

Pattern of Acute Pediatric Poisonings in Birjand City, East of Iran

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ABSTRACT

Background: Acute pediatric poisoning represents a frequent cause of admission to the emergency departments. This descriptive and retrospective study was conducted in Birjand, eastern Iran, with the aim of evaluating the pattern of pediatric poisoning in this region.

Methods: During the 6-year period from 21st March 2006 to 20th March 2012, all files of pediatrics poisoned patients admitted to the emergency department of Vali Asr teaching hospital was reviewed and the data were recorded in a pre-designed form. The results were analyzed by relevant statistical tests.

Results: During this period, 246 cases (41.1% female and 58.9% male) were admitted with a diagnosis of acute poisoning. The mean age was 37.6 +/-32.64 (range: 0.06-156) months. The majority of poisonings occurred in the children aged about 2 to 5 years. The most common agents involved were opioids (39.43%), pharmaceuticals (22.76%) and envenomations (15.9%). Most of the patients were living in urban areas (56.91%). There was a significant correlation between older age and intentional poisoning (P<0.01). There were also significant correlations between the toxic agent and either the season (P<0.0001), or patients' age (P<0.0001), residential status (P=0.008) and or consciousness (P<0.0001). Moreover, we introduced Majoon Birjandi as a new cause of poisoning in the literature.

Conclusion: Acute opium poisoning was the most common in terms of morbidity and mortality in this region. Health authorities should consider preventive programs in this regard. Moreover, Majoon-e-Birjandi as a new cause of poisoning should be considered in this region, which is not previously reported in the literature.

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1. Introduction:

Acute poisoning remains an important health problem in children worldwide (1-3). According to the world health organization (WHO) reports, more than 3 million cases of acute poisonings occur in developing countries (1, 4). It is considered one of the common causes of morbidity and mortality in children (5, 6). Acute poisoning has also been the 3rd most common treated injury for children less than 16 years in the emergency department globally (6). Although many educational programs have been designed to prevent of children's to acute poisoning, it continues to be a common medical emergency in this population (2). The incidence and risk factors of acute pediatric poisoning are different among various societies due to their cultural, demography, education and economical characteristics (6-8). Different forms of poisonings may be observed at different time period in some regions (6, 7). Pattern of acute poisonings in an area depends upon the availability of the toxic substance, occupation prevalent in the society, religious and cultural influences (1). Opium and tramadol poisonings are still the most important causes of poisoning in Iran (9, 10). Furthermore, envenomation is a problem in the eastern and southern parts of Iran, while Organophosphate and aluminum phosphide poisonings are major health problems in the northern areas of this country (11-13). Acute accidental poisoning is most commonly observed in 1-5 years and these children constitute 80% of all poisoning cases in Iran (8).

As part of the prevention process, epidemiological research played a major role in assessing and identifying the magnitude of the problem and the major risk factors and effective preventive and therapeutic approaches for child poisonings (8). Vali Asr teaching hospital in Birjand city is the unique referral hospital for poisoned patients

in South Khorasan province located in eastern Iran (14). We conducted the study in this hospital to evaluate the demographics, type of poisoning and the other relevant parameters among children.

2. Materials and Methods:

We carried out an epidemiological retrospective study of poisonings in children who admitted in the emergency department of Vali Asr teaching hospital between 21st March 2006 and 21st March 2012. During the 6-year period, all files of the pediatric poisoned patients were reviewed and recorded in a pre-designed profarma. All cases less than 13 years old are admitted in pediatric service in our hospital. We enrolled all pediatric poisoned patients during the study period and other patients greater than 13 years old excluded from the study. We categorized patients in four age groups: 1. Young infants and infants (<12 month), 2. Toddlers (1-2 years old), 3. Pre schools (2-5 years old), and 4. School age children (>5 years old) (15). All epidemiological data available in the files including age, gender, place of living, toxicant type, route of entry, and manner of poisoning was recorded and then transferred into the software of statistical package for social sciences (SPSS, version 16. Chicago, USA) for statistical analyzes. Data were analyzed by Fisher exact and Chi square tests. Ethical approval was obtained from the Medical Ethics Committee of Birjand University of Medical Sciences, before the study.

