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

Mohammad Manouchehrifar¹, Niloufar Derakhshande², Majid Shojaee³, Anita Sabzghabaei¹,
Fariba Farnaghi²

1. Department of Emergency, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2. Department of Pediatrics, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
3. Department of Emergency, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

*Corresponding Author: Fariba Farnaghi; Department of Pediatrics, Loghman Hakim Hospital, Makhir Avenue, Tehran, Iran. Tel: +989125865182 Email: faribafarnaghi@yahoo.com
Received: April 2015; Accepted: May 2015

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

Cite this article as: Farnaghi F, Manouchehrifar M, Shojaee M, Sabzghabaei A, Derakhshande N. An epidemiologic study of pediatric poisoning; a six-month cross-sectional study. Emergency. 2016;4(1):21-24.

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 ± 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.

*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.*

### Table 1: Baseline characteristics of the studied patients

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

![Figure 1: Frequency of toxic agents based on intentional or unintentional poisoning (p < 0.001).](image-url)

| 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.

**Acknowledgments:**
The authors appreciate the insightful cooperation of staffs of the Emergency and Pediatrics Department of Loghman Hakim Hospitals, Tehran, Iran.

**Conflict of interest:**
None

**Funding support:**
None

**Authors’ contributions:**
All authors passed four criteria for authorship contribution based on recommendations of the International Committee of Medical Journal Editors.

**References:**
1. Lipnik-Štangelj M. Hospitalizations due to poisonings in Slovenia—epidemiological aspects. Wien Klin Wochenschr. 2010;122(2):54-8.
2. Krenzelok EP. The use of poison prevention and education strategies to enhance the awareness of the poison information center and to prevent accidental pediatric poisonings. Clin Toxicol. 1995;33(6):663-7.
3. Mohammadi N, Karbakhsh M, Pajoumand A. Epidemiologic aspects of deliberate self-poisoning in adolescents: a hospital-based study in Tehran. Tehran Uni Med J. 2007;65(4):59-64. [Persian].
4. Sawalha AF, Sweileh WM, Tufaha MT, Al-Jabi DY. Analysis of the pattern of acute poisoning in patients admitted to a governmental hospital in Palestine. Basic Clin Pharmacol Toxicol. 2010;107(5):914-8.
5. Olsson M, Gamerooff MJ, Marcus SC, Greenberg T, Shaffer D. National trends in hospitalization of youth with intentional self-inflicted injuries. Am J Psychiatry. 2005;162(7):1328-35.
6. Sarjami S, Pajoumand A. One year epidemiological study of acute adult and adolescent poisoning admitted to Loghman Hospital, Tehran, 2004-2005. Sci J Forensic Med. 2008;13(48):235-40.
7. Monuteaux MC, Lee L, Fleegler E. Children injured by violence in the United States: emergency department utilization, 2000–2008. Acad Emerg Med. 2012;19(5):535-40.
8. Ramisetty-Mikler S, Mains D, Rene A. Poisoning hospitalizations among Texas adolescents: age and gender differences in intentional and unintentional injury. Tex Med. 2005;101(5):64-71.
9. Herbert HK, van As AB, Bachani AM, et al. Patterns of pediatric injury in South Africa: an analysis of hospital data between 1997 and 2006. J Trauma Acute Care Surg. 2012;73(1):68-74.
10. Awdimiretz N, Phillips L, Bratu I. Focus on pediatric intentional trauma. J Trauma Acute Care Surg. 2012;72(4):1031-4.
11. Limbos MAP, Peek-Asa C. Comparing unintentional and intentional injuries in a school setting. J Sch Health. 2003;73(3):101-6.
12. Marahatta S, Singh J, Shrestha R, Koju R. Poisoning cases attending Emergency department in Dhulikhel hospital-Kathmandu university teaching hospital. Kathmandu Uni Med J. 2009;7(2):152-6.
13. Paulouzzi LJ, Ryan GW. Opioid analgesics and rates of fatal drug poisoning in the United States. Am J Prev Med. 2006;31(6):506-11.
14. Prosser JM, Perrone J, Pines JM. The epidemiology of intentional non-fatal self-harm poisoning in the United States: 2001–2004. J Med Toxicol. 2007;3(1):20-4.
15. Cox S, Kuo C, Jamieson DJ, et al. Poisoning hospitalisations among reproductive-aged women in the USA, 1998–2006. Inj Prev. 2011;17(5):332-7.
16. Mehdiizadeh M, Zamani G, Kabiri M. Attempt to suicide in children in Loghman hospital. Iran J Pediatr. 2006;16(3):337-42.