ORIGINAL ARTICLE

The pattern of acute poisoning in hospitalized children under 18 years old of Yazd, Iran

ZAHRA NAFEI[1], NASRIN SABOUHI[2], FARZAD FERDOSIAN[1], FARIMAH SHAMSI[3]

[1]Children Growth Disorder Research Center, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[2]Department of Pediatrics, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.
[3]Center of Healthcare Data Modelling, Department of Biostatistics and Epidemiology, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Abstract

Acute poisoning is a common cause of emergency department visits in childhood and can increase children's morbidity and mortality. Since the causes of child poisoning in different parts of Iran may differ due to cultural differences, this study was conducted to evaluate the most common causes of poisoning in Yazd.

This retrospective cross-sectional study is based on the medical records of children less than 18 years of age admitted to the pediatric emergency department at Shahid Sadoughi Hospital in Yazd during 2018. The collected data included demographic information, the cause, and the outcome of acute poisoning. Out of 105 cases, 61.9% were boys. The highest poisoning rates were in the age group of 1 to 4 years (55.2%). In 50% of the participants, the family size was five or more, and 91% had Iranian nationality. Drugs were identified as the most common causes of poisoning (51.4%), and opioid analgesics were the most frequent drugs. The most common complaint at the time of referral in patients was the loss of consciousness (33%). The mean hospital stay was 56 hours, and no death was reported.

According to the findings of this study in Yazd, the probability of accidental poisoning in boys under four years and due to different types of drugs, especially opioids, was higher than others. It seems that increasing parents' awareness about keeping drugs used by family members in a safe place and out of children's reach is essential in preventing poisoning.

Keywords: Poisoning, Pediatrics, Hospitalization, Iran

How to cite this article: Nafei Z, Sabouhi N, Ferdosian F, Shamsi F. The pattern of acute poisoning in hospitalized children under 18 years old of Yazd, Iran. ***Asia Pac J Med Toxicol*** **2021; 10(2):44-47.**

INTRODUCTION

Childhood poisoning is one of the most common causes of emergency department visits and also one of the notable causes of morbidity and mortality in this age group. Because most cases of poisoning in children are accidental, it can be prevented. (1, 2).

According to various studies, the causes of poisoning and related issues vary in different geographical areas based on cultural and social differences (3-6). Even the causes of poisoning in an area may change over time. Therefore, physicians should always improve their knowledge in this regard (7). Some substances can cause poisoning through ingestion, skin contact, and inhalation. Children aged less than five years are more likely to taste and eat different substances because of their great curiosity about exploring their environment, so accidental poisoning, especially from eating, is more common in this age group. Children are at home most of the time, so they are often poisoned by drugs or substances available at home (7-9).

Although the number of poisonings in children is high, the resulting mortality is low. Severe poisoning is not common, but in some cases, emergency care and even hospitalization are required. Unfortunately, there is little information about the number of hospitalizations and the factors contributing to these poisonings (10). Preventing accidental poisoning is an essential step in significant health problems (11). Since etiological and epidemiological information of poisoning effectively makes appropriate decisions regarding its prevention and treatment, this study was conducted to investigate the epidemiology of poisoning in people under 18 years referred to Shahid Sadoughi Hospital in Yazd.

METHODS

This retrospective study was conducted based on the information recorded in the files of 105 patients younger than 18 years old who were admitted to Shahid Sadoughi Hospital in Yazd during 2018 due to accidental poisoning. Before running the study, the ethics committee approved its conduction. (IR.SSU.MEDICINE.REC.1399.209)

Data were extracted from patients' files and transferred to standard forms, and sent for statistical analysis. Age, sex, type of toxin, main complaint, nationality, and outcome were assessed. Stata 16 Statistical Software(StataCorp. 2019. Stata

*Correspondence to: Farzad Ferdosian, MD, Assistant Professor, Shahid Sadoughi Hospital, Yazd, Iran
Phone number: 09131534150, Fax number: + (98)3531833532, E-mail: Ferdosian@ssu.ac.ir
https://orcid.org/0000-0002-2763-7859

Statistical Software: Release 16. College Station, TX: StataCorp LLC) was used for all statistical analyses.