3. Results:

During this period, 246 cases were admitted with a diagnosis of acute poisoning. Among them, 145 (58.9 %) were boys and 101 (41.05%) were girls. The mean age was 37.6+/- 32.64 (range: 0.06-156) months. The majority of poisonings occurred in third age group (2-5 years old). Most of the patients were living in urban areas (56.92%). As expected, the poisonings were mostly accidental (96.3%), although there were 9 cases of intentional poisoning (3.7%). The majority of poisonings admitted in summer (n=89, 36.17%). The most common agents involved were opioids (39.4%) followed by

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pharmaceuticals (22.76%) and envenomations (15.85%) as shown in Table 1. Among pharmaceuticals, acetaminophen was the most common cause followed by antipsychotics and TCAs as described in table 2. Opium was the most common opioids (Table 3). Envenomations were mostly scorpion stings and snake bites.

The majority of cases (n=160; 65.04%) was discharged within 48 hours after receiving appropriate treatment. The mean hospitalization was 2.24 \pm 1.68 (range of 1-11) days. Out of 151 cases (61.38%) that had loss of consciousness, 48 patients (19.5%) required intensive care therapy and thus referred to the intensive care unit (ICU). Eighteen cases (7.3%) were intubated, of which 4 patients were expired. Three of the fatal cases were opioid overdoses and one of them was intoxicated by organophosphate pesticide.

Narcotic poisoning was associated with the longest (3-11 days) duration of hospitalization. There was a significant ($P<0.01$) correlation between the age and purpose of poisoning (suicidal or accidental). There was also a significant association between the toxic agent and the season ($P<0.0001$). Most cases (68.28%) occurred at warm season (spring and summer) except ethanol and hydrocarbon poisonings which mainly occur in the cold season (autumn and winter). There was a significant correlation between the toxic agent and age ($P<0.0001$). With increasing age, there was an increase in pharmaceutical poisoning rate. Opioid and hydrocarbon poisonings mostly occurred in children at the age of 1-5 years. There was also a significant relationship between the toxic agent and unconsciousness ($P<0.0001$). Opium poisoning was the most common cause of unconsciousness.

There was a significant correlation between residence status and poisoning substance ($P=0.008$). Poisonings by pharmaceutical, opioids and Majoon-e-Birjandi (a hashish product as a candy) and bleach (as a household cleaner) were more common in the urban population, while the carbon monoxide (CO) and pesticide poisonings and also envenomations were more common in rural population. There was no significant

association between sex and purpose of poisoning.

There were 9 cases of intentional poisoning. The youngest patient was only 5 years old and one at the age 6 years. The frequency distribution of different age groups of <1 years old, 1-2 years old, 2-5 and more than 5 years were shown in Figure 1. The most common age group was 2-5 years (toddlers). In this period, 4 cases of deaths occurred in 3 boys and one girl. One death in the urban population and 3 deaths occurred in rural population. Three patients expired due to accidental opioid poisonings and the other one due to an intentional organophosphate pesticide poisoning.

4. Discussion:

Acute pediatric poisoning is a major health issue worldwide and it is responsible for many morbidity and mortalities (2-4,6). Poisonings in children may produce clinical diagnostic problems for the general pediatricians (4).

Sex and age

Reviewing the literature showed that poisoning is commonly seen in infancy (3). In our study, the highest incidence of poisoning was at age of 2-5 years. It was in accordance with other studies, like India (16) and Turkey (3). Children at this age are not able to differentiate between safe or dangerous objects and have a greater tendency to explore their environments and to put any things into their mouth (6).

