

## Epidemiology of Poisonings in Shahid Beheshti Hospital in Kashan, Iran

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### ABSTRACT

**Background:** Poisoning is a major public health problem and is one of the most common causes of referral to emergency departments. The aim of this study was to evaluate and define clinical and demographic details of poisoned patients who were admitted to Shahid Beheshti Hospital, Kashan, Iran in 2010.

**Methods:** In this descriptive-analytical and retrospective study, necessary data were collected from medical records of admitted poisoned patients and were evaluated prospectively and statistically analyzed and presented in the form of tables and graphs.

**Results:** Of 163 poisoned patients in this study, 47.6% were females and 52.4% were male. 88% of patients were from urban areas and the rest from rural areas. The most common reason of poisoning was suicide 50.6%, while 38.1% were accidental, and 11.3% had a variety of different reasons. Age group of 0-10 years was the most predominant affected group with 26.8% poisoned patients. The most common poisoning agents were clonazepam, acetaminophen, diazepam and methadone. Four patients in the study population died (2.4%).

**Conclusion:** The medications are the leading causes of poisoning, especially in children. Therefore, parents are advised to keep the medicines correctly, out of sight and reach of children, read the label carefully; learn about their safety and the right way of their use. It is also recommended to immediately dispatch the poisoned child to the emergency department. Giving the crucial information about the poisoning to help the medical staff to treat the child effectively and quickly, reduce the hospitalization period, and possibility of child death.

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## 1. Introduction:

Poisoning is a major public health problem and one of the most common causes of visits to emergency departments and an important cause of mortality in many countries. In the United States, more than two million poisoned patients have been recorded annually (1, 2). Due to a lack of a correct system for recording poisoned people, it is believed that the number of cases of poisoning is more than that recorded in many countries. The general patterns of poisoning vary among the developing countries. In the Asia, the cause of poisoning may be affected by social, economical and cultural conditions, including the religious beliefs (3- 5). The most prevalent cause of poisoning in adults in developing countries is intentional poisoning (6). The prevalence of suicide has the highest rates among the intentional poisoning (7). Suicide occurs mostly by swallowing lethal agents or breathing lethal gases (8).

Amongst common causes of accidental poisoning are lack of appropriate labeling on chemical containers or misinterpreting them, and also unsuitable classification of these agents at the workplace, and therefore inappropriate use of these agents.

In addition to chemicals, medicines play an important role in accidental poisoning. Errors due to incorrect dose adjustment by nurses, pharmacists, physicians, parents or elderly patients are the most related causes of accidental poisoning, which mostly occurs in children under the age of six (9). Studies have shown that medicines are the third leading cause of poisoning and death among those aged 35- 45 years (10). In the Western Europe and North America, the leading cause of poisoning is household medicines, while in the developing countries, paraffin, snake bites, traditional medicines and insect stings are the major causes of poisoning. A study in Turkey during 2000 showed that

36.5% of total poisoning cases were accidental, while 63.5% involved poisoning with suicidal intent (11).

In the United States of America from 1977 to 1981, 954 poisoning outbreaks have been recorded, all of which were caused due to the consumption of contaminated food. Unfortunately, in third world countries and even in many European countries, accurate records of poisoning outbreaks, their types and resulted diseases due to contaminated food consumption are not available (12). In Germany, 48% of poisoned cases are accidental due to heroin, alcohol and herbal material misuse (13).

In a study on 1751 patients admitted because of poisoning to four hospitals in the Mazandran province in north of Iran from 1997 to 2000, 55.5% were female and 45.5% were male. Mortality in males was more than in females, and the highest rate of poisoning occurred between the ages of 16 to 25 years of age. Most of the poisonings were accidental or occupational and the most common causes of poisoning were drugs, aluminum phosphate, lead, pesticides, petroleum and ethanol. However, the causes of poisoning were different in different parts of Iran.

As an example, in Tehran, Mashhad and Babol, poisoning with sedatives was high, while in Gilan in the north of Iran poisoning with pesticides and chemical fertilizers was high. As a result of different culture, religion and personal beliefs, the patterns and the outbreaks of poisoning in Iran are different from rest of the world.

