

Poisoning in Childhood: A Single Institution's Experience

Çocukluk Çağında Zehirlenme: Tek Merkez Deneyimi

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ABSTRACT

Objective: Poisoning and suicide in children are still important problems throughout the world. In the present study we aimed to present the etiology, clinical features, outcomes and other characteristics of childhood poisoning and suicide in a developing European country.

Material and Methods: The medical records of children, aged 0-18 years, admitted to the pediatric emergency department with acute poisoning were analysed retrospectively. The toxic agent, amount, route of intake, reason and time elapsed between the substance intake and admission were evaluated.

Results: A total of 297 children with acute poisoning were analysed, The median age was 3.8 years (range 1 months to 17 years) and the Male/Female ratio was 134/163. Of the total 51.9%, were below 4 years of age. It was noted that 73.1% of poisoning cases were accidental. Poisoning mostly occurred via the oral route at 87.9%. The most common etiological drug was a non-steroidal anti-inflammatory drug at 3.1%. 235 out of 297 (79.1%) children were poisoned by a single intoxicant. Nearly 89.6% of the cases presented within the first 6 hours. Accidental poisoning was seen mostly in younger children, with a single intoxicant, in the summer months, and during the daytime while suicidal poisonings occurred at an older age, with multiple intoxicants, in the winter months and during the night hours.

Conclusion: It is seen that poisoning in young children occurs during daylight hours and can be preventable. It is therefore important to increase the awareness of the families about the precautions that should be taken to protect the young children from poisoning. In addition, characteristics of the suicides and the reasons behind them must be clearly documented in every population to prevent undesirable results.

Key Words: Childhood, Epidemiology, Poisoning

ÖZET

Amaç: Çocukluk çağında zehirlenme ve intihar olguları tüm dünyada önemli bir sağlık sorunudur. Çalışmada, gelişmekte olan bir Avrupa ülkesinde çocukluk çağındaki zehirlenme ve intiharin etiyolojisi, klinik özellikleri, sonuçları ve diğer özelliklerini saptamak amaçlandı.

Gereç ve Yöntemler: Akut zehirlenme ile çocuk acil servisine başvuran, yaşı 0-18 yıl arasında, tıbbi kayıtları olan çocuklar geriye dönük olarak değerlendirildi. Çocukların tıbbi kayıtlarından toksik madde çeşidi, miktarı, alım yolu, nedeni, madde alımı ve başvuru arasında geçen süre değerlendirildi.

Bulgular: Akut zehirlenme ile çalışmaya kabul edilen 297 çocuğun ortanca yaşı 3.8 yıl (aralık 1 ay-17 yaş) olarak saptandı. Erkek/kız oranı yaklaşık 0.8 olarak bulundu. Olguların %51.9'u 4 yaşın altındaydı. Zehirlenme olgularının %73.1'inin kaza sonucu olduğu saptandı. En yaygın zehirlenme etkeni non-steroid anti-inflamatuvar ilaçlar %3.1'di. 297 çocuktan 235'i (%79.1) tek bir zehirlenme etkeni ile zehirlendi. Olguların yaklaşık %89.6'sı ilk 6 saat içinde başvurdu. Kaza sonucu zehirlenmeler çoğunlukla küçük çocuklarda, tek zehirlenme etkeni ile yaz aylarında ve gündüz gözlenirken, intihara bağlı zehirlenmeler ileri yaşlarda, birden fazla zehirlenme etkeni ile, kış aylarında ve gece saatlerinde meydana geldi.

Sonuç: Küçük yaşta çocuklardaki zehirlenmelerin gündüz saatlerinde meydana gelmesi nedeniyle önlenbilir olduğu görülmektedir. Bu nedenle küçük yaşta çocukların bakımı sırasında, zehirlenmemesi için alınması gereken önlemler konusunda ailelerin bilincini artırmak önemlidir. Buna ek olarak istenmeyen sonuçları önlemek için her toplumda intiharin özellikleri ve bunların arkasındaki nedenler açıkça ortaya konulmalıdır.

Anahtar Sözcükler: Çocukluk, Epidemiyoloji, Zehirlenme

INTRODUCTION

Poisoning is a common and potentially fatal public health problem and seen more frequently in children with a significant morbidity and mortality. The cause of poisoning in children varies with age, sex, cultural background, education, population and also the climate. The etiological agents differ from country to country and even between geographical areas within the same country. Every country and every population should therefore document their own poisoning profiles and risk factors and take the appropriate preventive measures (1-3).