In this study, the boys were slightly more prominent compared to girls, which is similar to other studies (4, 6, 7, 17). This predominance may be due to the higher

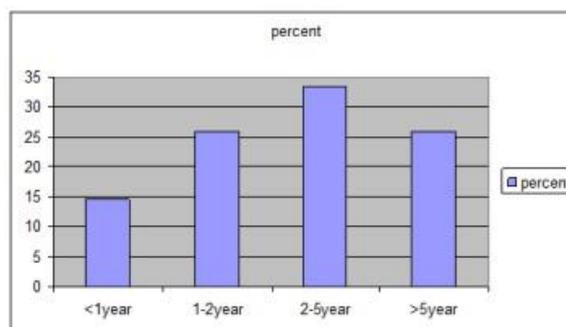


Fig. 1. Age distribution among pediatric-poisoned patients who admitted to Vali Asr hospital in Birjand, Iran (2006-2012) (N=246).

Table 1: Demographic characteristics of acute pediatric poisoned patients who admitted to Vali Asr hospital in Birjand, Iran (2006-2012) (Number of patients=246).

		Sex	Purpose		Number (%)	
		M-F	Suicidal (%)	Accidental (%)		
Age	Less than 1 year(young infants and infants)	16-20	0 (0)	36 (15.18)	36 (14.63)	
	1-2 year (Toddlers)	31-33	0 (0)	64 (27)	64 (26.01)	
	2-5 year (Pre-school age)	58-24	0 (0)	82 (34.59)	82 (33.33)	
	More than 5 years old (chool age)	40-24	9 (3.65)	55 (23.2)	64 (26.01)	
	Total	145-101	9 (3.65)	237 (96.34)	246 (100)	
Location	Urban	86-54	5 (2.03)	135 (54.87)	140 (56.91)	
	Rural	59-47	4 (1.6)	102 (41.46)	106 (43.08)	
Season	Spring	45-34	1 (0.4)	78 (31.7)	79 (32.11)	
	Summer	49-40	7 (2.84)	82 (33.33)	89 (36.17%)	
	Autumn	24-7	0 (0)	31 (12.6)	31 (12.6)	
	Winter	27-20	1 (0.4)	46 (18.69)	47 (19.10)	
	Pharmauticals	32-24	4 (1.62)	52 (21.13)	56 (22.76)	
	Pesticides	6-3	2 (0.81)	7 (2.84)	9 (3.65)	
	Narcotics	57-40	2 (0.81)	95 (38.61)	97 (39.43)	
	CO	2-2	0 (0)	4 (1.62)	4 (1.62)	
	Envenomations	24-15	0 (0)	39 (15.85)	39 (15.85)	
	Hydrocarbons	14-11	1 (0.4)	24 (9.75)	25 (10.16)	
	Bleach	3-1	0 (0)	4 (1.62)	4 (1.62)	
	Ingested processed cannabis (Majoon Birjandi)			0 (0)	2 (0.81)	2 (0.81)
		1-1				

Alcohol	3-2	0 (0)	5 (2.03)	5 (2.03)
Other	1-1	0 (0)	2 (0.81)	2 (0.81)
Unknown	2-1	0 (0)	3 (1.21)	3 (1.21)

energy behavior of boys which increased the liability (7, 17).

Residential areas

Very few studies evaluated patterns of pediatric poisoning between rural and urban areas. In this study, children belonging to urban areas were more exposed (56.92%) compared to those in rural area. This could be due to the fact that mothers in urban area are busier in their jobs and leading to neglect of their child in this area. The toxic agents may also be more available in the cities than in the rural areas. The difference in the population and easier access to the hospital for urban citizens may also contribute and revealed more admission.

Mode of poisoning

Accidental poisoning is still an important health problem in children globally, particularly in developing countries (18). The incidence of accidental pediatric poisoning in our study was quite high. It was similar to other studies conducted in the other part of Iran (19), but it was much higher than the other studies conducted in Turkey (3) and Saudi Arabia (20). Similar to our finding, the other studies showed that poisoning in age of five years or less is mainly accidental (5, 6, 8), but in age of 10 years or more, is usually due to suicidal attempt (8). In our study the rate of intentional poisoning (3.7%), is similar to the report of Turkey (3.5%) (3). In a study conducted in Tehran, Iran, factors related to suicide attempts by poisoning in Iranian children was evaluated and it was found that females are at higher risk of intentional poisoning in comparison with men. Family argument was the most common cause of suicidal attempts in children. In this report, 85.4% of the children attempted suicide by using pharmaceuticals and 55.5% of them occurred between 18.00 and 24.00 PM (21). Although the rates are varied between

countries, suicide is one of the most common causes of death among young people (4).

