

## Prevalence of clinical manifestations of poisoning in children admitted to hospitals of Khorramabad in 2011

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### ABSTRACT

**Background:** Poisoning is considered an important public health issue. Considering the high prevalence of poisonings and the diversity of their ensuing symptoms, this study aimed to investigate the epidemiology of the clinical symptoms of poisoning in children admitted to Shahid Madani and Ta'min Ejtema'i hospitals of Khorramabad in 2011.

**Methods:** In this cross-sectional study, the data was collected from the records of the children hospitalized with a diagnosis of poisoning in the referral hospitals of Khorramabad in 2011. Collected data was statistically analyzed using SPSS software.

**Results:** Of the 230 hospitalized patients whose age ranged from 30 days to 11 years (with a mean age of 3.1 years  $\pm$  2.4), 117 (50.9%) were male and 113 (49.1%) were female. Neurological (43.5%) and gastrointestinal (21.3%) symptoms ranked as the most common clinical symptoms of poisonings. At  $P < 0.01$  level of significance, drug abuse (42%) was identified as the most prevalent cause of neurological symptoms, and hydro-carbonic poisonings (40.81%) stood as the most frequent causes of gastrointestinal symptoms.

**Conclusions:** Neurological complications are viewed as one of the main threats to pediatric health and the high incidence of such complications in the sample of poisoned children in this study suggests that the issue of pediatric poisoning needs to be taken into serious consideration. Furthermore, high priority needs to be accorded to the careful training of the personnel of healthcare centers and the correct treatment of the poisonings which result in neurological complications.

**Keywords:** Children, Drugs, Epidemiology, Hydrocarbon, Poisoning.

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### INTRODUCTION

Toxins are substances that can cause harm or interfere with the functioning of the body through chemical reaction. These compounds enter the body in various ways and leave behind a series of local and systemic effects. Poisoning refers to the enduring of harm or death due to a toxin and is a qualitative term used to define the chemical compounds' potential to inflict harm in the body [1].

Toxicology is a branch of medicine that deals with the functions and biochemical effects of drugs and toxins and their ensuing clinical symptoms [2]. Throughout history, poisoning has had a huge effect on human life [3]. In addition, poisoning has always been

considered a major public health problem so that 15-20% of the patients admitted to the emergency departments are poisoning victims [4].

Poisonings, annually, lead to more than 130,000 admissions to emergency departments and account for one % of annual pediatric hospitalizations. These admissions and hospitalizations, in turn, implicate high financial burdens. e.g. the cost of treating poisoning in the USA in 1992 amounted to three billion dollars. Inadvertent ingestion of toxic substances remains one of the most important causes of pediatric poisoning and is most prevalent in the age group of 1-5 year olds [5]. Usually, at this age range, boys are at greater risk of poisoning than girls [6-11].

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A study in Spain revealed that 28% of all emergency admissions involved poisoning and that 67% of patients were less than 4 years old [12]. Pediatric poisoning is also common in Iran, and with the prospect of industrialization plans and population growth, it is expected to be increasingly on the rise [13, 14]. A research conducted in Sanandaj reported that in the age group of less than 5 year olds, cases of inadvertent poisoning (39.4%) were most frequent [4]. In another study, Kushanfar *et al.* identified hydrocarbons and drugs as the most common causes of poisoning and observed that those in the age group of 2-5 year olds were most susceptible to poisoning [15].

On the other hand, according to available statistics, in Iran and in Tehran alone annually around 30000 patients, of whom 12000 are hospitalized, suffer poisoning due to ingestion of drugs and chemicals. Of these patients, 1200 are transferred to ICU units and at least 120 people lose their lives. Iran's Organization of Forensic Medicine reports that in the first 9 months of 2007, drug poisoning and poisoning by chemicals and pesticides claimed the lives of 383 and 602 people, respectively.

Thus, preparing a detailed record of patient's complaints and conducting oriented physical examination and necessary laboratory tests might be of help to the physician in the clinical diagnosis of poisoning, the selection of specific toxicology tests, and the subsequent prescription of antidotes [16]. All these steps prepare the grounds for reducing deaths due to poisoning. In other words, the primary objectives of poisoning treatment might include inhibiting the absorption of the toxins, administering the right antidotes, and encouraging the excretion of the absorbed toxins. As stated above, these steps can lead to a decline in the mortality rates of poisonings. It should be noted that emergency cardiopulmonary support must take precedence over any diagnostic measure [17, 18].

