

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

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Abstract

Background: Information on the pattern of acute poisonings in Birjand hospitals is limited. This study aimed to address this knowledge gap by examining the admissions in a poisoning center in Birjand.

Methods: Medical records of a main poisoning center in Birjand were reviewed for poisoned patients admitted to hospital from September 2017 to August 2018.

Results: During the study period 897 cases of acute poisoning were evaluated. Patients' age ranged from 11 to 97 years, with a high rate of poisonings between 15 and 25 years. A slight female predominance in poisoning cases was observed. Most cases of poisonings occurred in spring, and the common route of exposure was oral (90.7%). High incidence of poisoning occurred in married couples, uneducated patients, and residents of urban areas. Patients with a previous medical history experienced addiction and psychiatric disorders. Intentional poisoning accounted for 49.5% of acute poisoning cases referred to the hospital in the current study. The main groups of toxicants were pharmaceutical products (45.8%), chemicals (13.3%), and narcotics (9.4%). The mean of hospital stay was 2.8 ± 3.0 days, and the final treatment outcome was 66.0% complete recovery. The mortality rate was 0.8%, and most cases of death were due to pesticides poisoning.

Conclusions: Acute poisoning, particularly intentional poisoning, is common in Iran. Due to the high rate of deliberate poisonings, especially in young adults and students, monitoring drugs and distribution and exceptional attention to mental health should be seriously taken into consideration by national health authorities for the prevention of suicide attempts.

Background

Acute poisoning is a significant public health problem and is a frequent reason for referral to emergency departments [1]. Poisonings can be intentional or unintentional [2]. Accidental poisonings remain common causes of intoxication in children. Pediatric unintentional poisonings could be prevented to reduce mortality in childhood. Deliberate self-poisonings occur more frequently in adults as suicide attempts [3]. Unintentional poisonings include food poisoning, chemical and pharmaceutical intoxication, animal bites and pesticides toxicity [4].

Nearly 500,000 people die annually from poisonings worldwide [5]. Poisonings following chemical or pharmaceutical products are a common cause of emergency admission in Iran that makes up to 2.5-5% of all deaths [6]. Various factors influence the pattern of poisonings. Advances in technology, agriculture and pharmacology have led to significant changes in the pattern of poisonings. Household chemicals and prescription drugs are the most common cause of poisoning in developed countries [7]. Analysis of the pattern of poisonings in a specific area will play an essential role in identifying risk factors [8]. Non-drug poisonings are also common in many parts of the world. A variety of poisonings due to organophosphorus compounds, aluminum phosphide, opium, crack, venoms and detergents are among

them [9 10]. Since most poisoning cases are not reported, the exact number of incidences can be higher. Moreover, the incidence of poisoning cases is steadily increasing [11].

The majority of poisonings in Iran are intentional, which occur predominantly in the young population. Moreover, opioids and insecticides are accounted for the most important causes of death [12]. Pattern of poisonings in different parts of the world may differ. Pesticides and snakebite are important causes of poisoning in the region in the East of Africa [13]. Pesticides were mentioned as common source of adults poisoning in south India. Besides, the majority of deaths in children due to plant toxins and paraffin have raised concerns [14]. In 2003, sedative-hypnotic drugs and opioids developed a pattern of acute poisoning in Tehran, Iran. The reported mortality rate was 1.3% [15].

We aimed to assess the epidemiological characteristics of acute poisonings and types of intoxication in all poisoned patients admitted to the Imam Reza hospital in Birjand city, Iran from September 2017 to August 2018.

Patients And Methods

A descriptive cross-sectional study was conducted to investigate the epidemiological pattern of acute poisoning in cases admitted to the Imam Reza Hospital in Birjand city, east of Iran. All referred poisoned patients (897 cases) from September 2017 to August 2018 were enrolled.

The studied variables included age, gender, type of toxicant, route of exposure, cause of intoxication, pharmaceutical product, season, marital status, levels of education, job, location of poisoning, type of access to the poison, the time gap between poison intake and hospitalization, past medical history, treatment duration, and outcome.

Based on the variables mentioned above, a standardized data collection sheet was used. A prepared questionnaire was filled in for each patient to collect demographic characteristics. Gathered data were statistically analyzed using SPSS software version 21. Results were presented as descriptive statistics (frequency distribution, percentage, mean \pm SD) and quantitative analysis. Collected information remained strictly confidential. No names were inputted into the statistical software. Instead a previously assigned medical record number was chosen for each patient. The ethics committee approved the study of Birjand University of Medical Sciences.