Adolescent were prone to emotional and situational crisis leading to self-harm (8, 22). In our study 7 out of 17 patients aged 6 years and higher were cases of intentional poisonings.

In two reports, accidental poisoning was more common in older girls and accidental poisoning was more common in younger boys (8, 23). But in our study no relationship was found between the sex and suicidal attempts that may be due to limited number of studied cases.

Pattern of intoxicants

Pattern of intoxicants is varying from country to country. We observed a high frequency of opium poisoning (39.4%), which is higher than the other regions in Iran such as Tehran (18.8%) (24), Zahedan (17.68%) (25), Shiraz (11.9%) (26), Kerman (26.7%) (27) and Babol (21.4%) (19). But less than Golestan province (north of Iran), which opium was responsible for more than half of pediatric poisonings with 91% mortality (28). Unfortunately, a report showed that the highest numbers of addicts in Iran are less than 25 years of age who are mostly students (29). Previous studies showed that Iran has the highest rate of abuse of opiates in the world (30,31). Meanwhile, It was revealed that the rate of opium intoxication in children less than 5 years of age in Iran is higher compared to other regions of the world (32).

The high number of opium poisoning in our studied area may be due to increase in number of opium addiction in our region (10) and the long border with Afghanistan in this region (25, 26). Opium is grown mainly in Afghanistan, in the eastern borders of Iran

and is smuggled to Iran (10). In these regions, opium is used for home treatment of diarrhea, cough and common cold in

Table 2: Frequency of pharmaceuticals which caused poisonings in pediatric patients who admitted to Vali Asr hospital in Birjand, Iran (2006-2012) (N=55).

Substances	Number	Percent (%)
Tri cyclic antidepressant	6	10.9
Acetaminophen	10	18.18
Anti-convulsion	7	12.72
Tramadol	2	3.63
Benzodiazepines	5	9.09
Antihistamines	2	3.63
Anticholinergics	1	1.81
Antibiotics	2	3.63
Baclofen	1	1.81
Anti-psychotics	1	1.81
Ferrous sulfate	3	5.45
Non-steroidal anti-inflammatory drugs (NSIADS)	3	5.45
Contraceptive	1	1.81
Metoclopramid	4	7.27
Bopronorfen	1	1.81
Lidocaien	2	3.63
Unknown	4	7.27
Total	55	100

children and thus it is likely to induce overdose (25, 33). Moreover, other studies showed that in some areas of Iran, opium is used by parents as a symptomatic therapy for routine illnesses in young children (34) which increase accidental pediatric opium poisoning. Meanwhile, high number of opium addicts in this region increase availability of this agent in houses and increase risk of accidental poisoning. Opium and hashish have been used for many years, but some drugs such as heroin, buprenorphine, cocaine, tramadol, and ecstasy are new drugs of abuse in Iran (10). Abuses of the new drugs in Iran are now a major health problem (35).

Majoon-e-Birjandi (MB)

A new substance in our study that caused poisoning in children is Majoon-e-Birjandi (MB). This substance is an extract of hashish (*Canabis stiva*) plus mixture of different materials including sugar, chickpea, pistachio, cinnamon, ginger and coconut, which is consumed as a recreational candy. MB is produced and districted in this region, but may also be transported to the other part of Iran. This substance has been abused

Table 3: Frequency of various illicit drug poisoning in pediatric patients who admitted to Vali Asr hospital in Birjand, Iran (2006-2012).