Because recognition of poisoning causes and evaluation of related factors in each region are important for designing a prevention plan, this study was conducted for determining epidemiology of poisonings in poisoned patients who visited Shahid Beheshti hospital in Kashan in 2010.

## 2. Materials and Methods:

This is a descriptive-analytical and retrospective study of cases in 2010. The necessary information was collected from the records of all poisoned patients admitted to the emergency department of Shahid Beheshti hospital of Kashan (center of Iran).

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Complete information has been collected from patient files and re-written in the relevant questionnaire form including various items such as name, sex, age, occupation, type of medicine used, reason, type of poisoning and its symptoms. Processing, analysis and display of collected data has been done by use of Excel spreadsheet software.

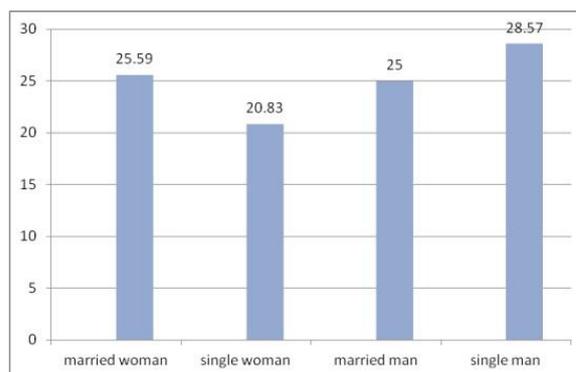
### 3. Results:

Of 163 poisoned patients in this study, 47.6% were females and 52.4% were male. 88% of patients were from urban areas and the rest from rural areas. The most common reason of poisoning was suicide (50.6%), while 38.1% were accidental, and 11.3% had a variety of different reasons. The most common poisoning agents were clonazepam, acetaminophen, diazepam and methadone. Four patients in the study population died (2.4%).

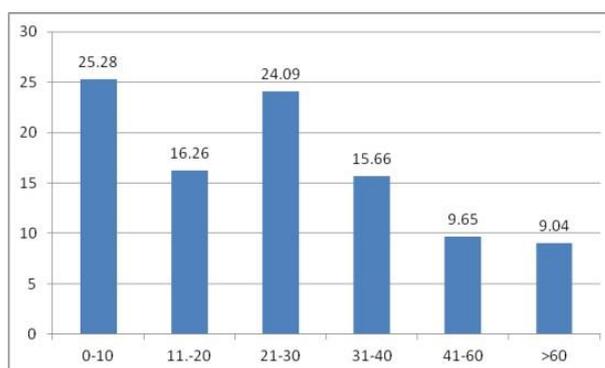
Results indicate that poisoning was 52.4% in males and 47.6% in females. Based on marital status, poisoning frequency was (25.6%) in married women and 25% in married men, whereas it was 28.6% and 20.8% in single men and single women respectively (Fig. 1). In this study, the most cases of poisoning (25.3%) were in an age group of 0-10 year. In contrast, least poisoning took place in the age group above 60 years (9.0%) (Fig. 2).

88.1% of the patients admitted to hospital were from urban areas whereas only 11.9% were from rural area. There was a significant difference between type of poisoning and their places of living (Fig. 3). Approximately 29.2% of poisoned patients had a history of admission to hospital while 70.8% had not (Fig. 4). 24.8% of patients were hospitalized for less than one day, 20.6% for one day, 7.4% for four days or more (Fig. 5). Most patients discharged themselves from hospital (Fig. 9). The majority of patients have been admitted to hospital and stayed for one night or more (Fig. 10).

