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Research Paper

Epidemiologic profile of deaths due to drug and chemical poisoning in patients referred to Baharloo Hospital of Tehran, 2011 to 2014

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ABSTRACT

Background: In developing countries with high mortality rates, poisoning is one of the most common causes of admission to emergency rooms. To minimize future deaths related to poisoning, the epidemiological profile of deceased individuals is essential.

Methods: The medical records of all dead patients due to poisoning during 2011–2014 in Baharloo Hospital, Tehran, were evaluated. Exclusion criteria include: incomplete records, unknown causes of death, and persons less than 6 years of age. Data analysis was done by means of SPSS at the significance level of $P < 0.05$.

Results: The study included 184 males and 65 females. The mean age range was 37.65 ± 16.78 years. The highest mortality rate was seen in the age range of 21–30 years (30.5%). The most common cause of poisoning was aluminum phosphide (101 cases). The average time of hospitalization was 3.61 days. Most deaths occurred during the first 10 days of admission with intentional poisoning being the most common type (81.5%).

Conclusion: The outcome of this study indicates that the main cause of death among young people is intentional poisoning with AIP. This study proves that a greater focus when diagnosing mental health patients, as well as an increase in restrictions when accessing lethal drugs and toxins, is crucial.

1. Introduction

Many people are admitted into emergency rooms each year due to various types of poisoning. Reports show that a large number of these patients cannot be saved[1–3]. According to World Health Organization's (WHO) Global Burden of Disease Study in 2010, 180,000 deaths due to poisoning have been estimated[4]. Currently, WHO estimates that 0.3 million people die every day because of various poisonings[5]

The most common causes of poisonings are drug and chemical related. Between the two, drug poisoning is the most common.[6–9] Similar data can be seen in Iran.[10–12] A study focusing on the prevalence of poisoning in Iran, between 2004 and 2013, demonstrated an increase in poisoning with time, and most patients being young in age[13] Suicidal toxins vary from region to region. In many countries, various studies have been done about drug types and poisons along with their symptoms, complications, and mortality rates in high risk and deceased patients. These studies also offer suggestions for proper patient care. In comparison with other countries, drugs are easily accessible in Iran; therefore, the first and most fundamental step in reducing and preventing deaths caused by poisoning is to study the current condition and work towards minimizing easy access to drugs. The goal of this study was to determine the epidemiological profile of mortality, due to drug and other chemical poisons. This study was conducted in one of the toxicological referral centers of Tehran, Baharlo Hospital, during a three-year period.

2. Materials and methods

In this cross-sectional study, clinical records in hospital files of all patients who died due to drug poisoning and were being treated at Baharlo Hospital, from April 2011 to April 2014, were researched.

Demographic data included the following: age, sex, season, and place of admission, occupation, and education, vital signs of the patient at time of visit, level of consciousness, hospitalization, and repeat drug

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users. This information was extracted from patient files and entered into pre-designed forms. Types of medications, as well as dosage amounts being administered to these patients, were determined through personal statements from patients and their companions. In scenarios where either party was uncertain, laboratory tests in his or her hospital files were used.

This study was limited to patients who were exposed to toxic chemicals or patients who died due to drug poisoning. Exclusion criteria included the following: an age of less than 6 years, incomplete case information, patients who died before these necessary procedures and those with uncertain drug types and dosage amounts.

To describe the data, mean and standard deviation were used for quantitative variables and frequency and percentage for qualitative variables. To analyze the data, the Chi-Square Test was used for qualitative variables and T-Test for quantitative variables. Data was analyzed by SPSS software.

3. Results

In this study, 249 qualified drug poisoned patients were studied for a three-year time span. The average age of the death was 37.65 ± 16.78 (with the lowest being 6 years and the highest being 89 years). 184 men, with an average age of 38.98 ± 16.26, and 65 women, with an average age of 33.93 ± 17.88, were studied.The most frequency of death had been occurred in male 184(73.89%), during the summer season 82(32.93%), and the most cases 223(89.6%) had hospital admission < 10 days, other descriptive results has been shown in Table 1.