	Frequency	Percent
Opium	76	76.7
Methadone	17	17.15
Shireh (Opium residue)	5	5.05
Cannabis	1	1.01
Total	99	100.0

traditionally in this area and after ingestion it can cause euphoria (336). Availability of this agent in South Khorasan Province increase risk of accidental MB poisoning. Parents should be educated about the dangers of this substance and it must be out of reach to children. MB poisoning as a cause of pediatric poisoning is not reported in the literature and it is the first report.

International pattern of intoxicants

In developing countries like Pakistan, India and Bangladesh, household and pesticide poisonings are the most common intoxicants. Approximately 3 million acute poisoning and 220,000 deaths from pesticide exposure have been reported annually in the world (2, 7, 17). Moreover, cleansing products are the most common agent in France, and kerosene is the most common agent of acute pediatric poisoning in Nigeria and Kuwait (4). Nowadays, we have a major concern due increasing amount of pesticide poisoning especially organophosphate and aluminum phosphide poisonings in Tehran as well as in northern part of Iran (12, 13, 37).

In this study, pharmaceutical poisonings among children were the most common after narcotics poisoning, but pharmaceuticals are the most common cause of intoxication in some studies conducted in Iran and other countries (5, 8, 38). As shown in table 2, among pharmaceuticals, acetaminophen was the most common, followed by antipsychotics and TCA. Analgesics is commonly prescribed by medical practitioners or easily purchased from pharmacy as an over the counter. Acetaminophen is the most common analgesic that can cause liver failure due to its hepatotoxicity (39). Strategies to prevent drug toxicity in children can include: child-resistant tampering containers; proper labeling (including illustrations recognizable by children); adding ill-smelling or tasting components; and parental education (40).

Carbon monoxide (CO)

CO Poisoning was reported in the rural community (1.6%). CO poisoning can completely preventable (41). Preventive action such as education, safe heating

equipment and special alarms can prevented CO poisoning (42).

General morbidity and mortality

In our study, majority of cases were discharged within 48 hours after receiving appropriate treatment but 48 patients needed intensive care therapy. Less hospitalization days reported from Turkey (85% were discharged after 24h) (3).

Poisoning is generally associated with more morbidity and mortality. Mortality rate of poisoning is 3-5% in developing countries and 1% in developed countries (4). In our study, there were four mortalities (1.6%) in the data which is less than in Kuwait (3.22%) (4) and Turkey (2%) (3). The highest mortality (13.6%) was reported from Karachi in 1982 (6). The mortality rate was reported 12% in Nepal (1).

5. Conclusion:

Acute pediatric poisonings are common in Birjand, of which opium poisoning is the most common with the highest morbidity and mortality. It is therefore a common health problem of children in this region. Educational and preventive programs should be seriously considered by the health authorities locally and nationally. However, prospective studies in acute pediatric poisoning on a larger scale including the outpatients and those treated at home is recommended. Further studies on the causes of narcotic poisoning and its prevention are needed. Moreover Majoon-e-Birjandi (M.B) as new cause of poisoning should be considered in this region which is not previously reported in the literature.

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References

1. Budhathoki S, Poudel P, Shah D, Bhatta NK, Dutta AK, Shah GS et al. Clinical profile and outcome of children presenting with poisoning or intoxication: a hospital based study. *Nepal Med Coll.* 2009;11(3):170-5.