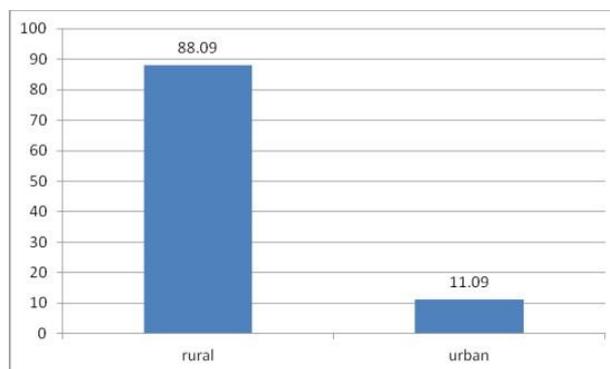
The rate of poisoning in spring was 36.9% which was more than other seasons (Fig. 6). In this study, the leading causes of poisoning were suicide (50.6%), accident (38.1%),



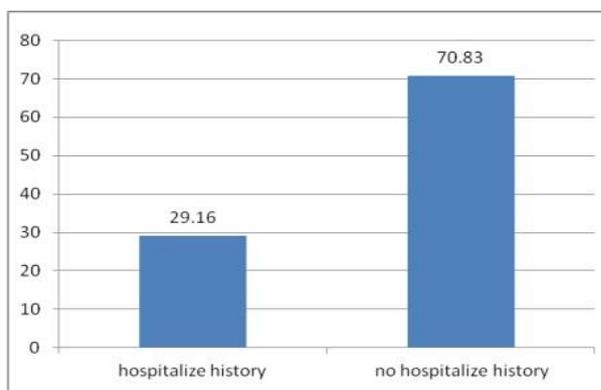
**Fig. 1.** Poisoning distribution according to marital status.



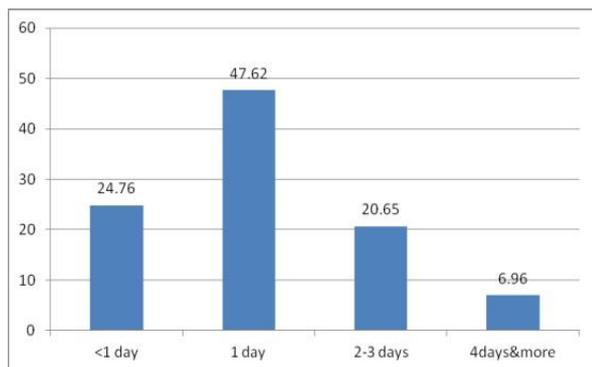
**Fig. 2.** Age distribution of poisoned patients admitted to hospital.



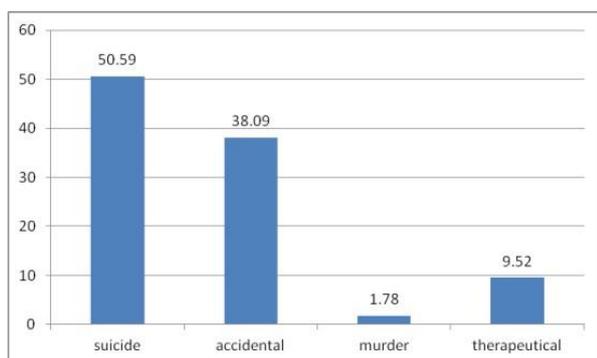
**Fig. 3.** Poisoning distribution according to residency place (urban or rural).



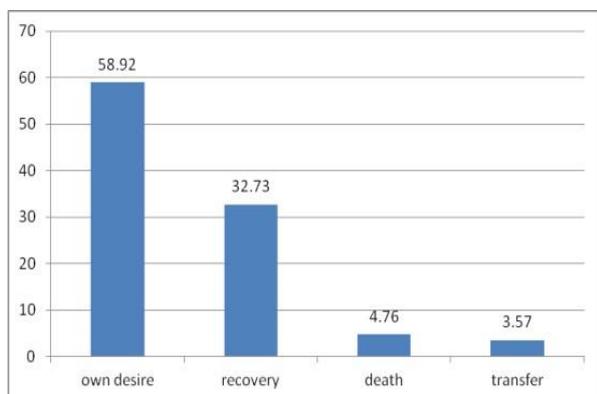
**Fig. 4.** Poisoning distribution according to patients' history of medical hospitalization.