Despite the urgency of the issue, unfortunately, there has not been any serious attempt yet to develop a comprehensive program for controlling and preventing the

incidence of poisonings as one of the most critical medical emergencies. As evident, in Iran as well as other countries, the issue of poisoning has been frequently investigated, yet, ever-increasing introduction of new chemical and pharmaceutical compounds to the market calls for the continuation of such studies. In this vein, the current study reports on some new developments about recently identified as well as already established strains of poisoning.

## MATERIALS AND METHODS

This post-hoc retrospective study explored the epidemiology of clinical symptoms ensuing pediatric poisonings in referral hospitals of Khorramabad city in 2011. In this study, researchers investigated the records of 230 patients admitted to Shahid Madani and Ta'min Ejtema'i hospitals of Khorramabad city, which provide service to patients from Khorramabad city and nearby districts, since the beginning of April 2011 till the end of March 2011.

Information derived from patient records were encoded into special data sheets which detailed the age and gender of the patient, cause of poisoning, toxins modality of introduction to body (oral, parenteral, and respiratory), time of admittance (morning, evening, or night), outcome of treatment (recovery, impairment, or death), clinical symptoms, duration of hospitalization, and the time lapse between the contact with the toxin and the earliest medical intervention.

According to the questionnaire was completed by reading, name and surname was not mentioned in the questionnaire, there was no particular ethical problem in this study.

The encoded data were, then, analyzed through Chi-square test. Descriptive statistics were, also, presented in the form of figures and tables of frequency.

## RESULTS

Of the 230 admitted patients whose age ranged from 30 days to 11 years (with a mean age of 4.2 years  $\pm$  1.3), 117 (50.9%) were male and 113 (49.1%) were female. A total of 213 patients (92.6%) were hospitalized for inadvertent poisoning, while the other 17 admitted patients (7.4%) had been

deliberately poisoned. The highest frequency of poisonings that amounted to 188 cases (81.7%) was related to the age group of less than five year olds. The main causes of poisoning in the observed data were drugs and hydrocarbons each with frequencies of 63 (27.4%) and 44 (19.1%) cases, respectively.

Regarding the sample as a whole, the most frequent clinical symptoms of poisoning involved neurological (43.5%) and gastrointestinal (21.3%) complications, and the least prevalent clinical symptoms of poisoning were related to the simultaneous cardiovascular and gastrointestinal (0.4%) complications. At  $P < 0.01$  level of statistical significance, drug abuse and poisoning by hydrocarbons counted as the most prevalent causes of neurological (42%) and gastrointestinal (40.81%) complications.

In the case of drug-induced poisoning, neurological (66.67%) and respiratory symptoms (11.11%) were most frequent, respectively. However, with regards to

hydrocarbon poisonings, respiratory and gastrointestinal complications were observed in 47.73 % and 45.45% of the cases, respectively. In majority of the cases, toxins had been consumed orally (86.5), and most of the patient admissions had occurred between 2 and 8 p.m. (44.81%). The time lapse between contact with the toxin and the earliest medical intervention was less than 24 hours in 90.7% of the instances, and in 1.7% of the cases the time gap extended from 24 to 48 hours. Also, 77.9% of the patients needed to stay for 1 to 2 days at hospital for recovery. At  $P < 0.01$ , 79.39 % of the patients who had orally consumed toxins and 70% of the ones poisoned through respiratory tract had been hospitalized 1 to 2 days, whereas 100 % of those poisoned through parenteral mode needed to stay at hospital for 4 to 5 days to reach full recovery. Treatment led to full recovery in 98.7 % of the cases; however, after treatment, 0.4 % of the patients sustained impairments and 0.9 % of them died of poisoning.