2. Tsalkidis A, Vaos G, Gardikis S, Kambouri K, Tripsianis G, Mantadakis E, et al. Acute poisoning among children admitted to a regional university hospital in Northern Greece. *Cent Eur J Public Health*. 2010;18(4):219-23.
3. Ozdogan H, Davutoglu M, Bosnak M, Tutanc M, Haspolat K. Ozdogan H, et al. Pediatric poisonings in southeast of Turkey: epidemiological and clinical aspects. *Human & Experimental Toxicology*. 2008;27:45-8.
4. Abahussain EA, Ball DE. Pharmaceutical and chemical pediatric poisoning in Kuwait: a retrospective survey. *Pharmacy Practice (Internet)*. 2010;8(1):43-9.
5. Lito vitz IL, Flager SL, Manoguera AS, Veltiv JC, Wright L. Recurrent poisoning among pediatric poisoning victim. *Med Toxicol Adverse Drug Exp*. 1989 Sep-Oct;4(5):381-6.
6. Manzar N, Saad SM, Manzar B, Fatima SS. The study of etiological and demographic characteristics of acute household accidental poisoning in children - a consecutive case series study from Pakistan. *BMC Pediatrics*. 2010;10:28.
7. Camidge DR, Wood RJ, Bateman DN. The epidemiology of self-poisoning in the UK. *J Clin Pharmacol*. 2003;56:613-9.
8. Sahin S, Bora Carman K and Dinleyici E. Acute Poisoning in Children; Data of a Pediatric Emergency Unit. *Iran J Pediatr*. 2011;21(4):479-84.
9. Taghaddosinejad F, Mehrpour O, Afshari R, Seghatoleslami A, Abdollahi M, Dart RC. Factors related to seizure in tramadol poisoning and its blood concentration. *J Med Toxicol*. 2011;7:183-8.
10. Karrari P, Mehrpour O, Balali-Mood M. Iranian crystal: A misunderstanding of the crystal-meth. *J Res Med Sci*. 2012;17(2):203-4.
11. Mehrpour O, Keyler D, Shadnia S. Comment on aluminum and zinc phosphide poisoning. *Clin Toxicol (Phila)*. 2009;47(8):838-9.
12. Hosseinian A, Pakravan N, Rafiei A, Feyzbakhsh SM. Aluminum phosphide poisoning known as rice tablet: A common toxicity in North Iran. *Indian J Med Sci*. 2011;65(4):143-50.
13. Ahmadi A, Pakravan N, Ghazizadeh Z. Pattern of acute food, drug, and chemical poisoning in Sari City, Northern Iran. *Hum Exp Toxicol*. 2010;29(9):731-8.
14. Mehrpour O, Abdollahi M. Poison treatment centers in Iran. *Hum Exp Toxicol*. 2012;31(3):303-4.
15. Rosen's Emergency Medicine: Concepts and Clinical Practice. 7th ed. Philadelphia: Mosby/Elsevier; 2013.
16. Gupta SK, Peshin SS, Srivastava A, Kaleekal T. A study of childhood poisoning at National Poisons Information Centre, All India Institute of Medical Sciences, New Delhi. *J Occup Health*. 2003;45(3):191-6.
17. Memon Y, Majeed R, Kolachi H, Querashi K, Sheikh S. Clinical spectrum and outcome of accidental poisoning in children. *Biomedica*. 2010;26:92-5.
18. Olguin HJ, Garduño LB, Pérez JF, Pérez CF. Unintentional poisoning with drugs in a Mexican pediatric population. *J Popul Ther Clin Pharmacol*. 2011;18:156-60.
19. Moghadamnia AA, Esmaeilnia-Shirvani T, Esmaeili MR, Bayati Z, Gholitabar ZA. A report of childhood poisoning in babol. *Archives of Iranian medicine*. 2004;7(4):297-9.
20. 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(1-2):13-15.
21. Seghatoleslam T, Farzaneh E, Rezaee O, Sajadfar F, Mehrpour O. Factors Related to Suicide Attempts by Poisoning in Iranian Children. *Indian Journal of Forensic Medicine & Toxicology*. 2013;7:254-87
22. Farzaneh E, Mehrpour O, Alfred S, Moghaddam HH, Behnoush B, Seghatoleslam T. Self-poisoning suicide attempts among students in Tehran, Iran. *Psychiatria Danubina*. 2010;22(1):34-8.
23. Lin YR, Wu TK, Liu TA, Chou CC, Wu HP. Poison exposure and outcome of children admitted to a pediatric emergency department. *World J Pediatr*. 2011;7(2):143-9.
24. Joghataee H, Mirakbari SM, Moosavi SS, Farnaghi F. Poisoning In Children: A Study Of 1120 Poisoned Patients Younger Than 12 Years At Loghman Hakeem Poison Control Center, Tehran, Iran, 2000-2001. *The Internet Journal of Pediatrics and Neonatology*. 2002;2(2).
25. Khajeh A, Narouie B, Noori NM, Emamdadi A, Ghasemi Rad M, Kaykha M, et al. Patterns of Acute Poisoning in Childhood and Relative Factors in Zahedan, Southeast Iran. *Shiraz E-Medical Journal*. 2012;13(1).
26. Assar S, Hatami S, Lak E, Pipelzadeh M, Joorabian M. Acute poisoning in children. *Pak J Med Sci* 2009;25(1):51-54.
27. Zarezadeh M, Bahrampour A. Poisoning Survey of Referred Children to Afzalipour Hospital in Kerman in 2009-2010. *IJT*. 2011;4(4):397-401.

