

## Research Article

# Epidemiological Aspects of Acute Poisoning in Children Admitted to a Referral Hospital During a Six-Year-Period

Mohammad Amin Fallahzadeh<sup>1</sup>, Alireza Salehi<sup>2</sup>, Jafar Hassanzadeh<sup>3</sup> and Mohammad Hossein Fallahzadeh<sup>4\*</sup>

<sup>1</sup>Department of Pediatrics, Shiraz University of Medical Sciences, Iran

<sup>2</sup>Department of Biostatistics and Epidemiology, Shiraz University of Medical Sciences, Iran

<sup>3</sup>Research Center for Traditional Medicine and History of Medicine, Shiraz University of Medical Sciences, Iran

<sup>4</sup>Department of Nephrology, Shiraz University of Medical Sciences, Iran

**\*Corresponding author**

Mohammad Hossein Fallahzadeh, Department of Nephrology, Shiraz University of Medical Sciences, Shiraz, Iran; Tel: 987116125849; Fax: 987116474298; E-mail: fallahzh@sums.ac.ir

Submitted: 27 July 2014

Accepted: 04 September 2014

Published: 05 September 2014

**Copyright**

© 2014 Fallahzadeh et al.

**OPEN ACCESS****Keywords**

- Poisoning
- Children
- Epidemiology
- Drugs
- Opium

**Abstract**

**Objective:** Acute poisoning is considered as an important health problem leading to admission of children. Also, the epidemiologic surveillance specific for each country is necessary. Therefore, we conducted this study to obtain the epidemiological information on poisoning in Nemazee Hospital, a referral center in South of Iran.

**Methods:** In this cross sectional study, we determined age, sex, presence of suicidal intent and poisoning incidence and causes of the children admitted to Nemazee Hospital due to poisoning from 2008 to 2013.

**Results:** We found that 1391 out of 21940 admissions were due to poisoning with an incidence of 6.3%. Mean age of the patients was  $9.34 \pm 6.11$  years; 40.5% were male. Poisoning was intentional in 53.3% of cases. The most frequent causes of poisoning were drugs (54.3%), opium (7.9%), methadone (7.6%), household products (6%) and hydrocarbons (3.5%).

**Conclusion:** According to our findings, the rate of pediatric in-patient poisoning was high. Also, drugs, opium and methadone were the most common poisonous substances.

**INTRODUCTION**

Acute poisoning is considered as one of the most common medical emergencies in children. The incidence of poisoning in children is from 0.74 % to 3% [1-5]. About 80% of all cases of poisoning in children occur in ages 1-5 years; therefore, it is most common in younger ages [1]. Acute poisoning in children constitute 2.3% of all pediatric emergency admissions [1]. In addition, the overall mortality rate of acute poisoning in children is about 3-5% [6]. In infants and younger children, it is mainly accidental but in older children, it is usually intentional [7,8].

The pattern of poisoning may change over time. Also, it is not similar in different countries [1-3,7-11]. Therefore, epidemiologic surveillance specific for each country is necessary to determine the extent of problem and the preventive measures which need to be taken.

Thus, we conducted this study to find out age, sex, presence of

suicidal intent and poisoning incidence and causes of the children admitted to Nemazee Hospital, a referral hospital in Shiraz, Iran, during six years.

**MATERIALS AND METHODS**

In this cross-sectional study, we included all the infants and children who were admitted to Nemazee Hospital because of poisoning from March 2008 to January 2013. We excluded patients younger than 1 month or older than 18 years, those with bites or stings and the cases with mild poisoning who did not need hospitalization.

We determined the incidence of poisoning by considering all of the admitted patients in non-surgical pediatric wards, pediatric intensive care unit and pediatric emergency wards as denominator. Furthermore, we obtained demographic data of the patients admitted due to poisoning including age, sex and presence or absence of suicidal attempts. Additionally, we

determined different causes of poisoning including drugs, alcohol, opium, methadone, household compounds, organophosphates, hydrocarbons, battery, herbal medicines, heroin, carbon monoxide, insecticides, mushroom or food poisoning.

We performed the statistical analysis with Statistical Package for the Social Sciences (SPSS) version 16. We described the variables as means and standard deviations. We used student's t-test for between-group analyses and considered P value less than 0.05 as significant.

## RESULTS AND DISCUSSION

Total number of admitted patients during the study period was 21940 with the overall incidence of 6.3%, 1391 cases, for poisoning. No predominance was seen regarding gender in patients younger than 12 years (Table 1). However, there was female preponderance after 12 years of age. Mean age of total population was 9.34±6.11 years while it was 7.84±6.07 and 10.3±5.93 in male and female respectively (p<0.001). Also, male to female ratio was 0.7.

