

ORIGINAL RESEARCH

An Epidemiologic Study of Pediatric Poisoning; a Six-month Cross-sectional Study

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Abstract

Introduction: Intentional and unintentional poisoning are among the most common reasons for referrals to emergency department (ED). Therefore, the present study was designed to evaluate epidemiologic features and effective risk factors of intentional and unintentional poisoning in children. **Methods:** This prospective cross-sectional study was carried out in ED of Loghman Hakim Hospital, greatest referral poison center of Iran, Tehran during March to August 2014. Demographic data, medical history, history of psychiatric disease in child, the cause of poisoning, parents' educational level, household monthly income, location of residence, history of addiction or divorce in family, and the poisoning intentionality were gathered. Data were analyzed using SPSS 18 and appropriate statistical tests based on the purpose of study. **Results:** 414 participants with the mean age of 4.2 ± 3.43 years were included (57.5% male). Children in the 0-4 year(s) age range had the most frequency with 281 (67.9%) cases. 29 (7%) cases were intentional (62% female, 76% in the 10-14 years old group). Methadone with 123 (29.7%) cases was the most frequent toxic agent in general and in unintentional cases. 10-14 years of age ($p = 0.001$), and the history of psychiatric disease in children ($p < 0.001$), had a direct correlation with probability of intentional poisoning. While, history of addiction in the family showed an indirect correlation with this probability ($p = 0.045$). **Conclusion:** Based on the results of this study, most cases of poisoning in the children were unintentional methadone intoxication in boys in the 0-4 age range with a history of a psychiatric disease, and those who had a history of addiction in the family. In addition, the most powerful risk factor for the children's intentional poisoning was their history of psychiatric disease. The history of addiction in the child's family had indirect correlation with intentional intoxications.

Key words: Poisoning; child, hospitalized; mental disorders; methadone; suicide

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Introduction:

Intentional and unintentional poisoning are among the most common reasons for referrals to emergency department (ED) (1). Intentional cases are responsible for more than 60% of related deaths (2). Following car accidents, poisoning is the second frequent cause of child death due to unintentional harm (3). Unintentional poisoning occurs more in children as a result of their curiosity and wanting to copy their parents (4). Although the frequency of hospitalization due to intentional harm is decreasing among children and teenagers in recent decades, it is still a challenge for the health systems (5). Based on previous reports, teenagers make up 22% of the poisoned patients referred to EDs in Iran, which is considerable in comparison to European countries (6).

Outcomes such as death and hospitalization in intensive care unit (ICU) have psychological and financial consequences for the person, their family, and society. Therefore, the present study was designed to evaluate epidemiologic features and effective risk factors of intentional and unintentional poisoning in children.

Methods:

This prospective cross-sectional study was carried out in ED of Loghman Hakim Hospital, greatest referral poison center of Iran, Tehran during March to August 2014. Children and teenagers aged 0-14 year(s) old who were referred to the ED due to poisoning were included. The patients' data were gathered using a checklist that consisted of demographic data, medical history, history of psychiatric disease in child, the cause of poisoning, level



of education, household's monthly income, location of residence, history of addiction or divorce in family, and intentionality. The Ethics Committee of Shahid Beheshti University of Medical Sciences approved the protocol of this study and all researchers were committed to keeping the patients' data confidential based on the recommendations of Helsinki declaration. Parents of all participants signed the informed written consent form.

Statistical analysis

SPSS 18 was used for data analysis. Quantitative data were reported as mean \pm standard deviation and qualitative data as frequency and percentage. Chi square test was used to evaluate the relationship between variables. Then a stepwise logistic regression was designed to identify independent effective factors on occurrence of poisoning. In all the tests, $p < 0.05$ was considered as significance level.