Suicide and suicide attempts by children and adolescents continue to be a major public health problem in many countries. Personality development during the adolescence period may sometimes lead to aberrational behaviors and even suicide attempts. Even though suicide is more common in girls, the death rate is higher in boys (4, 5).

In the present study we aimed to present the etiology, clinical features, outcomes and other characteristics of childhood poisoning and suicide in a developing European country. In this way, we tried to increase the awareness of both the population and the health policymakers about the precautions that should be taken to protect the children from poisoning and suicide.

METHODS

Study Population

A total of 297 medical records that belonged to children aged 0-18 years who presented with acute poisoning to our emergency department during 2012 were evaluated retrospectively. This study was conducted in the fifteenth most populous city (with a population of 1.295.355 in 2013) of Turkey. While the clinic serves as a referral center for the entire country, patients may be seen without a referral. Thus, it functions as both a primary and tertiary health care service.

The analyzed parameters were age, gender, time of poisoning, etiological agents, route of poisoning, symptoms, seasonal period, treatment options, and time elapsed after the poisoning.

The poisonings were classified as accidental, suicidal and iatrogenic. The poisoning agents were divided into two groups as pharmacological agents and non-pharmacological agents. The agents of poisoning were also grouped as drugs, carbon monoxide, foods, caustic agents, hydrocarbons, insecticides and others. The drugs were grouped as analgesics and antipyretics, antibiotics, anticoagulants, antidepressants, central nervous system drugs, antihistamines, antineoplastic drugs, hormones, cardiovascular drugs, muscle relaxants, respiratory system drugs, nasal drops, vitamins and others. The route of intake was classified as oral, inhalation, skin, rectal, and contact with the eyes.

Statistics

The SPSS 16.0 software program (Chicago, IL, USA) was used for statistical analysis. The frequencies and the percentages of the variables were given and descriptive statistics were performed. Then, the numeric variables were tested for the distribution of normality (Kolmogorov-Smirnov or Shapiro-Wilk). Normally distributed variables were tested with the independent sample t test and non-normally distributed variables were tested with the Mann-Whitney U test or Kruskal-Wallis test. The categorical variables were tested using the Chi Square test. A p value of < 0.05 was considered statistically significant.

RESULTS

A total of 297 children with acute poisoning and a median age of 3.8 years (range 1 months to 17 years), were analysed. Of the total, 51.9% were below 4 years while 21.9% were over 14 years of age (Figure 1). There were 134 (45%) males and 163 (55%) females. The male to female ratio was 0.8. It was noted that 73.1% of poisoning cases were accidental, 24.2% were suicidal and 2.7% were a result of a therapeutic error. Poisoning mostly occurred via the oral route 87.9%, followed by inhalation 10.8%, skin 1.0% and the rectal route 0.3%. The most common etiological drug was a non-steroidal anti-inflammatory drug at 3.1%.

Seasonal distribution of the poisoning cases was 31.6% in the summer, 23.9% in the autumn, 23.9% in the winter and 20.5% in the spring. The highest admission rate for poisoning was in July (12.1%) whereas the lowest was in March (4.0%).

The time intervals of the day when the poisonings occurred most were 20-22 pm (14.1%), 12-14 pm and 14-16 pm in decreasing order. 235 out of 297 (79.1%) children were poisoned by a single intoxicant. The time elapsed between poisoning and presentation ranged from 1 hour to 48 hours (2 hours±6 hours). Of the total, 68.4% of the cases admitted within the first 2 hours and this rate reached 89.6% at the end of the 6th hour.

135 children (45.6%) did not show any sign of intoxication. The most common symptoms were nausea and vomiting (95 children, 32.1%). Treatment options were active charcoal and gastric lavage in 165 patients (55.4%), only active charcoal in 15 patients (5%), only gastric lavage in 7 patients (2.3%) and specific antidote application in 17 patients (5.7%). Fortunately, there was no death among the study population. The characteristics of the poisoning and suicidal cases are presented in Table I.

Among the 8 patients poisoned due to a therapeutic error, 7 were poisoned via the oral route and one the rectal route. The later one was a 2 years old boy and was erroneously given his mother's indomethacin instead of a paracetamol suppository. No side effect was seen in this boy because of this application.