**Fig. 5.** Poisoning distribution according to length of hospitalization.



**Fig. 7.** Poisoning distribution according to poisoning causes.

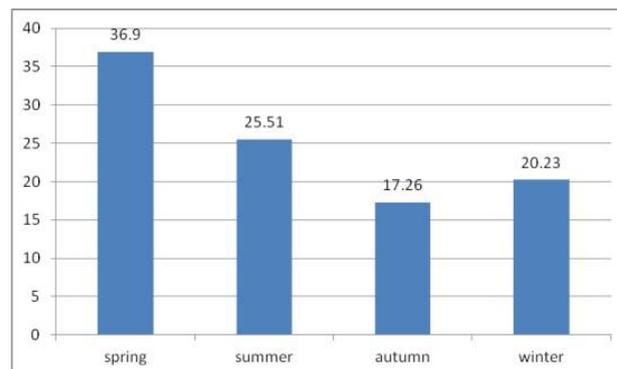


**Fig. 9.** Poisoning distribution according to discharge statuses.

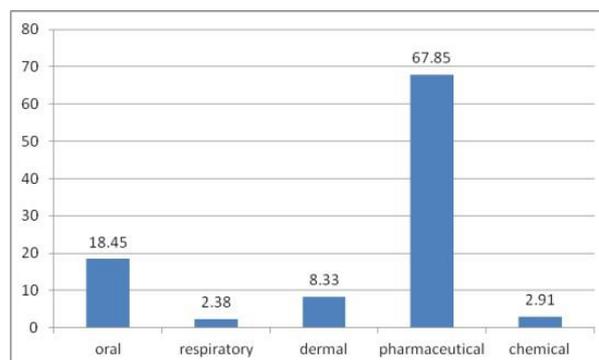
medications (9.5%) and homicide (1.8%) (Fig. 7). Types of poisoning in order of prevalence were 67.8% medicinal, 18.4% gastrointestinal, 8.3% dermal, 2.9% chemical and 2.4% respiratory (Fig. 8).

The most common medications causing poisoning were psycho-active medicines such as sedatives and tranquilizers (15 cases), antibiotics and vitamins (5 cases) and cardiovascular medicines (3 cases).

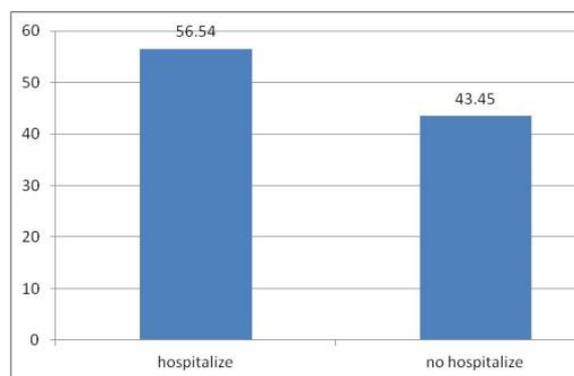
The leading individual medications were clonazepam, acetaminophen, diazepam, alprazolam and methadone, followed by



**Fig. 6.** Poisoning distribution according to season of hospital admission.



**Fig. 8.** Poisoning distribution according to type of poisoning.



**Fig. 10.** Poisoning distribution according to hospital status (inpatient or outpatient).

other medications like tramadol, ibuprofen, carbamazepine, warfarin, valproic acid, lorazepam and oxazepam.

The leading causes of respiratory poisoning were carbon monoxide (3 cases) and detergent components. The leading causes of gastrointestinal poisoning were narcotic derivatives (10 cases), expired foods (7 cases), toxic plants (5 cases), rodenticides (mouse killer) (5 cases) and acids or alcohol (3 cases). The leading causes of dermal poisoning were insect bites (9 cases), snakebite and scorpion stings (4 cases). Most

common poisoning symptoms were: lower level of consciousness, nausea or vomiting, drowsiness followed by other symptoms such as dizziness, severe coughs, difficulty breathing, seizure and burning sensation during urination. There are also some rare symptoms such as swelling, abdominal pain, diarrhea, locking jaws and coma.