28. Cheraghali F, Taymori M. Epidemiological study of drug intoxication in children. *Acta Medica Iranica*. 2006;44(1):37-40.
29. Ahmadi J, Ghanizadeh A. Motivations for use of opiates among addicts seeking treatment in Shiraz. *Psychol Rep*. 2000;87(3 Pt 2):1158-64.
30. Zamani N, Mehrpour O: Outpatient treatment of the poisoned patients in Iran; may it be a feasible plan? *DARU J Pharm Sci*. 2013;21(1):45.
31. Mehrpour O, Sezavar SV. Diagnostic imaging in body packers. *Mayo Clin Proc*. 2012;87(7):53-4.
32. Besharat S, Jabbari A, Besharat M. Opium as a Fatal Substance. *Indian Journal of Pediatrics*. 2008;75:1125-8.
33. Afshari R, Majdzadeh R, Balali-Mood M. Pattern of acute poisonings in Mashhad, Iran 1993-2000. *J Toxicol Clin Toxicol*. 2004;42(7):965-75.
34. Zamani N, Sanaei-Zadeh H, Mostafazadeh B. Hallmarks of opium poisoning in infants and toddlers. *Trop Doct*. 2010;40(4):220-2.
35. Karrari P, Mehrpour O, Afshari R, Keyler D. Pattern of illicit drug use in patients referred to addiction treatment centres in Birjand, Eastern Iran. *J Pak Med Assoc*. 2013;63(6):711-6.
36. Mehrpour O, Karrari P, Afshari R. Recreational Use and overdose of ingested processed cannabis (Majoon Birjandi) in the Eastern Iran. *Hum Exp Toxicol*. 2012;31(11):1188-9
37. Hassanian-Moghaddam H, Zamani N, Rahimi M, Shadnia S, Pajoumand A, Sarjami S. Acute adult and adolescent poisoning in Tehran, Iran; the epidemiologic trend between 2006 and 2011. *Arch Iran Med*. 2014;17(8):534-8.
38. Akin Y, Ağzikuru T, Cömert S, Atilkan P, Erdağ GC, Telatar B. Hospitalizations for pediatric intoxication: a study from Istanbul. *Turk J Pediatr*. 2011;53(4):369-74.
39. Mehrpour O, Shadnia S, Sanaei-Zadeh H. Late extensive intravenous administration of N-acetyl cysteine can reverse hepatic failure in acetaminophen overdose. *Hum Exp Toxicol*. 2011;30(1):51-4.
40. Oprescu F, Peek-Asa C, Wallis A, Young T, Nour D, Cherecheş RM. Pediatric Poisonings and Risk Markers for Hospital Admission in a Major Emergency Department in Romania. *Matern Child Health J*. *Matern Child Health J*. 2012;16(2):495-500.
41. Graber JM, Smith AE. Results from a state-based surveillance system for carbon monoxide poisoning. *Public Health Reports*. 2007;122(2):145-54.
42. Barry J. Diagnosis and management of the poisoned child. *Pediatric Annals*. 2005;34(12):937-46.