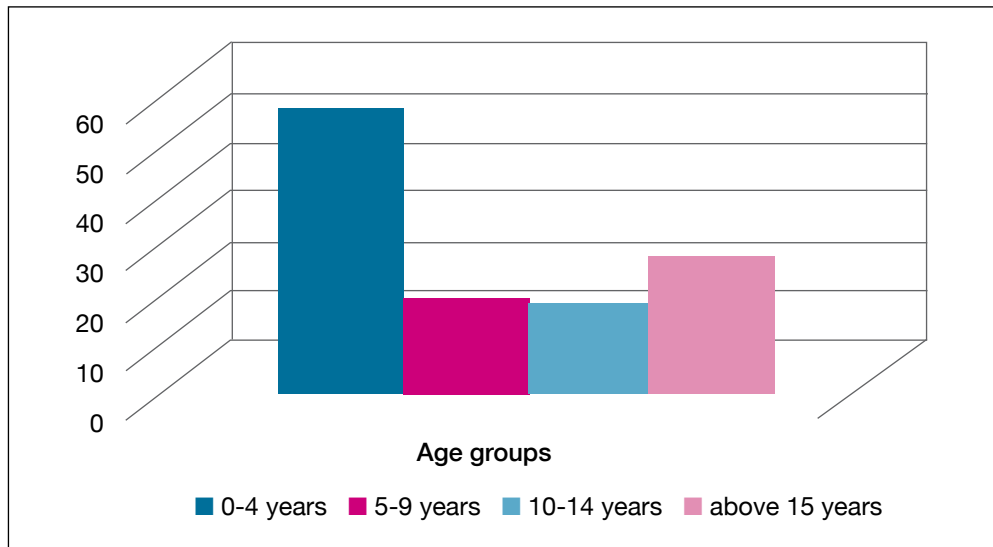


Figure 1: Distribution of the poisoning cases by age group.

Table I: Characteristics of the accidental and suicidal poisoning cases.

	Accidental (n=217)	Suicidal (n=72)	p
Rate among all poisonings (%)	73.1	24.2	
Age (Median) (years) (min-max)	2.9	15.1	0.004
Male/Female	1.19	0.18	<0.001
Most frequent season (%)	Summer (35)	Winter (37.5)	<0.001
Most frequent month (%)	October (13.4)	December (13.9)	<0.001
Most common route (%)	Oral (83.9)	Oral (100)	>0.05
Asymptomatic at admission (%)	47	40	>0.05
Pharmacological agent (%)	58	100	0.004
Single drug poisoning	90.8	47.2	<0.001
Multi-drug poisoning (%)	9.2	52.8	<0.001
Admission in the first 2 hours (%)	72.4	58.3	0.004
Most frequent poisoning time	12.00-14.00	16.00-18.00	<0.001

Accidental poisoning was more frequent among boys whereas suicidal poisoning was more common among girls. Boys were poisoned with a single drug whereas girls preferred multi-drug intake. The most common time of suicide in boys was 12-14 pm (17.2%) whereas it was 20-22 pm (15.3%) in girls.

The comparison of suicidal and accidental poisonings revealed that accidental poisonings were mostly with a single drug whereas suicidal poisonings were with multiple drugs. Accidental poisonings occurred mostly in summer and during the daytime whereas suicidal poisonings occurred mostly in the winter and at night time. In suicidal poisonings the route of intake was usually oral while in accidental poisonings both the oral and inhalational routes were common. The age of the children was also higher in the suicidal poisoning group compared to the accidental poisoning children. The time elapsed between poisoning and admission was also longer in suicidal poisoning when compared with accidental poisoning.

DISCUSSION

In the present study we defined the characteristics of children with accidental or suicidal poisoning in a developing European country. Most of the children were female, under 4 years of age, poisoned mostly with a single agent and via the oral route as expected. Nearly 90% presented to the emergency department within the first 6 hours of poisoning. Approximately half of the children had no sign or symptom. Accidental poisoning was seen mostly in younger children, with a single intoxicant, in the summer months, and during the daytime; however suicidal poisoning mostly occurred at an older age, with multiple intoxicants, in the winter months and during the night hours.

We found that poisoning cases constituted 0.5% of total admissions for the study period. This rate is lower than expected when compared to other emergency departments of the country and the literature (3-8). An important reason for this

may be the overuse and misuse of the emergency department in our region.

