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Original Article

Epidemiological and sociocultural assessment of childhood poisonings

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ABSTRACT

Objectives: Poisoning occurring in childhood still continues to be an important public health issue. The aim of the study is to socio-demographically and clinically examine poisoning cases consulted to emergency department.

Methods: The findings of 121 patients between the ages of 1 month and 17 years consulting to the pediatric emergency department with the suspicion of poisoning were examined retrospectively in the study.

Results: The mean age of the patients was 6.60 ± 5.70 (min-max: 0–17) years and 49.6% of the patients were male and 50.4% were female. The most common causes of poisoning were corrosive chemicals in 35 patients (28.9%), poisonous animals in 24 patient's (19.8%) and prescription medications in 24 patients (19.8%). While 103 (85.1%) of the cases were exposed to the factor accidently, 18 of the cases (14.9%) had attempted suicide. The mean monthly family income levels of accidently poisoned cases were significantly higher than those who attempted suicide ($p < 0.001$). The father's education level was lower in cases who were poisoned by suicide attempt than in those who were accidently poisoned ($p < 0.001$).

Conclusion: Poisoning rates in childhood and varieties of factors differentiate among the regions. The rate of poisoning cases due to poisonous animals was found to be quite high in the region where this study was carried out. In addition, the study showed that poisoning rates due to suicide attempt in children of families with low income level and/or father's education level have increased.

1. Introduction

Poisoning is the deterioration of the body's functions by the ingestion of any substance being toxic to the body or by overdosing a non-toxic substance at a normal dose.[1] Poisoning occurring in childhood continues to be an important public health issue. While the 0.7–5.0% of the cases consulting to pediatric emergency department are due to poisoning and a significant part of these cases are seen during preschool period in Turkey.[2,3] Poisoning cases may vary according to the geographical and seasonal characteristics of the region, sociocultural structure of the population, life index and the age groups.[4–9] Poisoning can occur accidently, during the course of treatment, or intentionally. Childhood poisoning usually occurs accidently due to domestic cleaning products, pesticides and other medicinal products, while adult poisoning is mostly suicidal through the use of various drugs.[10] It is observed that the drugs used for medical purposes in the accidental exposure to poisoning are the most common analgesic and antipyretic drugs.[11,12]

The aim of the study is to determine risk factors for childhood cases and to develop appropriate prevention and treatment methods in consideration of scientific data in addition to the updating of the regional epidemiological data by examining the socio-demographic and clinical data of children consulted to our hospital's pediatric emergency department. In addition, we aimed to investigate the risk factors that affect the suicide attempts in childhood in this geography with low life index.

2. Methods

This study was carried out with a retrospective analysis of the information of 121 patients between the ages of 1 month and 17 years who were admitted to the pediatric emergency department of a tertiary level state university hospital between the dates January 1 - December 31, 2016. The study was carried out in accordance with the principles of the 2008 Helsinki Declaration, and the local ethics committee (with the decision dated 12.02.2013 and numbered 2012–02/10) approval has been taken by the institution where the study was conducted. The following issues have been examined according to the patient files: Age,

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gender, social security, place of residence, application season, poisoning agent, encountering route (oral, inhaler, etc), the person giving the substance, the period until the person was brought to the hospital, the attempts of families before coming to the hospital, how much of the cases were suicidal, findings and symptoms during the first consultation, prognosis of the patients, whether there has been a poisoning issue of the same patient, or in another member of the same family. For each patient, recorded calling information for Sanitation Poisoning Consultation and Research Center providing service for 24 h was evaluated. In addition, incomplete data of some of the patients was completed by a phone call to their families.

Poisoning factors have been classified as chemicals (with corrosive properties), poisonous animals, prescription medications (tablets or biological substances used for therapeutic purposes), pesticides (insecticide, agricultural drugs, etc), foodstuffs, carbon monoxide-other volatile substances and unknown factors. The prescription medications were classified as paracetamol, amitriptyline, aspirin, risperidone, iron, multiple drug intake and others. The causes of poisoning were grouped as accidents and suicide attempts. Poisonings without noticing such as accidental drug intake of the child, mother's accidental giving, other family members' accidental giving, and toxic gas inhalations were accepted as accidental poisoning. Poisonings aiming to end one's own life have been evaluated as suicidal. The education levels of the parents were divided into groups as illiterate, primary school graduate, high school graduate and university graduate. The mean monthly income of parents was calculated in Turkish Lira (TRY) in terms of the total amount earned by the parents and then converted to US dollars. (1 $ = 3.02 TRY, http://www.tcmb.gov.tr/kurlar/kur2016_tr.html).