RESULTS

In the present study, 105 patient files were reviewed, of whom 61.9% were male, and 38.1% were female. The highest rate of accidental poisoning was in children under four years old (77.1%), and the lowest rate of poisoning was in children over 12 years old (2.9%). (Table 1)

Furthermore, in 50% of the subjects, the family size was five or more, and only 9% of all cases had non-Iranian citizenship.

According to the results, the most common chief complaint of patients at the time of hospitalization was loss of consciousness (33%), while 23% of subjects were asymptomatic. Gastrointestinal symptoms (20%), respiratory symptoms (10%), restlessness (8%), and seizure (6%) were in the next ranks, respectively.

The most common causes of poisoning were drugs (51.4%), caustic substances (29.5%), and opiates (5.7%), respectively. Opioid analgesics, especially methadone, were the most common drugs that caused accidental poisoning in children. (Table 2)

The mean length of the hospital stay in the current study, was two days and 8 hours, and all the poisoned children were discharged from the hospital after recovery.

Table 1. Demographic information of children with acute poisoning

Variables	No. of Children	% of Children
Gender		
Male	65	61.9
Female	40	38.1
Age group		
0–<1 yrs	23	21.9
1–4 yrs	58	55.2
5-12 yrs	21	20
13–18 yrs	3	2.9
Total	105	100

Table 2. Distribution of agents causing acute poisoning

Agent	No. of Children	% of Children
Different types of drugs	33	31.4
Methadone	17	16.2
Tramadol	2	1.9
Buprenorphine	2	1.9
Opiets	6	5.7
Methamphetamine	1	0.95
Caustic substances	31	29.5
Hydrocarbons	4	3.8
Pesticides	6	5.7
Alcohol	2	1.9
Carbon Monoxide	1	0.95
Total	105	100

DISCUSSION

Since accidental poisoning in children is preventable and avoidable, this study was conducted in a tertiary center to investigate the common causes of poisoning in children of Yazd and the factors affecting it. In this study, the frequency of poisoning was higher in boys (61.9%). This result is consistent with many studies conducted in Iran and other parts of the world on children's accidental poisoning (3, 7, 12-17). Males are probably more active and curious than females, and in most societies are less under parental supervision, which may justify the high rate of accidents, including poisoning in males (18-20). About 77% of participants were under four years old, and the highest frequency was seen in one to four-year-old (55%). Several studies in Iran have achieved similar results (1, 17, 21). In two separate studies in India and Pakistan, poisoning was usually observed between 1 and 5 years (3, 14). Numerous studies have reported similar results in the accidental poisoning of children (7, 16, 22, 23). Children in this age group have a great desire to explore the environment, are very active, and have a great tendency to put everything in their mouths (14, 19). The frequency distribution of family size in participants was five and higher (50%), four (27%), and three (23%), respectively. Based on these results, it seems that in families with more than two children, parents probably have less supervision on children and the risk of accidental poisoning increases.

Our study revealed that loss of consciousness was the most common complaint of children with poisoning when brought to the emergency room. In a similar study in a referral teaching hospital in Qazvin, Iran, it was identified that loss of consciousness was the most common symptom in 77.7% of patients (13). The results of various studies are consistent with our study (11, 20, 21, 24).

A notable result in this study was that 23% of children were asymptomatic on arrival at the emergency room. A study in southern Iran reported that most patients were asymptomatic at the time of referral, but the most common clinical presentation was decreased level of consciousness (8). In two different studies, Lee et al. and Dayasiri et al. reported that most patients were initially asymptomatic, whereas neurological symptoms were predominantly observed in symptomatic subjects (7, 15).

In our study, gastrointestinal symptoms were observed in 20% of children with poisoning. Numerous studies have cited gastrointestinal manifestations as one of the most common manifestations of acute poisoning in children (7, 13, 14, 21, 24).

Moreover, our study showed that drugs were the predominant cause of poisoning (51.4%), followed by caustic substances (29.5%), and opiates (5.7%). Abundant studies have reported drugs as the most common cause of poisoning, in line with our study (1, 4, 20-25). Based on the results, opioid analgesics, especially methadone, were the most

common drugs that caused accidental poisoning in children. In a study conducted in Arak, Iran, The most common causes of poisoning were drugs (65.2%); methadone, metoclopramide, and clonazepam were at the top of the list (21). In other studies in Iran, methadone was reported as the most frequent cause of poisoning (20, 26). Methadone is a long-acting opioid prescribed in addiction treatment centers as a methadone maintenance treatment for addicts. Unfortunately, unlabeled factory packaging and parental storage of methadone syrup in medicine bottles such as acetaminophen or diphenhydramine may cause the mother or caregiver to make a mistake while giving the medicine (27, 28).