Results:

414 participants with the mean age of 4.2 ± 3.43 years were included (57.5% male). Children 0-4 year(s) old

had the most frequent age category with 281 (67.9%) cases. 260 (63%) cases of poisoning was seen in children who resided in downtown. 29 (7%) cases were intentional, 62% female and 76% in the 10-14 years old group. Table 1 summarizes the demographic data of the patients and figure 1 shows the frequency of the toxic agents based on intentionality of poisoning. Methadone with 123 (29.7%) cases was the most frequent toxic agent in general and in unintentional cases. Benzodiazepines with 17.24% (5 cases) prevalence were the most common toxic agent in intentional cases. Among probable risk factors, 10 to 14 years of age ($p < 0.001$), female gender ($p = 0.023$), history of addiction in the child's family ($p = 0.003$), history of psychiatric disease in the child ($p < 0.001$) and type of toxic agent ($p < 0.001$) had significant correlation with poisoning incidence. Table 2 shows the results of stepwise logistic regression analysis. Based on this analysis, out of the five mentioned factors 10-14 years of age ($p = 0.001$) and history of psychiatric disease ($p < 0.001$) had a direct correlation with

Table 1: Baseline characteristics of the studied patients

Characteristics	Type of harm frequency (%)		P-value
	Intentional	Unintentional	
Age groups (Year)			
0-4	2 (0.7)	279 (99.3)	<0.001
5-9	5 (6.7)	70 (93.3)	
10-14	22 (42.3)	30 (57.7)	
Gender			
Male	11 (4.6)	227 (95.4)	0.02
Female	18 (10.2)	158 (89.8)	
History of psychiatric disease			
Positive	23 (71.9)	9 (28.1)	<0.001
Negative	5 (1.8)	273 (98.2)	
History of illness			
Positive	0 (0)	23 (100)	0.18
Negative	29 (7.5)	356 (92.5)	
History of addiction in family			
Positive	4 (2.3)	169 (97.7)	0.003
Negative	14 (10.4)	120 (89.6)	
History of divorce in family			
Positive	1 (50)	1 (50)	0.14
Negative	28 (6.8)	384 (93.2)	
Location of residence			
South (Downtown)	17 (6.5)	243 (93.5)	0.38
West	2 (3.6)	53 (96.4)	
East	4 (8.5)	43 (91.5)	
North	6 (12)	44 (80)	
Father's level of education			
High school diploma or less	27 (7.6)	327 (92.4)	0.25
Associate degree or above	2 (3.8)	50 (96.2)	
Mother's level of education			
High school diploma or less	24 (7.2)	308 (92.8)	0.56
Associate degree or above	5 (6.8)	69 (93.2)	
Family's monthly income			
400 dollars or less	24 (7.3)	306 (92.7)	0.61
400-800 dollars	5 (7.9)	58 (92.1)	
800 dollars or more	0 (0)	12 (100)	