2.1. Statistical analysis

The results were presented using SPSS (Statistical Package for Social Science) 24.0 computer program. Descriptive statistics were summarized as number, percentage and standard deviation. The conformity of the variables with the normal distribution was analyzed using images (histogram and probability graphs) and Kolmogorov-Smirnov test. The Mann Whitney U test was used to analyze the data not revealing normal distribution, while independent sample t-test was used to analyze the data showing normal distribution. Categorical variables were analyzed using Pearson chi-square or Fisher's precision test (when any of the theoretical values observed in the 3 × 2 table is lower than 5). In all statistical analyzes, when the p value was lower than 0.05, the result was considered as significant.

3. Results

Poisoning cases which were consulted to the pediatric emergency department consisted of 0.55% of all the cases of the pediatric emergency department. When gender distribution was examined, 49.6% of the patients were male and 50.4% were female. The mean age of all cases was found to be 6.60 ± 5.70 (min-max, 0–17) years. More than half of the cases (% 56.1) were between 0 and 4 years of age. When the causes of poisoning according to the order of frequency were examined, the following were found: chemicals in 35 cases (28.9%), poisonous animals in 24 cases (19.8%), prescription medications in 24 cases (19.8%), pesticides, in 17 cases (14%), foodstuff in 13 cases (10.7%), carbon monoxide (CO) and other volatile substances poisonings in 7 cases, (5.8%) and an unknown reason in 1 case (Table 1).

When the subgroup of corrosive chemicals is examined, the most frequent ones are found as; bleach in 14 cases (11.6%), thinner in 8 cases (6.6%), and hydrochloric acid in 5 cases (4.1%). In the cases of poisonous animals are; scorpion sting was observed in 16 cases (13.2%) and snake bites were seen in 7 cases (5.8%). Cases due to the most common prescription medications used for therapeutic purpose; 4 patients (3.3%) had paracetamol and 3 patients (2.4%) had ibuprofen. Most cases of poisoning have consulted to the emergency department in August (14.9%), July (14%), January (10.7%) and April (10.7%). It was seen that corrosive substances (34.3%) and poisonous animal cases (79.1%) were mostly common in summer. Drug poisoning (70.8%) was found to be frequent in winter (Fig. 1).

Table 1
Sociodemographic characteristics of poisoning cases.

	N (%)
Gender distribution Male/Female	60/61(49.6/50.4)
Mean age/year (mean ± SD)	6.60 ± 5.70
T. C. nationals/refugees	116/5(95.8/4.2)
Causes of poisoning	
Chemicals	35(28.9)
Poisonous animals	24(19.8)
Prescription medications	24(19.8)
Pesticides	17(14)
Foodstuff	13(10.7)
Carbon monoxide-other volatile substances	7(5.8)
Unknown reason	1(0.8)
Family history of poisoning? Yes/No	16/105(13.2/86.8)

N: Number of cases; SD: Standard deviation; T.C: Republic of Turkey.

When the maternal education level of patients consulting to the emergency department due to poisoning was examined, 78 mothers (64.5%) were found illiterate whereas 36 mothers (29.8%) were primary school graduates and 5 mothers (4.1%) were found to be high school graduates. Only 2 mothers (1.7%) were found to be university graduates. According to the education level of father; While 23 fathers (19%) were found illiterate, 46 fathers (38%) were primary school graduates, 44 fathers (36.4%) were high school graduates and 8 fathers (6.6%) were university graduates.

When the treatment methods of the patients were examined, it was found that 61 patients (50.4%) received only intravenous (IV) fluid supplementation, 21 patients (17.4%) had IV fluid supplementation, activated charcoal and gastric lavage. Fifteen cases (12.4%) received scorpion or snake serum against venom and inhaler oxygen supplementation was provided in 14 cases (11.6%) against various factors. Antidote treatment was performed in 9 cases (7.4%) whereas skincare was performed in 1 case (0.8%). While 49 cases (40.5%) were admitted to the intensive care unit (ICU), 31 cases (25.6%) were admitted to the general pediatric clinic. Forty-one of the cases (34%) were followed-up only in the emergency department and they were discharged accordingly. All cases were discharged and no mortality was observed. The mean period of staying at the general pediatric clinic was found to be 2 ± 3.1 days and the mean period of staying at the ICU was found to be 0.78 ± 1.73 days.

