly taken orally, especially children under five years of age trying to recognize objects by mouth, explains this situation (4,11).

In this study, the number of poisoning cases was found to be higher in children living in the city center than in children living in rural areas ($p<0.05$). In the case of suspected poisoning, easier access to health care facilities for downtown residents may have increased the number of admissions to the hospital. However, because working parents are more common than those who live in rural areas, it is assumed that children are more alone, and the factor of the caregiver is the most important (5).

Limitations

The study has some limitations. Patient information was obtained through the hospital's record registration system. Because the study was retrospective, patient data were analyzed from medical records as much as possible, and it was not possible to examine the sociodemographic and sociocultural characteristics of the families. Only a part of the cases admitted to the hospital could be recorded. When symptoms developed in symptomatic cases, they could not be distinguished from the data in the files.

Conclusions

In the study, drug-induced poisonings are high. Aside from the fact that analgesic/antipyretic/anti-inflammatory medications and CNS medications are common in poisonings, and attempts to raise awareness of this issue among children and their parents, additional safety measures on issues such as the use, storage, and access to these medications in children should be added to the agenda. Poisonings with these drugs are especially important because of the high mortality and need for intensive care. Therefore, it is believed that preventing the over-the-counter supply of such medications and making the drug boxes in a way that children cannot easily open them can reduce the number of drug poisonings.

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Conflict of interest

There is no conflict of interest among the authors.

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