The average length of hospital stay was 3.61 days, with the shortest length being less than a day and the longest being 43 days. The highest mortality rate was found in 223 (89.6%) patients who had stayed in the hospital for less than 10 days and there was a significant relationship between the length of hospital stay and the mortality (p-value = 0.013). Table 1 shows the Glasgow Coma Score (GCS). 106 patients had a GCS of 3–8, 42 patients had a GCS of 9–12, and 87 patients had a GCS of 13–15, statistically significant difference between groups was not found (p-value = 0.2). The majority cases of poisonings (81.5%) were found to be intentional, and the other 18.07% were accidental. The most cause of death in both genders was Rice Tablet 101(40.6%). And second one the cause of poisoning and death in males and females was related to Opium 70(28.1%). Overall in this study there was a statistically significant difference between the cause of poisoning and mortality (p-value < 0.001), more information has shown in Table 2. In this study, vital signs were recorded when patients were first admitted into the hospital. The results were the following: 117 (47%) patients had normal blood pressure, 102 patients (41%) had hypotension, 57 patients (22.9%) had a normal heart rate, and 34 patients (13.7%) had tachycardia (Table 3).

Patients poisoned with anticonvulsants, hydrochloric acid, methanol, carbon dioxide, and acetaminophen had a normal heart rate. Patients poisoned with tricyclic antidepressants, tramadol, and acidic substances were found to have tachycardia and normal rate in the same percentages. Tachycardia was seen in stimulants similar to amphetamines and marijuana. Time of death was recorded as the following: 83 people died between the hours of 0800–1600, 99 people died between the hours of 1600–2400, and 61 people died between the hours of 2400 to 0800. There was no significant relationship among the different times of death in this study (P-value = 0.2).

Table 1
Frequency (absolute or relative) of Death according to different variables.

	Total (n = 249)	p-value
Age, Mean (SD)	37.65 ± 16.78	
Sex, No. (%)		
Male	184(73.89%)	0.021
Women	65(26.10%)	
Season		
Spring	51(20.48%)	0.1
Autumn	82(32.93%)	
Summer	56(22.48%)	
Winter	60(24.09%)	
Days of Hospitalization		
< 10	223(89.6%)	0.013
10–19	17(6.8%)	
20–30	9(3.6%)	
Glasgow Coma Scale		
3–8	106(42.6%)	0.2
9–12	42(16.9%)	
13–15	87(35.3%)	
Hospital Location		
Emergency Rooms	87(34.9%)	0.08
ICU	162(65.1%)	
Cause of Poisoning		
Intentional (suicide)	203(81.5%)	0.019
Accidental(economic, cultural)	45(18.07%)	
Unknown	1(0.004%)	

Table 2
The distribution cause of death according to different factors.

Cause of poisoning and death	Male	Female	Total
Uncertain	23(88.5%)	3(11.5%)	26(10.4%)
Rice Tablet	66(65.3%)	35(34.7%)	101(40.6%)
Opium	62(88.6%)	8(11.4%)	70(28.1%)
TCA	2(50%)	2(50%)	4(1.6%)
Anticonvulsants	1(33.3%)	2(66.7%)	3(1.2%)
Tramadol	8(72.7%)	3(27.3%)	11(4.4%)
Essential Oil	0(0)	2(100%)	2(0.8%)
Methanol	7(100%)	0(0)	7(2.8%)
Multiple Drug Toxicity	3(50%)	3(50%)	6(2.4%)
Toxicity of Carbon Monoxide	1(50%)	1(50%)	2(0.8%)
Acetaminophen	1(100%)	0(0)	1(0.4%)
Acidic Substances	2(66.7%)	1(33.3%)	3(1.2%)
Stimulants	8(80%)	2(20%)	10(4.01%)
Insecticides (Endosulfan)	0(0)	1(100%)	1(0.4%)
Cardiovascular Medicines	0(0)	21(100%)	2(0.8%)
Total	184(73.9%)	65(26.1%)	249(100%)

4. Discussion

The poisoning is the important cause of death in the world. The results of various studies have shown that the poisoning is the third cause of death[14,15]. This study shows the epidemiologic pattern of poisoning in Iran. There are very few studies that have shown the epidemiological status of poisoning in the country. One of the most important results of this study is that most people died from intentional poisoning and that drugs have been the main cause. The etiology of approximately 81% of deaths in this study was intentional. This result is similar to other reports. in the Sugarzadeh study, it has been shown that 77.1% of poisoned people were poisoned intentionally[12] also Various studies in Iran have shown that drug poisoning and intentionally

Table 3
The frequency of most prevalent signs of poisoning in under study cases.