While 106 of the cases (87.6%) were certainly caused by the anamnesis, 15 patients (12.4%) had suspicion of exposure to the substance. When the cause of poisoning was examined, 103 cases (85.1%) were accidently poisoned, and 18 cases (14.9%) attempted suicide. The mean age of the cases attempted suicide was 14.22 ± 3.54 years and the mean age of cases accidently poisoned was 5.27 ± 4.91 years (Table 2). Parents of all cases who attempted suicide were alive, healthy and they were living together. No statistically significant difference was found in terms of mother education level and the parental consanguineous (Fisher's Exact Test, $p > 0.05$) (Table 2) among the groups. There was a significant difference found with respect to the education level of the father between the cases who attempted suicide and were poisoned accidently (Fisher's exact Test, $p < 0.001$) (Table 2). While 46.7% of the fathers of cases who attempted suicide were found to be illiterate, only 11.1% of them were high school or university graduates. In the group of accidental poisoning cases, 48.5% of the fathers were high school or university graduates and only 10.7% were illiterate. As there were not sufficient number of patients, it was divided into two groups as illiterate and those with primary or higher

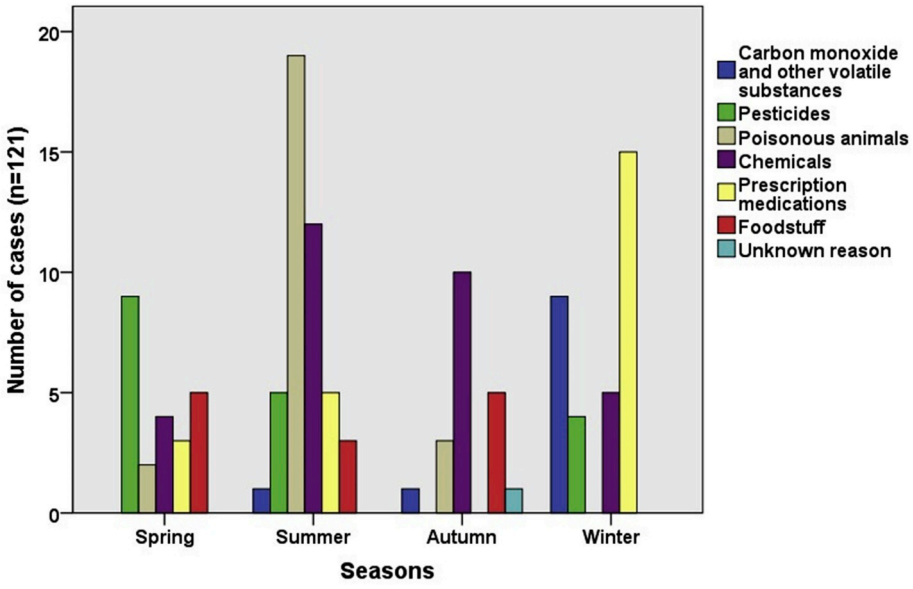

Fig. 1. Seasonal distribution characteristics of poisoning types.

education. Fathers who attempted suicide were 16.7 times more likely to be illiterate than those who were accidently poisoned (odds ratio 16.72, 95% confidence interval: 5.23–53.39, $p < 0.001$).

While the mean monthly income of the families of accidently poisoned cases was 795.95 ± 498.96 $ (min-max, 314.57–2814.57), the mean monthly income of the families of the cases who attempted suicide was found as 467.71 ± 218.84 $ (min-max, 324.50–1258.28) (Man Whitney U test, $p < 0.001$).

4. Discussion

Childhood poisoning, which is an important cause of preventable mortality and morbidity, is one of the most important health problems in the world.[8] While a significant number of cases of poisoning are seen at the age of pre-school due to accidental exposure, suicide attempts are more frequently seen in individuals over the age of 15.[13] In a study conducted in China between 2006 and 2015, it has been stated that poisoning cases were mostly seen in pre-school period with a rate of 45.6%.[4] In a different study by Özdemir et al.,[14] it was found that poisoning was more frequently seen in males under the age of 5 and in females over the age of 13. In the study of Andiran and Sarikayalar,[15] it was reported that there were more poisoning cases in males under the age of 10 compared to the females over the age of 10. In a cross-sectional study examining cases of poisoning within 7 years in France, it was noted that poisonings had peaked in males under the age of 4 and in two age groups of females which are 12 and 15.[16]

In our study, the rate of child poisoning cases compared to all patients consulted to the emergency department was found to be 0.55%. In addition, it was noted that 56.1% of the cases were under the age of five whereas the mean age of the cases who attempted suicide was found to be higher.

It has been highlighted in our study that poisoning with prescription medications were more frequent during spring and winter and non-drug poisoning were more frequent in the summer (Fig. 1). These rates have shown similarities in the previous studies carried out in Turkey.[17] However, poisoning is more common where carbon monoxide poisoning may occur in winter.[18] It is believed that poisoning of non-pharmacological agents is more frequently seen in summer due to easier

Table 2
Sociodemographic characteristics of cases exposed to accidental and suicidal exposure.