Results

During the study period, 897 medical records were evaluated for the incidence of acute poisonings. Age of patients ranged from 11 to 97 years and the majority (413, 46.0%) were between 15 and 25. The frequency distribution of the age of the studied population is shown in Table 1. Among patients 50.5% were female and the rest (49.5%) were male. Most cases of poisonings occurred in spring (31.2%). Cases of poisonings related to the other seasons are as follows: 19.2% in summer, 22.4% in autumn, and 27.2% in winter. Concerning marital status, 43.5% were single and 56.5% were married. The frequency

distribution of jobs in the poisoned population was as below: 55.0% had job, 25.3% were students, 4.7% were soldiers and 15.0% were unemployed. Moreover, 9.9% possessed university degrees while 90.1% did not. Thirty (3.4%) patients were not hospitalized and released from the hospital after a few hours of stay while being under clinical supervision. The mean hospital stay was 2.8 ± 3.0 days and ranged from 1 to 30 days. Most patients (78%) needed less than four days of hospitalization. Patients who referred to the hospital before 3 hours of incidence were 58.4% while 41.6% referred to hospital after 3 hours of poisoning. 74.6% of the patients lived in the city and the rest (25.4%) were in the countryside. The causes of intoxication were as 49.5% deliberate (suicidal), 27.1% unintentional, 0.8% criminal, and 22.6% overdose. The incidence of oral poisoning was 90.7%. The other routes of exposure were ocular (0.3%), respiratory tract (2.3%), and animal bite (6.7%). Most registered poisonings were at home (72.8%), following 7% at work, 0.2% in hospital, and 9.2% in street, while 10.8% were unknown. Type of toxicants is shown in Table 1. 18.2% of patients had a history of opioid addiction and 10.8% had known psychiatric diseases. Full details regarding the frequency distribution of disease history in the studied population are available in Table 2. Two important places where patients had access to medicine or drug were identified as house (34.5%) and pharmacy (17.5). Prescribed or off-label pharmaceuticals included acetaminophen, alprazolam, amoxicillin, chlordiazepoxide, chlorpromazine, clozapine, diazepam, dimenhydrinate, hydroxyzine, ibuprofen, mefenamic acid, methadone, nortriptyline, novafen, oxazepam, phenytoin, and tramadol. The treatment outcome in the studied patients was 66% full recovery, 33.2% partial recovery (with complications), and 0.8% death. In the current study, 7 cases (out of 897) died, in which 4 were female. All except 1 were from urban areas. The route of exposure was oral apart from 1 envenomed case. Most cases of death in our study were due to pesticides poisonings.

Table 1
Description of poisoned patients of Imam Reza Hospital,
Birjand, September 2017 to August 2018 (n = 897)

| Variable | Frequency | Percentage |
|---------------------------|------------------|-------------------|
| <i>Age (years)</i> | | |
| < 15 | 25 | 2.8 |
| 15–25 | 413 | 46.0 |
| 25–35 | 112 | 12.5 |
| 35–45 | 134 | 14.9 |
| 45–55 | 79 | 8.8 |
| > 55 | 134 | 14.9 |
| <i>Gender</i> | | |
| Female | 453 | 50.5 |
| Male | 444 | 49.5 |
| <i>Type of exposure</i> | | |
| Intentional | 444 | 49.5 |
| Accidental | 243 | 27.1 |
| Criminal | 7 | 0.8 |
| Overdose | 203 | 22.6 |
| <i>Route of exposure</i> | | |
| Oral | 814 | 90.7 |
| Ocular | 2 | 0.2 |
| Inhalation | 21 | 2.3 |
| Envenomation | 60 | 6.7 |
| <i>Place of residence</i> | | |
| Urban | 669 | 74.6 |
| Rural | 228 | 25.4 |
| <i>Type of toxicant</i> | | |
| Chemical products | 117 | 13.3 |
| Pharmaceutical products | 403 | 45.8 |

| Variable | Frequency | Percentage |
|-------------------------------|------------------|-------------------|
| Plant toxin | 1 | 0.1 |
| Envenomation | 53 | 6.0 |
| Narcotics | 83 | 9.4 |
| Alcohol | 9 | 1.0 |
| Majoon Birjandi (Cannabinoid) | 28 | 3.2 |
| Pesticides | 47 | 5.3 |
| Unknown | 139 | 15.8 |
| <i>Outcome</i> | | |
| Full recovery | 592 | 66.0 |
| Partial recovery | 298 | 33.2 |
| Death | 7 | 0.8 |
| Total | 897 | 100.0 |