Moreover, caustic substances were the second leading cause of poisoning in our study. Caustic agents are the most dangerous substances at home, as swallowing small amounts can cause severe esophageal burning and complications (7).

In terms of patients outcome, the mean hospital stay in our study population was 2.34 days, and fortunately, no deaths were reported. Pirzadeh et al. reported that the mean hospital stay in patients was 25±22 hours and, death occurred in %0.06 of cases (20). Compared to our study, the mean duration of hospital stay in Tiwari et al. study was 4.2 days, and death occurred in 2.97% of patients(2) . The average hospital stay in a study in India was 4.8 ± 3.0 days, while death occurred in 7.4% of patients (29). The mean length of hospital stay in the study by Lee et al. was 1.02 days, and all cases survived (7). Higher survival in some of these studies may result from parental awareness of poisoning, early detection of toxin exposure in children, shorter time to arrival medical centers, and improved medical management.

LIMITATIONS

The notable limitation of this study is its retrospective design, and therefore it has limited data. Furthermore, only one year has been considered; thus, it is difficult to know the main causes of poisoning and related factors.

It is hoped that future studies will evaluate the risk factors and various treatments.

CONCLUSION

The results of the present cross-sectional study showed that drug poisoning, mainly due to opioid analgesics, is the most common type of poisoning. To prevent poisoning, it is crucial to increase the awareness of families about how to use, side effects, and how to store drugs, especially in parents who use opioid analgesics. Also, educating people about detergents' proper storage can prevent poisoning by caustic substances. Additionally, proper packaging of medicines and cleansing agents in the factory can help in reducing this danger in a way that children are no longer able to open them easily. Parents should be advised to take their child to a medical center as soon as they are suspected of poisoning so that treatment can begin without delay.

ACKNOWLEDGMENT

The authors would like to thank the staff of Shahid Sadoughi Hospital for their cooperation in the information gathering process. This study was derived from Nasrin Saboohi's MD thesis in the Department of Pediatrics, Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

Conflict of interest: None to be declared
Funding: None

REFERENCES

1. Disfani HF, Kamandi M, Mousavi SM, Sadrzadeh SM, Farzaneh R, Doolabi N, et al. Risk factors contributing to the incidence and mortality of acute childhood poisoning in emergency department patients in Iran: a hospital-based case-control study. Epidemiol Health 2019; 41: e2019016.
2. Tiwari A, Trivedi P, Mishra S, Sachdev M, Panda S, Chandramohan GM. Clinical spectrum and outcome of poisoning. Indian J Pediatr. 2021;88(3):289.
3. Agarwal G, Bithu K, Agarwal R. An epidemiological study of acute poisoning in children in a tertiary care hospital of western Rajasthan, India. Int J Contemp Pediatrics. 2016;3:1249-51.
4. Fan AY, Che AH, Pan B, Yang C, Coulter CV, Shieffelbien L, et al. Investigating childhood and adolescence poisoning exposures in New Zealand reported to the national poisons centre during 2000-2009. Asia Pac J Med Toxicol 2013;2(2):52-7.
5. Akbarizadeh MR, Naderifar M, Abdollahimohammad A, Saravani K. The causes of poisoning in children under 14 years old referred to Amir al-Momenin Ali hospital, Zabol, Iran. Med Sci. 2019;23(98):488-91.
6. Wang L, Wu Y, Yin P, Cheng P, Liu Y, Schwebel DC, et al. Poisoning deaths in China, 2006–2016. Bull World Health Organ. 2018;96(5):314-26A
7. Lee J, Fan N-C, Yao T-C, Hsia S-H, Lee E-P, Huang J-L, et al. Clinical spectrum of acute poisoning in children admitted to the pediatric emergency department. Pediatr Neonatol. 2019;60(1):59-67.
8. Haghighat M, Moravej H, Moatamedi M. Epidemiology of pediatric acute poisoning in southern Iran: a hospital-based study. Bull Emerg Trauma. 2013;1(1):28-33.
9. Vilke GM, Douglas DJ, Shipp H, Stepanski B, Smith A, Ray LU, et al. Pediatric poisonings in children younger than five years responded to by paramedics. J Emerg Med. 2011;41(3):265-9.
10. Maior MdCLS, Osorio-de-Castro CGS, Andrade CLTd. Demographics, deaths and severity indicators in hospitalizations due to drug poisoning among children under age five in Brazil. Rev Bras Epidemiol. 2020; 23: E200016.
11. Asghar A, Anees M, Mahmood KT. Accidental poisoning in children. J Biomed Sci Res. 2010;2:284-9.
12. Soori H. Developmental of risk factors for unintentional childhood poisoning. Saudi Med J. 2001;22(3):227-30
13. Mohammadi N, Rastgoo N, Esmaeil Zadeh S. Epidemiological and Clinical Features of Acute Poisoning in Children in a Referral Teaching Hospital in Iran, 2015-2018. J Compr Ped. 2020;11(4) :e97867.
14. Abbas SK, Tikmani SS, Siddiqui NT. Accidental poisoning in children. J Pak Med Assoc. 2012;62(4):331-4.
15. Dayasiri K, Jayamanne S, Jayasinghe C. Accidental and deliberate self-poisoning with medications and medication errors among children in rural Sri Lanka. Emer Med Int. 2020;2020 (2):1-8
16. Omer HAM. Acute Poisoning in Children in Aden-Yemen. Int J Sci Healthc Res.2020;5(2):270-73
17. Haratipour H, Yahyaei B, Jahanpour H. Determination of pediatric poisoning factors in children. J Gorgan Univ Med Sci. 2016; 18 (2): 127-31
18. Potdar SM, Junagade SV, Kumavat V, Panot JN. Clinical