#### 4. Discussion:

Poisoning is common public health problem and one of the main considerations of health care system. In 2010, from the 163 admitted poisoned patients to the hospital, there were similar numbers of males and females. This survey showed that more than 50% of cases had suicide motivation and were attempts at self-poisoning. In one study of poisoning cases in Urmia city (center of west Azarbaijan province in northwest of Iran), 86% were suicide (15). This result revealed that rate of suicide in Kashan city is much lower than Urmia. At the present time, the suicide rate is higher than other type of poisoning in Iran. The reduction in the standard level of socio-economic life may be a reason for this increasing rate through the country.

The most important reasons for occurrence of this event among the youths can be social relationship such as improper family relations, lack of social success and physical changes along with puberty. In our study, poisoning in male was slightly higher. In 1999, Ozkose reported that, the rate of poisoning in Turkish women was higher than men (16) which were not in agreement with our results. It is possible that the conditions of Turkish life, their different living place, the time of survey and cultural differences be the main affecting reasons for this dissimilarity.

In this study, the medications most commonly involved in intentional and accidental poisoning were clonazepam, acetaminophen, diazepam, alprazolam and methadone followed by tramadol, ibuprofen, carbamazepine, warfarin, valproic acid, lorazepam and oxazepam. However, based on studies which conducted in Turkey, the main medication poisoning was alcohol,

antidepressants, sedatives, antibiotics, cardiovascular drugs, carbon monoxide, poisoning foods, detergents and pesticides (17). It seems they are easily available to use to commit suicide.

In one report from China, 19% of poisoning events were due to carbon monoxide (18). Warm weather of Kashan during the year leading to less use of burner heat which it could be main reason for lower rate of carbon monoxide poisoning.

It was observed from different poisoning types and their causes that availability of these agents for easy consumption is the main and key factor in occurrence of poisoning.

It should be noted that there were considerable differences between the rates of intentional or accidental poisoning in our study with other countries. The reason is that of socio-economic pressure on people. On the other hand, people with low socioeconomic status are more likely to develop emotion for intentional poisoning.

In this study, a meaningful correlation was observed between the place of residency and the possibility of poisoning. The rate of intentional poisoning among the residents of Kashan city was higher than those living in its countryside. It seems that, the people who lived in the urban areas had more poisoning accidents than people of rural areas. In general, consumption of medicines, especially psychiatric medications in urban areas is higher than rural areas. This is may be due to complications of life and higher level of the socioeconomic problems in urban areas than rural areas. In addition, rural people have high endurance and patience and live simply (13). Several reports have indicated that reduction of awareness level and gastrointestinal disorders such as nausea, vomiting, diarrhea and abdominal cramps are the most predominant signs of poisoning (19).

This study showed that the most prevalence of poisoning (26.78%) took place in children under 10 years old, mostly by accident or mistake. The main cause of poisoning was "Soul drugs battalion" of parents which were available for children. It was mentioned in

several that the most poisoning incidents have been occurred in low age children, especially in age of 0 to 10 which were unintentionally poisoned (11).

There are several factors which can play an important role in preventing children poisoning including: parents' training, their awareness of drugs' effects and their potential to harm, production of well-built cover and quality package for drugs, storage out of the reach of children, and also suitable labels with presented serious warning (12).

According to this study the most prevalence of poisoning was in the spring and then summer, which can be due to the use of more pesticide, effect of high temperature on foods (food poisoning), increase of insects and snakes (envenomation) and high prevalence of agricultural spraying in these seasons. This was in agreement with a study in Gorgan city (10).

The number of deaths in this study was 4, which was due to illegal drug overdoses. In contrast, the greatest mortality rate in USA was due to poisoning with anti-depressants, cardiovascular medicines and alcohol (14).

### 5. Conclusion:

All chemical agents have potential to harm due to their poisonous effect, therefore their application in medicine, agriculture, industry and residential environment should be supervised, controlled or restricted, because improper use of these agents has led to such problems. The true suicidal cases are the psychological state of the patients; simple and routine treatment is not sufficient and need to treat the root cause of problem. In the case of accidental poisoning in children and elderly, use of the guardians is suggested. It seems that different factors in different societies are the cause of poisonings; therefore the logical solution for prevention of poisonings in every society should be based on their social and cultural context.

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