Table 2
Frequency distribution of disease history in studied poisoned patients

| Entry | Disease history | Frequency distribution | Percentage (%) |
|--------------|---|------------------------|----------------|
| 1 | Cardiovascular | 40 | 4.8 |
| 2 | Respiratory | 6 | 0.7 |
| 3 | Renal | 3 | 0.4 |
| 4 | Gastrointestinal | 12 | 1.4 |
| 5 | Psychiatric disorder | 90 | 10.8 |
| 6 | Addiction | 152 | 18.2 |
| 7 | Gastrointestinal + Addiction | 5 | 0.6 |
| 8 | Psychiatric disorder + Addiction | 17 | 2 |
| 9 | Cardiovascular + Addiction | 16 | 1.9 |
| 10 | Respiratory + Addiction | 2 | 0.2 |
| 11 | Gastrointestinal + Addiction + Psychiatric disorder | 1 | 0.1 |
| 12 | Addiction + Other diseases | 3 | 0.4 |
| 13 | Gastrointestinal + Cardiovascular | 2 | 0.2 |
| 14 | Gastrointestinal + Addiction + Other diseases | 1 | 0.1 |
| 15 | Cardiovascular + Addiction + Psychiatric disorder | 1 | 0.1 |
| 16 | Cardiovascular + Addiction + Renal | 1 | 0.1 |
| 17 | Cardiovascular + Addiction + Renal + Other diseases | 1 | 0.1 |
| 18 | Cardiovascular + Renal + Other diseases | 1 | 0.1 |
| 19 | Gastrointestinal + Psychiatric disorder | 1 | 0.1 |
| 20 | Cardiovascular + Psychiatric disorder | 2 | 0.2 |
| 21 | Cardiovascular + Respiratory | 2 | 0.2 |
| 22 | Cardiovascular + Renal | 1 | 0.1 |
| 23 | Cardiovascular + Other diseases | 2 | 0.2 |
| 24 | No previously history | 464 | 55.6 |
| 25 | Unknown | 71 | 7.9 |
| Total | | 897 | 100 |

Discussion

The results showed that most poisonings occurred in spring. This was contrary to the findings of Jalali (2012) study in which most poisonings were in autumn [16]. The reason for this discrepancy might be due to the geographical diversity and incidence of envenomation. Seasonal distribution of poisoning varies among different studies, and the incidence may occur at any time of the year. Most cases of poisoning in Mehrpour (2015) and Shokrzadeh (2018) study were in summer [17, 18]. The results of present study also showed that the rate of poisoning in patients between 15 and 25 years was higher than the other age groups. For this age group, psychological factors are considered as the determinative indicator [19, 20]. Inability to develop coping skills seems to be probable in young adults [21]. This was consistent with the findings of some other studies [22–24]. Based on related studies, findings generally indicate that the highest rate of intoxication occurs in adolescents, tragically happens among the active workforce. Intentional poisonings were the most common cause of intoxication in the current study. We found that deliberate self-poisoning was accounted for half of the patients. A total of 7 patients were criminal cases, of which 5 cases were female, thereby the rate of criminal poisoning was 0.8%. In all of them, the route of exposure was oral. Criminal poisoning was more common in spring, similar to the seasonal distribution for all other patients.

Significant gender differences were not observed in the number of referred poisoning cases to the hospital. A slight female predominance in poisoning cases, similar to our findings, was reported by Lam et al., (2010) [25]. Moreover, the incidence of poisoning cases in married couples was higher than the single population, and this may be contrary to expectations. However, the geographic region seems to be associated with marital status and as a result, there were more married cases of acute poisonings than single ones. Furthermore, intimate partner violence, sexual coercion and age disparity might be the underlying causes of such differences. Findings of studies of Shokrzadeh (2018) [18], Nair and Revi (2015) [26] and Guntheti (2011) [27] confirm the present study in this regard.

