



Investigation of Poisoning Prevalence and its Related Factors in Patients Referred to Farsan's Hospital During 2018-2019, Iran

Majid Kabiri^{ID}, Seyede Mahboobe Hosseini^{ID}, Farshid Veisi^{ID}, Seifollah Mortezaei^{ID}, Ali Ahmadi^{ID}, Zeinab Agashteh^{ID}, Setare Fazel^{ID}

Clinical Research Development Unit, Ayatollah Kashani Hospital, Shahrekord University of Medical Sciences, Shahrekord, Iran

Abstract

Background and aims: Poisoning is one of the main medical emergencies that is divided into intentional and unintentional types. According to previous records on poisoning attributed to Farsan's hospital, Iran, the current study focused on investigating its prevalence, type, and poisonous agent.

Methods: In the descriptive-analytical cross-sectional study, the registered data of 557 poisoned patients during 2018-2019 were used by a consensus method. Age, gender, residence, type, and agent of poisoning and hospitalization were employed as explanatory variables. Data were extracted from medical records and entered into the standard checklist. Descriptive statistics such as frequency, percentage, mean, and standard deviation were applied for data analysis. Finally, the chi-square test and independent *t* test were used to analyze variables in SPSS 22.0.

Results: Among a total of 557 poisoning cases, 70% were intentional, 52.1% were related to males, 66% lived in cities, 38.2% were in the age group of 16-30 years, and 58% were associated with drug and opioid use. In addition, 31.4% occurred in spring and about 85% of them were discharged in 2 days. The poisonous agent was different between genders ($P \leq 0.001$). Intentional poisoning was more prevalent in youth compared to the elderly and children. Further, poisonous agents demonstrated a significant difference according to the poisoning type, as in intentional poisoning opioids, drugs, and toxins had been used more than the other agents ($P \leq 0.001$).

Conclusion: In this study, most poisoning cases were intentional, related to males and young individuals, and those residing in cities, and occurred via opioids and drugs. Therefore, it is suggested that more comprehensive studies should be conducted about the cultural and socioeconomic status of vulnerable groups and provide them with appropriate training and attention.

Keywords: Poisoning, Intentional, Poisonous Agent, Farsan

*Corresponding Author:

Seyede Mahboobe Hosseini,
Clinical Research Development
Unit, Ayatollah Kashani
Hospital, Shahrekord
University of Medical Sciences,
Shahrekord, Iran
Tel: 09133801541,
Email: mahboobehosseini42@
gmail.com

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Introduction

Poisoning is a major medical emergency and a common cause of death and infection in any part of the world. Many people suffer from a wide range of problems due to poisoning, from mild illness to hospitalization in intensive care units (ICUs) and death that imposes a massive economic, physical, and psychological load on the individual, family, and society.¹ Despite health programs and higher public awareness, poisoning is still a common medical problem and the cause of 15-20% of visits to the emergency departments of hospitals and medical centers according to the previous research.² It was estimated that more than half a million people die from poisoning every year in the world.³ Intentional drugs use is also a significant health problem in the Asia-Pacific region with about 300 000 deaths per year.⁴ In Iran, the majority of poisoning was reported to be intentional, mainly at the ages of 21-30 years. Furthermore, the death rate from poisoning was reported at 8 per 1000 patients in general

hospital wards and 109 per thousand patients in the ICU, the most important causes of which were drugs and pesticides.⁵

In general, the prevalence of poisonings is increasing due to changes in their patterns and nature in developed and developing countries, including Iran.⁶ The clinical model of patients with severe poisoning varies from one place to another. In developed countries, access to drugs has led to a significant increase in the reception of patients with drug poisoning in medical centers. In developing countries, the incidence of pesticide poisoning has dramatically increased in recent decades, with a significant share of poisoning deaths despite access to intensive care facilities.⁷ In Iran, the most important poisonous agents are hydrocarbon compounds, carbon monoxide, opioids, drugs and psychiatrists, poisonous food, mushroom, and poisonous plants, the bite of toxic animals, pesticides, and heavy metals such as mercury and lead.⁸

In one categorization, poisoning is divided into

pharmaceutical and non-pharmaceutical types.² The most important pharmaceutical agents include painkillers, sedatives, anti-jussive and anti-cold, anti-depressants, stimulants, psychiatric drugs, alcohol, hypnotics, and cardiovascular drugs.^{9,10} On the other hand, non-pharmaceutical poisoning is also common, which includes a wide range of organophosphorus toxins, aluminum phosphide, opioids, poisonous plants, detergents, poisonous foods, venoms, gases, and carbon monoxide, hydrocarbon compounds, and the like.^{11,12}

From another perspective, poisoning can be divided into two intentional and unintentional categories. Intentional poisoning is defined as the arbitrary use of large amounts of poisonous agents to harm himself; it is an important health problem in many countries and includes suicide, suicide attempts, and self-harming behaviors.¹³⁻¹⁵

The intentional poisoning reasons are usually multifactorial and include biological, psychological, and social factors. Important factors having a significant impact on adolescence and youth include psychiatric and personality disorders, alcohol and opioids abuse, favorable social factors, including premature loss of parents for any reason (orphan or divorce), parental negligence, and sexual abuse experience. Moreover, the other factors are chronic economic and social problems, improper physical hygiene, physical illnesses, social accelerating factors, and stressful life issues. Hence, the most common age for intentional poisoning is 15-40.¹⁶ The severity of poisoning in adults is normally acute and is often caused by an overdose of oral medications, opioid and psychiatric drug abuse, and environmental, industrial, and agricultural factors.^{17,18}