Signs	Frequency	Percent
Blood Pressure		
Hypertension	5	2.0%
Normal	117	47.0%
Hypotension	102	41.0%
Unknown	25	10.0%
Total	249	100.0%
Heart Rate		
Bradycardia < 60	7	2.8%
Normal (60–100)	57	22.9%
Tachycardia > 100	34	13.7%
Unknown	151	60.6%

poisoning are the most important causes of poisoning in the country[10,16–18] The average age at the time of death, as a result of drug and chemical poisoning, is approximately 37 years old. It can be seen that more deaths occur in middle-aged patients. The average reported age for poisoning patients varies from one study to another, a study shows that the average age of poisoned patients in Iran is approximately 27 years.[19] While other studies have shown that poisoning occurs in younger and middle-aged age groups,[13,19,20] It appears that cultural problems and economic status of young people in the country have caused them to commit suicide. Therefore, psychosocial interventions and life skills development can be very helpful to reduce suicide in young people.

This study shows that the highest mortality rate in poisoned patients occurred in males. Based on sex, death from rice, opium, tramadol, and methanol was higher in men than in women. In this study, there was a meaningful relationship between gender and death in poisoned patients.

The results between gender and poisoning are different in other studies. Some studies have shown that poisoning rates are higher in men,[20–24] but the rate of poisoning in men and women varies from one study to the next. Many studies have also shown that the death rate from poisoning is higher in women than men [13]Additionally, the rate of intentional suicide is higher in women[25,26] The consumption of drugs, such as opium, tramadol and alcoholic beverages, are lower in women than in men. This is because of the Iranian culture and the beliefs of its people. Deaths caused by these substances are more often a result of misuse (overdose).

Aluminum phosphide (AlP) that in Persian called rice tablet, commonly used pesticide,[27] especially against insects.[28] In Iran due to availability and inexpensiveness, It is used to deal with rice pests But easy access and high use of this substance have increased the toxicity of it in Iran.[29]

In this study, it was determined that rice tablets play an important role poisoning and related death in Iranian people.To reduce mortality, there is an urgent need for rapid action by authorities to collect rice tablets from herb shops, to prohibit its entry and sales, and to notify the public properly in regards to how dangerous rice tablets can be when misused. If the above actions are taken based on this study, mortality can be reduced by up to 50%. Hospitalization of patients poisoned, along with the lethal substances used, in the ICU and greater than or equal to that of the emergency room. Based on these results, poisoned patients need special attention, especially during the first few days of admission. Because of drug metabolism, drug elimination from body, and drug half-life, this problem is reasonable. By conducting specialized therapeutic interventions or referring these patients to specialist centers in the early hours of being poisoned, controlling the majority of deaths is possible. One of the main limitations of this study is that some of the variables that may affect the pattern of death are not measured. For example, marital status, socio-economic status, social isolation, housing, education and occupation can be variables related to death from poisoning which was not evaluated in this study. This study only serves to show a pattern of death due to poisoning. Additional factors and variables affecting these deaths will need to be observed and accounted for in future studies. Also considering all age groups, including those under the age of 6, can be useful in future studies. One strength of this study is that it was conducted on patients who were referred to Baharlo Hospital in Tehran, which has its own toxicological department; therefore, those who entered this study represent the entirety of poisoned people in Tehran.

5. Conclusion

In this study, it was found that most deaths caused by poisoning are related to opium and rice tablets. Early prevention, as well as informing and educating people, can be very helpful. high prevalent of mortality followed by drug poisoning at a young age (especially intentional) and the determination of the mortality rate by type of drugs and chemical substances Most deaths occurred among young people and men. These two groups of people are more likely to be at risk for intentional poisoning which leads to death, and it is necessary that health officials pay more attention to them and come up with better interventions for them.

Conflicts of interest statement

The authors declare that there is no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jflm.2019.02.009.

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