Education is deterrent to the incidence of poisoning or suicide. The incidence of poisoning is higher among patients without a college degree than those possessing university education levels. Most patients referred to the hospital in a short time after the incident. Early referral to the hospital revealed its impact as full recovery for 66.0% of the population. In Jalali et al., (2012) study, 65.4% of poisoned patients referred to a hospital less than 3 hours of incidence [16]. During the studied period, 74.6% of patients lived in urban areas and the rest (25.4%) were in rural settings. This can be contributed to urbanization and the point that poisoned residents in the cities are quickly or more frequently referred to a hospital. De Silva and Ratnayake (2008) also showed that drug poisonings were higher in urban areas [28]. Employment rates among poisoned patients found to be 55.0% in our study. Noticeably, poisonings rate was high in students (25.3%). The impact of romance issues, weak social connections and inability to use coping skills are probably the causes of intoxication in students who lie in adolescents and youth age range. Another study showed that students tend to attempt self-poisoning with pharmaceutical agents. In this study, the most common reason for the suicide attempt was family conflict followed by romantic issues, and the most common psychiatric disorders among students who attempt suicide were

adjustment disorder and major depression [29]. The matter of intoxication in students should be seriously taken into consideration.

Toxicity among most cases in our study was related to pharmaceutical products (45.8%) which were administered orally (90.7%) at home (72.8%). More medication supervision should be performed to prevent easy access to drugs and decrease poisoning and overdose. The matter becomes more important when it is understood that home and pharmacy access were more common among the patients. Another study evaluated epidemiology and agents of poisoning in poisoned patients admitted to the referral intensive care unit in Birjand and found that pharmaceutical medication, opioids, and pesticides were the most common exposures [30]. Shokrzadeh et al., (2018) [18], also showed that poisoning cases were due to drug overdose. In Shokrzadeh et al., (2018) study, 227 out of 800 cases of hospitalized poisonings were related to non-pharmaceutical products [18]. Based on our findings, half of the patients had no previous history of diseases. Among patients with a previous medical history, addiction was the most common. Although opioid poisoning accounts for only 9.4% of all cases, the number of poisoned patients with a history of drug abuse is not small. Several studies in different regions of Iran showed that the most common type of toxicants were due to narcotics. For instance, Farzaneh et al., (2016) in Ardabil (northwest of Iran) [31], Afzali et al., (2008) in Hamedan (western of Iran) [6] and Ayatollahi et al., (2011) in Yazd (central of Iran) [32] showed drug abuse as the most common cause of acute intoxication. Iran is heavily involved in opioids abuse as either medication or non-medication. This mainly is due to shared border with Afghanistan [33]. Hassanian-Moghaddam et al., (2014) found that opium and methadone were the most common drugs of abuse in acute adults' poisonings in Tehran. Narcotics toxicity contributed to 24.7% of deaths [34]. Apart from narcotics, some studies reported benzodiazepines, tricyclic antidepressants [30], psychoactive drugs [35], antiepileptics and sedative-hypnotics [34] as the leading agent of poisonings. Vallersnes et al., (2015) reported that benzodiazepines and paracetamol were the leading cause of toxicity among poisoned patients [36]. Following addiction, psychiatric disorders were common in our findings. Dragisic et al., (2015), found that psychiatric history and addiction were the most common amongst patients committed suicide [37]. Senanayake and Karalliedde (1988) showed that intentional poisonings in cases between 11–30 years old in Serilanka happened in people with a history of psychiatric disorder [38].

The majority of patients required less than four days of treatment. The duration of hospitalization varied in different studies. Sing and Aacharya (2007) reported that hospital stay was 1–16 days [22]. Nair and Revi (2015) reported that mean of hospitalization period was 5.5 days [26]. Abubakar et al, (2014) showed that the duration of hospitalization for poisoning cases ranged from 1–41 days [39]. While mortality rate in our study was 0.8%, death rate in some other studies were 0.3% [16], 1.3% [24], 7.8% [38], 4.2 [26], and 16% [37].

Conclusions

High poisonings rate in students should be seriously taken into consideration. Toxicity, among most cases in our study, was related to pharmaceutical products taken orally and more common at home. This

demands rigorous monitoring of drugs and other toxicants distribution. High percentages of deliberate poisonings especially in young adults are a medical and social problem. There is a need for special attention to mental health for the prevention of suicide attempts. Early referral to the hospital and receiving appropriate supportive care resulted in a high rate of complete recovery.

Declarations

Ethics approval and consent to participate: Ethical issues of this study have been approved by the ethics committee of Birjand University of Medical Sciences (IR.BUMS.REC.1396.143).

Consent for publication: Not applicable

Authors' contributions: KN, ZK and OM designed the study and collaborated in analysis, ZSS collaborated in data processing and analysis, MS wrote the manuscript, KN reviewed and edited the manuscript, and MS prepared the final version of manuscript for submission.

Conflict of interest disclosure: The authors declare that they have no conflict of interest.

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Availability of data and materials: The datasets used and analyzed in the current study are available on request.

Competing interests: The authors declare that they have no competing interests.

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