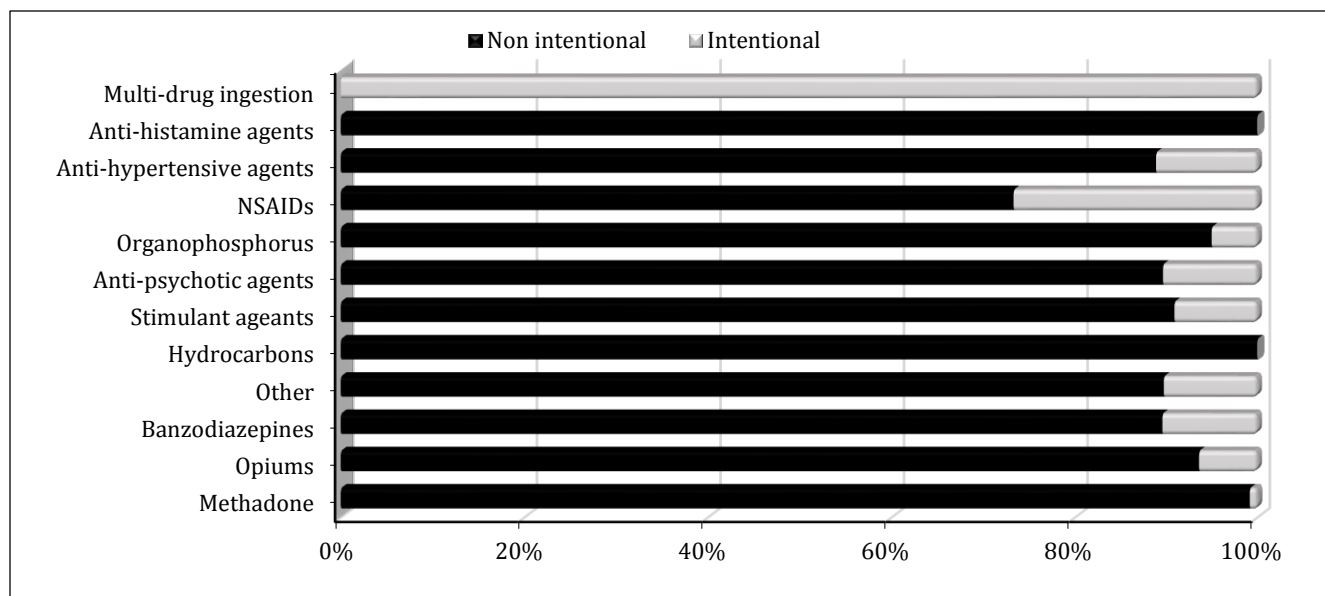


Figure 1: Frequency of toxic agents based on intentional or unintentional poisoning ($p < 0.001$).

probability of intentional poisoning. While, history of addiction in the family showed an indirect correlation with this probability ($p = 0.045$). 5 (1.2%) cases of intentional poisoning and 13 (3.1%, 53.8% female) cases of unintentional ones needed intensive care, but none of the cases died.

Discussion:

Based on the results of the present study, most cases of poisoning in the studied children were in the 0-4 age range, male, children with a history of psychiatric disease, and those who had a history of addiction in the family. In addition, 90% of the poisoning cases were unintentional and occurred due to consuming methadone. Acute poisoning is a life-threatening condition and epidemiologic evaluations in this field and detecting its predisposing risk factors, especially in children, can be a research priority. A study in 2012, has estimated the prevalence of unintentional poisoning to be 49 cases in 10,000 children (7). Regarding gender distribution, the results of the present study was similar to previous studies in South Africa and Canada, but not to the one from Texas, United States of America (8-10). Additionally, most cases of poisoning were seen in the 0-4 age range and most prevalence of intentional poisoning was observed in the 10-14 age range. While, in a similar study

in Canada most poisoning was detected in children under 1 year old and over 15 (10). The high percentage of unintentional poisoning, especially in the 0-4 year(s) group, can be due to their curiosity and tendency to copy their parents. A comprehensive study on 11674 poisoned children, expressed that the prevalence of unintentional cases was 5 times the intentional ones (11). In the studied population, the most frequent type of poisoning was drug intoxication, like the previous studies, which can be due to their availability (5, 12-15). In most studies analgesics and psychotherapeutic agents were the most commonly used drugs (6, 8, 12-14). Whereas, in this study methadone was the most common toxic agent. Methadone is an analgesic synthetic opioid and the high prevalence of intoxication with it, detected in this study, could be due to careless storage of this toxic drug, especially in families undergoing methadone therapy for rehabilitation. In this study, the probability of intentional poisoning was higher in children with a history of psychiatric disease such as depression, behavioral disorders and hyperactivity. A study in Iran, expressed that 47% of the suicide cases in children were related to history of psychiatric disease in the children or their family (16). In children with a history of addiction in their family, odds of intentional poisoning was lower, compared to others. The reason might be less referral of these cases

Table 2: Results of stepwise logistic regression analysis

Factors	Odds ratio (95% Confidence interval)	Z	P
Age (10-14 years)	1.45 (1.17-1.79)	3.39	0.001
Female gender	1.76 (0.37-8.22)	0.72	0.47
History of psychiatric disease	35.77 (6.21-205.88)	4.01	<0.001
History of addiction in family	0.13 (0.01-0.95)	-2.01	0.045
Toxic agent	1.4 (0.75-1.74)	0.63	0.53



to the hospital by the family, more prevalence of unintentional poisoning, and lower level of knowledge in these families. Educational programs and professional social work with the aim of teaching life skills to the patients and their families can widely prevent or reduce the risk of poisoning. The limitations of this study include restricted access to patients' medical history and low level of parent's cooperation.

Conclusion:

Based on the results of this study, most cases of poisoning in the children were unintentional methadone intoxication in boys in the 0-4 age range with a history of a psychiatric disease, and those who had a history of addiction in the family. In addition, the most powerful risk factor for the children's intentional poisoning was their history of psychiatric disease. The history of addiction in the child's family had indirect correlation with intentional intoxications.

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Conflict of interest:

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