Drugs, opium and methadone were the most common poisonous substances leading to hospitalization (Table 2). Additionally, poisoning was intentional in 53.3% of cases. Intentional poisoning according to sex was 60.6% in females

and 38.8% in males (p<0.001). Furthermore, mean age of the patients with accidental and intentional poisoning were 3.5±2.9 and 14.7±1.99 respectively (p<0.001).

We had the highest frequency of admissions in 2010 (Table 3). In addition, there is an increasing trend in proportion of methadone poisoning from 2010 to 2013. Moreover, the drugs used were known in 234 patients. The most frequently used drugs were: analgesics (30.8%), benzodiazepines (17.5%), antipsychotics (8.5%), cardiovascular drugs (8.1%), anticonvulsants (3.4%) and antihistamines (2.5%). Also, tramadol (56.9%) and acetaminophen (34.7%) were the most frequently used analgesics.

Our findings suggest that pharmaceutical drugs were the most common poisonous agents followed by opium and methadone; analgesics were the main pharmaceutical drugs causing poisoning. This pattern of causes of poisoning was almost similar in different years of the study except for higher rate of methadone poisoning in the last two years. This sudden change in the rate of methadone poisoning may be related to increased number of the adult patients who use this drug and keep it in reach of their children. Similarly, there are high rates of drug poisoning in many other reports [1,2,8,10,12,13].

**Table 1:** Age range of the patients with poisoning.

Age Range	Total number (%)	Male Patients (%)	Female Patients (%)	Cumulative number (%)
2 months to 2 years	285 (20.50)	143(50.2)	142(49.8)	285 (20.50)
3-6 years	299(21.5)	162(54.2)	137(45.8)	584 (41.98)
7-12 years	151(10.8)	69 (45.7)	82(54.3)	735 (52.84)
13-18 years	656(47.2)	189(29.9)	467(70.1)	1391 (100)

**Table 2:** Causes of poisoning in 1391 admitted patients.

Poisonous substance	Number (Percent)	Male Percent	Female Percent
Drugs	755(54.3)	33.1	66.9
Opium	110 (7.9)	48.6	51.4
Methadone	106 (7.6)	47.1	52.9
Household Products	82 (6)	52.4	47.6
Hydrocarbon	50 (3.5)	53.1	46.9
Alcohol	47 (3.4)	89.1	10.9
Others	70 (5)	65.7	34.3
Unknown	171 (12.3)	35.1	64.9

**Table 3:** Pattern of poisoning in different years of the study period.

Year	Total admissions	Number of Patients with poisoning (%)	Percent of drug poisoning	Percent of opium poisoning	Percent of methadone poisoning	Percent of alcohol poisoning	Percent of other causes of poisoning*
2008	2327	87(3.7)	55.2	11.5	2.3	1.1	29.9
2009	2505	147(5.8)	59.8	11.6	4.8	4.1	19.7
2010	3279	350(10.6)	62.6	6.3	3.1	4.3	23.7
2011	4913	311(6.3)	53.6	3.9	4.2	3.9	34.4
2012	6207	297(4.7)	47.5	11.1	11.4	4	26
2013	2709	199(7.3)	45.7	8	19.6	0.5	26.2

\* These causes include mushrooms, insecticides, organophosphates, household products, hydrocarbons, foods, heroin, herbal medicines, carbon monoxide and, battery ingestion.

In contrary to our findings, in some studies other substances like opium, alcohol or household products are the dominant poisonous substances [3,9,14]. This difference may be in part due to religious beliefs, easy access to the poisonous substances or difference in the age groups studied. Also, another factor involved in the difference of the rate of common poisonous substances is that some authors considered each drug or one category of drugs as a separate entity instead of considering all the drugs together [14].

The rate of suicidal attempt and accidental poisoning are almost equal in our study and two other similar reports [12,14]. However, in some reports with similar age groups, the frequency of intentional poisoning is about 75.5% [9] while in some other studies, accidental poisoning includes about 73.3- 78% of the patients [1,8,15]. We discovered that about half of the patients were older than 12 years. Most of these patients were female who had high frequency of suicidal attempts. This female predominance in committing suicidal attempts in older ages is compatible with some other reports [1,8,15]. Also, Ambade et al. reported that male preponderance was seen in all methods of suicide including poisoning and traumatic suicide except burning [16].

The effect of gender on poisoning is observed in many other studies and is dependent on the age range of the study groups. In some reports similar to the present study regarding the age of the patients, female group predominates [12,14] while in others male group preponderates [8,9]. We found that drug poisoning was two times more common in girls while alcohol consumption was about ten times more frequent in boys. Opium and methadone poisoning was not dependent to gender.