	Accidental exposure(n = 103)	Suicidal Exposure(n = 18)	P value
Gender distribution (n)			
Man/Women	7/11	53/50	0.325[a]
Mean age/year			
(mean ± SD),(min-max)	14.78 ± 2.21(9–17)	5.27 ± 4.91(0–17)	< 0.001[b]
Mother Education (n/%)			
Illiterate	13/72.2	65/63.1	0.827[c]
Primary school	4/22.2	32/31.1	
High school and higher	1/5.6	6/5.8	
Father Education (n/%)			
Illiterate	12/66.7	11/10.7	< 0.001[c]
Primary school	4/22.2	42/40.8	
High school and higher	2/11.1	50/48.5	
Monthly income ($)			
mean ± SD,(min-max)	795 ± 498,(314–2814)	467 ± 218,(324–1258)	< 0.001[b]
Parental consanguineous (n/%)			
Yes consanguineous	11/61.1	44/42.7	0.148[a]
No consanguineous	7/38.9	59/57.3	

[a] 2 × 2 Pearson correlation test.
[b] Mann Whitney U test.
[c] 3 × 2 Fisher's exact test; $:United States dollar.

access to open cleaning products and higher exposure to non-domestic toxins. Furthermore, Exposures to most common venomous scorpion species have been encountered frequently in summer mostly in Sanliurfa and Southeastern Anatolia Region of Turkey.[19,20] 79.1% of the cases of poisoning due to animals' venom were found to be in summer in the study.

Paracetamol is one of the most widely preferred and easily accessible analgesic and antipyretic drugs used in childhood all around the world.[21] Therefore, paracetamol is commonly seen as an active substance in cases of poisoning. In this study paracetamol, highly preferred by physicians and families, was found to be the most common active substance.

It has previously been reported that suicidal behaviors during adolescence are related to genetic, psychological, social and familial factors and especially to childhood depression.[22] Previous incidents of family such as suicide and death, abuse and existence of psychiatric diseases may be a risk factor.[23] On the other hand, it has been reported that low income level and unemployment of the parents may be a risk factor for suicide as well in some of the studies.[24] In a study conducted among adult population by Park et al.[25] it has been emphasized that low education level may be associated with increased suicide rates regardless of marital status. In 2015, Sanliurfa is among the last 10 provinces in the quality of life index made by the Turkish Statistical Institution.[26] This index contains many parameters such as education and income level. In a study conducted in Diyarbakır (with similar life index (among the last 10 cities) and in the same geography as Sanliurfa), suicide rate was found as 7.8% and it was stated that it would be useful to investigate underlying risk factors.[27] In this study, it was reported that the suicide attempt was more common among girls. In our cases, there was no significant health problem in the parents. There was no psychiatric support taken and no psychiatric drugs were used. In addition, the increased rates of poisoning related to suicide attempts in the children of families with low income level or lower education level of the father has shown us the importance of familial factors one more time. Although mortality rates in childhood poisoning vary by country and region, there has been a significant decrease in mortality due to various reasons in recent years.[28] In our study, all patients have completely recovered, and no mortality occurred after the treatment. It is thought that the low mortality rates observed in our study may be associated with the ease of access to health services in our country in recent years and correspondingly to early diagnosis and treatment of patients.

The limited number of patients who attempted suicide constitutes the limitation of this study. Multicentric studies are needed to reveal risk factors that may vary depending on local geographic conditions for suicide attempts. Therefore, we have not commented on the odds ratio that we found for the level of father education.

Consequently, the rates of childhood poisoning, and their factors may differentiate. Our study has shown that improving the education and income levels of the parents may reduce the number of suicidal poisoning. In addition, this study reaffirmed that good knowledge of the common factors in the regions having geographical and cultural characteristics is important in terms of early diagnosis and treatment.

Conflicts of interest

No conflict of interest was declared by the authors.

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Ethical approval

This study conformed to the principles of the 2008 Declaration of Helsinki and was approved by the local ethics committee of Harran University, Medical Faculty, Turkey (Approval date and number: 12.02.2013, 2012–02/10).

This study is registered in the Republic of Turkey National Thesis Center for Higher Education Institutions (Issue: 494702, Year: 2018).

Contributors

All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work. (Conception—Halil Kazanasmaz, Mustafa Calik, design—Ozlem Kazanasmaz, analysis and interpretation of data—Halil Kazanasmaz).

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