The most common age group in poisoning cases was 1-4 years of age in accordance with most of the literature (4-7). In our study, we found that 51.9% of children were under 4 years of age. An interesting finding was the high rate of suicidal poisonings (24.2%) in the present study when compared with the previous reports from our country (range from 3.5% to 13.9%) (5-7). Whether this high rate is coincidental or shows a real increase in suicidal poisonings should be investigated with further studies. Since the region is highly industrialized, we may speculate that the rate of suicidal attempts will increase as the region becomes more developed and a western lifestyle becomes more common.

Accidental poisonings were more common at each age group whereas suicidal poisoning were more common among girls and the 13-17 years age group (3-7, 9). Our findings were in accordance with the literature.

Suicide is an important medical and social problem both in developing and developed countries, especially among the adolescents, and accepted as the most important health issue of the future. Stressful sources during personality development during this period sometimes cause aberrant behaviors and even suicide attempts. Girls are more susceptible to these emotional changes and intrapsychic conflicts. In the present study suicidal poisonings were found to be more common among adolescent girls in accordance with the literature (4-7, 9). There was no child under 10 years of age among our cases admitted with suicidal poisoning. Interestingly, Andiran et al. reported a 16.4% suicidal poisoning rate in their case series under 10 years of age from our country (10).

Accidental poisonings were more common in summer months and during the daylight hours. This may be related to the mothers of the poisoned children as most of the mothers were housewives that deal with housework during the day and children were checked less. In addition, schools were closed throughout the summer months that enabled the children to spend their time at home and around freely. Suicidal poisoning cases were usually adolescent girls who presented mostly in the winter months and at evening hours. These characteristics may be related to school stress, seasonal properties and the psychological factors that affect children at this age group especially in the evening hours when they were alone in their rooms. Our accidental poisoning rate was similar to the previous studies but the suicidal poisoning rate was higher (3, 5-7).

The distribution of the poisoning cases showed the highest rate to be in the summer. Previous reports also support these findings (5-7, 10,11).

The most common etiological agents in our study were the drugs left unprotected at homes, in accordance with the

previous studies from Turkey (5-7,10,11). The National Poison Center at Refik Saydam National Public Health Agency, Turkey, reported 43939 cases of childhood poisoning aged 0-19 years between 2000 and 2004 and nearly 71.4% of the cases were drug related (12). In a report by the American Association of Poison Control Centers (AAPCC) in 2006, substances involved most frequently in all human exposures were found to be the analgesic drug group (12).

We found the oral route as the most common way of intoxication, similar to the previous studies reported both from Turkey and other countries (91%) (2,3,5-7,10-12). The oral route seems to be most common because of the curiosity to taste different subjects in young children and as the easiest way of suicidal attempts in adolescents. It is important to protect children from chemicals and drugs at home.

One of the main factors that determine the success of treatment is the time passed between the poisoning and presentation at the emergency department. Nearly 90% of our cases presented to the hospital within 6 hours. Findings from other studies were similar (2, 6, 7, 11). There was a significant delay in children with suicidal poisoning when compared with accidental poisonings. This may be related with the late awareness of the families about the suicide.

Mortality from poisonings is 1% in developed countries and 3-5% in developing ones (4, 14, 15). There was no poisoning-related death in our study population. In previous reports from Turkey, the mortality rate from poisoning ranges between 0.0% and 5.7% in different studies (5, 9, 11,13). Availability of the health services and poisoning centers increases every year. However, there is still much to do. It is reported that mortality is low in the pediatric age groups but there is a risk of death under 5 years of age (5, 9, 11).

There are some limitations to the current study. First, this study was designed to focus on children with a history of poisoning. Therefore, this was a patient-based survey and the results may differ from epidemiological studies. However, the clinic serves as a referral center for the entire country and patients may also be seen without a referral. Thus, it functions as both a primary and tertiary health care service and we believe that it reflects the general trend of the country. Second, the precise diagnosis of poisoning mostly depends on the declaration of the families so there may be missed cases because of social reasons.

In conclusion, it is seen that poisoning in young children occur during daylight hours can be preventable. Therefore we tried to increase the awareness of both the population and the health policymakers about the precautions that should be taken to protect the children from poisoning and suicide. In addition, characteristics of the suicides and the reasons behind them must be clearly documented in every population to prevent undesirable results.

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