**Table 1.** Frequency distribution of clinical symptoms of pediatric poisonings by cause.

Causes of poisoning	Clinical Symptoms								
	neurological	gastrointestinal	respiratory	cardiovascular	neurological and gastrointestinal	neurological and respiratory	gastrointestinal and respiratory	cardiovascular and gastrointestinal	no symptom
pesticides	6(31.6)	6(31.6)	0	2(10.5)	1(5.2)	0	0	0	4(21.1)
cardiovascular drugs	2(5)	0	0	0	1(25)	0	0	1(25)	0
antipsychotics	11(58)	0	0	0	2(10.4)	6(31.6)	0	0	0
alcohol	4(100)	0	0	0	0	0	0	0	0
carbon monoxide	2(100)	0	0	0	0	0	0	0	0
toxic herbs	0	2(20)	2(20)	2(20)	2(20)	2(20)	0	0	0
drugs	42(66.7)	6(9.5)	7(11.1)	0	4(6.3)	0	3(4.8)	0	1(1.6)
hypnotic sedative	11(61)	0	0	1(5.7)	0	2(11.1)	0	0	4(22.2)
hallucinogenic drugs <sup>1</sup>	10(77)	1(7.8)	0	0	2(15.4)	0	0	0	0
food supplements	0	5(100)	0	0	0	0	0	0	0
hydrocarbons	3(6.8)	20(45.5)	21(47.7)	0	0	0	0	0	0
miscellaneous causes	10(31.2)	9(28.1)	1(3.1)	0	1(3.1)	1(3.1)	2(6.3)	0	8(25)

$P < 0.0001$

## DISCUSSION

In this study, the number of patients who had been accidentally poisoned amounted to 92.6% and 7.4% of them happened to have been deliberately poisoned. Considering the frequency of inadvertent poisonings as opposed to deliberate ones, the findings of this project are consistent with the results of studies done in Tabriz (99.4%) [19], Shiraz (90%) [20], Urmia (62.7%) [21], and Ahvaz (93.8%) [22].

The fact that, in this research, poisonings were most prevalent in the age group of children less than 5 years old resonates well with the findings of many similar studies [21, 23-25].

In the present study, the most common complications in the patients as a whole were neurological (43.5%) and gastrointestinal (21.3%) symptoms. Mintegi *et al.* singled out neurological complications as the most prevalent clinical symptoms of poisoning [12]. Assar *et al.* pointed to the loss of consciousness (a neurological complication) as the most frequent clinical symptom [22]. These two studies seem to corroborate the results of the present study. However, in contrast to the present study, Talebian *et al.*'s project yielded that, in the whole sample, gastrointestinal (57.9%) and then neurological (45.3%) symptoms were most prevalent [23]. The present study identified respiratory (47.73%) and then gastrointestinal (45.45%) complications as the most common clinical symptoms of hydrocarbon poisonings, respectively. Talebian *et al.* examined kerosene poisoning and reported that in their research respiratory symptoms stood as the most frequent [23]. Arbabi *et al.*'s study focused on kerosene poisoning as well claimed that respiratory complications were the most prevalent symptoms (72%) in their study [26]. Respiratory distress turned out to be the main symptom of hydrocarbon poisonings (83.3%) in Assar *et al.*'s research report [24]. The results of the present study seem to be in accord with the findings of the three studies cited immediately above. Major references in the field of medicine [27, 28], as well, cite respiratory complications as the most

common symptoms of kerosene poisoning. This might be due to the aspiration of such compounds.

In the current study, neurological (66.67%) and then respiratory complications (11.11%) were the most common symptoms of poisoning by drugs. Jabal Ameli and Izadi investigated clinical symptoms of poisoning by drugs in Isfahan; their findings suggested central nervous system and neurological complications (74.1%) as the most prevalent symptoms followed by MUSE (64.6%) and then respiratory (57%) symptoms [29]. These findings are consistent with the results of the present study. While this study exclusively involved children, Jabal Ameli and Izadi covered all age groups in their research.

The present study indicated that in most of the cases toxins had been orally ingested (86.5%), and this accords with the findings of the studies in Tabriz [19], Shiraz [20], and Ahvaz [22].

In the present study, 77.9% of the admitted patients had been hospitalized for 1 to 2 days. Bataineh and Bataineh reported that 75% of poisoning victims in Saudi Arabia spent one day or less in hospital [30], and in Tabriz, Gharashi *et al.*'s study revealed that 36% of the patients were hospitalized for one day. They also reported that 6% spent less than a day in hospital while 35% stayed in bed for two days [25]. As can be seen, regarding the duration of hospitalization, the results of the above cited studies are consistent with the findings of the present study. The short duration of hospitalizations might be attributed to low intensity of poisonings and timely delivery of victims to medical centers.

## CONCLUSION

Hospital emergency department staff with sufficient knowledge of the toxicity and various training courses can help to prompt and appropriate medical actions to be taken to save the poisoned child if admitted to hospital. It seems important to note that parents' education is always taught as one of the most important ways to prevent and even reduce toxic side effects that have been raised.

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