Profile of poisoning in children. Int J Sci Res. 2019;8(9):11-13
19. Kandeel F, El-Farouny R. Study of Acute Poisoning Cases in Children Admitted To Menoufia Poison Control Center (MPCC) During the Year (2016). Ain Shams J Forensic Med Clin Toxicol. 2017;29(2):89-99.
20. Pirzadeh Z, Jamshidi M, Mollamohammadi M. Acute poisoning in children referred to Qazvin Children Hospital (2009 to 2012). J Compr Ped. 2016; 7(4):e40099.
21. Arjmand Shabestari A, Purfarzad Z, Ghorbani M. Acute Poisoning in Children: A Hospital-Based Study in Arak, Iran (2008-2012). Iran J Toxicol. 2014;8(26):1104-8.
22. Tobaiqy M, Asiri BA, Sholan AH, Alzahrani YA, Alkatheeri AA, Mahha AM, et al. Frequency and management of acute poisoning among children attending an emergency department in Saudi Arabia. Pharmacy. 2020;8(4):189.
23. Bacha T, Tilahun B. A cross-sectional study of children with acute poisoning: A three-year retrospective analysis. World J Emerg Med. 2015;6(4):265-9.
24. Gheshlaghi F, Piri-Ardakani M-R, Yaraghi M, Shafiei F, Behjati M. Acute poisoning in children; a population study in Isfahan, Iran, 2008-2010. Iran J Pediatr. 2013;23(2): 189-93
25. Fallahzadeh MA, Salehi A, Hassanzadeh J, Fallahzadeh MH. Epidemiological aspects of acute poisoning in children admitted to a referral hospital during a six-year-period. Ann Pediatr Child Health. 2014;2(3):1020.
26. Ayubi E, Mansori K, Soori H, Khazaei S, Gholami A, Rajabi A, et al. Population attributable risk of unintentional poisoning in Iranian children. Int J Pediatr. 2016;4(4):1655-62.
27. Bazmamoun H, Fayyaz A, Khajeh A, Sabzehei MK, Khezrian F. A study of methadone-poisoned children referred to Hamadan's Besat Hospital/Iran. Iran J child neurol. 2014;8(2):34-7
28. Alizadeh A, Asoudeh MZ, Abdi F, Moshiri M, Mood MB, Etemad L. Epidemiological pattern of acute pediatric poisoning in Mashhad, Iran during 2011-2013. Int J High Risk Behav Addict. 2017; 6(2):e33707.
29. Ram P, Kanchan T, Unnikrishnan B. Pattern of acute poisonings in children below 15 years–a study from Mangalore, South India. J Forensic Leg Med. 2014;25:26-9.