In this study, the mean incidence of poisoning in the admitted children was 6.3%; however, pediatric emergency service visits due to poisoning were less than one percent and 2.3% in similar reports from Spain and Turkey respectively [1,4]. Additionally, in a retrospective review of 15196 pediatric admissions in Nigeria, 0.74% was due to accidental poisoning [5]. Moreover, in two recent reports from Ouagadougou and Cyprus, about 1.3% and 3% of all pediatric admissions were due to poisoning respectively [2,3]. The high incidence of poisoning in our study compared to the aforementioned studies shows that poisoning is a serious problem in our center. Also, if the patients referred to the emergency ward and needed not to be admitted had been added, the rate of poisoning would have been higher. Finally, drug poisoning could be prevented by educating parents for safe drug storage at home. In addition, educating adolescents, particularly females, might be helpful in decreasing suicidal attempts.

## CONCLUSION

According to our findings, the rate of poisoning in the admitted children was high. Moreover, the most common poisonous substances were drugs, opium and methadone which can be largely prevented. Furthermore, suicidal attempts in patients older than 12 years have female predominance. One limitation of this research like many other similar studies was that it was retrospective.

## REFERENCES

1. Sahin S, Carman KB, Dinleyici EC. Acute poisoning in children; data of a pediatric emergency unit. *Iran J Pediatr.* 2011; 21: 479-484.
2. Koliou M, Ioannou C, Andreou K, Petridou A, Soteriades ES. The epidemiology of childhood poisonings in Cyprus. *Eur J Pediatr.* 2010; 169: 833-838.
3. Koueta F, Dao L, Ye D, Fayama Z, Sawadogo A. [Acute accidental poisoning in children: aspects of their epidemiology, aetiology, and outcome at the Charles de Gaulle Paediatric Hospital in Ouagadougou (Burkina Faso)]. *Sante.* 2009; 19: 55-59.
4. Burillo-Putze G, Munne P, Dueñas A, Pinillos MA, Naveiro JM, Cobo J, et al. Clinical Toxicology Working Group. National multicentre study of acute intoxication in emergency departments of Spain. *Eur J Emerg Med.* 2003; 10: 101-104.
5. Oguche S, Bukbuk DN, Watila IM. Pattern of hospital admissions of children with poisoning in the Sudano-Sahelian North eastern Nigeria. *Niger J Clin Pract.* 2007; 10: 111-115.
6. Halak Vasavada, Pankti Desai. Clinical Profile And Outcome Of Children Presenting With Poisoning (A Hospital Based Study). *NJIRM.* 2013; 4: 1-7.
7. Lamireau T, Llanas B, Kennedy A, Fayon M, Penouil F, Favarell-Garrigues JC, et al. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. *Eur J Emerg Med.* 2002; 9: 9-14.
8. Andiran N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara: what has changed in twenty years? *Turk J Pediatr.* 2004; 46: 147-152.
9. PawÅ, Owicz U, Wasilewska A, OlaÅ, Ski W, Stefanowicz M. Epidemiological study of acute poisoning in children: a 5-year retrospective study in the Paediatric University Hospital in BiaÅystok, Poland. *Emerg Med J.* 2013; 30: 712-716.
10. Gheslghi F, Piri-Ardakani MR, Yaraghi M, Shafiei F, Behjati M. Acute poisoning in children; a population study in Isfahan, Iran, 2008-2010. *Iran J Pediatr.* 2013; 23: 189-193.
11. Izuora GI, Adeoye A. A seven-year review of accidental poisoning in children at a Military Hospital in Hafr Al Batin, Saudi Arabia. *Ann Saudi Med.* 2001; 21: 13-15.
12. Gontko K, Mitkowska J, Panienski P, Ratajczak K. Acute poisonings in children in the years 2010-2012--single-centre study in Poznań. *Przegl Lek.* 2013; 70: 533-537.
13. Cheraghali F, Taymori M. Epidemiological study of drug intoxication in children. *Acta Medica Iranica.* 2006; 44: 37-40.
14. Haghghat M, Moravej H, Moatamedi M. Epidemiology of Pediatric Acute Poisoning in Southern Iran: A Hospital-Based Study. *Bulletin of Emergency And Trauma.* 2013;1: 28-33.
15. Mutlu M, Cansu A, Karakas T, Kalyoncu M, Erduran E. Pattern of pediatric poisoning in the east Karadeniz region between 2002 and 2006: increased suicide poisoning. *Hum Exp Toxicol.* 2010; 29: 131-136.
16. Ambade VN, Godbole HV, Kukde HG. Suicidal and homicidal deaths: a comparative and circumstantial approach. *J Forensic Leg Med.* 2007; 14: 253-260.

### Cite this article

Fallahzadeh MA, Salehi A, Hassanzadeh J, Fallahzadeh MH (2014) Epidemiological Aspects of Acute Poisoning in Children Admitted to a Referral Hospital During a Six-Year-Period. *Ann Pediatr Child Health* 2(3): 1020.