Unintentional poisoning is a situation in which a person becomes intoxicated without the intention to harm himself for reasons such as opioid abuse or overdose of drugs in an incorrect way.¹⁹

According to the Global Burden of Disease project of the World Health Organization, an estimated 345 814 people of all ages died worldwide due to accidental poisoning in 2014. Although most of these unintentional poisonings were observed among adults, 13% occurred among children and young people under 20 years. Poisoning ranks as the 13th leading cause of death among 15-19-year-old individuals.²⁰ Therefore, acute poisoning accounted for an estimated 45 000 deaths annually in children and young people under 20.²¹

However, the pattern of poisonings has changed during the past years.^{22,23} Alternation follows due to new poisonous products, higher accessibility, the encounter of children, and the increase of new consumer products.²² Poisoning in toddlers and infants is almost unintentional, secondary to their explorative behavior and the pleasure of putting objects in their mouths.

Thus, based on previous records on poisoning in Farsan,^[1] Iran, the researchers decided to investigate its prevalence, type, and other related factors to aware officials and health system managers of this growing and dangerous issue. Accordingly, this study was conducted

as a primitive study to conduct comprehensive futuristic research about all factors that affect this issue and lead to poisoning.

Materials and Methods

Subjects

This descriptive-analytical cross-sectional study was conducted on 557 poisoned people, who were referred to Farsan's hospital, Iran, during 2018-2019, using the consensus method. All demographic and poisoning data registered in their medical records were extracted and entered in the standard checklist designed according to available data. Related information included age, gender, poisoning type (intentionally and unintentionally), residence (city or village), time of poisoning occurrence (month and season), hospitalization (day), and poisoning agent (drugs, opioids, alcohol, psychiatrists, detergents, CO-CO₂, poisonous foods, poisonous plants, and hydrocarbon compounds).

The inclusion criteria were the diagnosis of poisoning and hospitalization during 2018-19. On the other hand, the exclusion criterion was insufficient registration of information in medical records.

Data were entered in SPSS (version 22.0) using descriptive statistics such as frequency, percentage, mean, and standard deviation (SD). Additionally, the chi-square test was employed for evaluating the relationship between qualitative variables, and an independent *t* test was used for a comparison between a quantitative variable with qualitative variables. All classified information was designed as tables.

Results

The result of the survey on 557 poisoning cases in the covered population during 2018-2019 showed that 390 (52.1%) of them were males. The highest frequency of poisoning was observed in spring and July ($n=175$, 31.4% and $n=70$, 12.4%), respectively (Table 1). The mean \pm SD of age was 27.52 ± 19.95 . The majority of cases were under 30 years ($n=365$, 63.7%), although poisoning was decreased by getting old, and were residents in cities ($n=371$, 66.6%). Hospitalization lasted 1-14 days, as 513 (85.2%) of patients stayed only 1-2 days (Table 2). The most frequent and important poisonous agents included opioids (27.4%), drugs (30.7%), and psychiatric drugs and alcohol (23.4%). Generally, 390 (70%) of poisoning was intentional (Table 3).

Based on the results (Table 3), the mean \pm SD of age was 34.37 ± 16.73 and it was 11.50 ± 17.58 in intentional and unintentional poisoning, respectively ($P \leq 0.001$). In addition, the mean \pm SD of the age of poisoned people ($P \leq 0.001$) by different poisonous agents was 25.62 ± 21.49 (drug), 33.13 ± 19.91 (opioid), 29.52 ± 17.22 (psychiatric drugs), 22.97 ± 10.20 (alcohol), 10.47 ± 18.95 (hydrocarbon compound), and 17 ± 14.52 (poisonous plants), the details of which are presented in Table 3.

Males were often poisoned via opioids (69.3%) and

Table 1. Poisoning Type Prevalence According to Qualitative Variables

Poisoning Type	Gender, No. (%)		Season, No. (%)				Residence, No. (%)	
	Male	Female	Spring	Summer	Fall	Winter	City	Village
Intentional	194 (49.8)	196 (50.2)	119 (68)	123 (76)	71 (67.6)	281 (75.7)	281 (75.7)	109 (58.6)
Unintentional	96 (57.48)	71 (42.52)	56 (32)	39 (24)	34 (32.4)	38 (33)	90 (24.3)	77 (41.4)
Total	290 (52.1)	267 (47/9)	175 (31.4)	162 (29)	105 (18.8)	115 (20.6)	371 (66.6)	186 (33.4)
<i>P</i> value ^a	0.97		0.28				0.001	

^a Chi-square test.

Table 2. Poisoning Prevalence According to Quantitative Variables

Poisoning Type	Hospitalization During (day)			Age (y)					
	1-3	3-6	≥7	1-15	16-30	31-45	46-60	61-75	75-90
No. (%)	513 (92.1)	35 (6.3)	9 (1.6)	142 (25.5)	223 (38.2)	108 (19.4)	59 (9.4)	24 (4.3)	18 (3.2)
Intentional (Mean ± SD)	1.76 ± 1.22			34.37 ± 16.73					
Unintentional (Mean ± SD)	1.96 ± 1.77			11.50 ± 17.58					
Total (Mean ± SD)	1.82 ± 1.41			27.52 ± 19.95					
<i>P</i> value ^a	0.132			0.001					

Note. SD: Standard deviation. ^aIndependent *t* test.

Table 3. Poisoning Agents According to Demographic Variables

Variable (Poisoning Agents)	No. (%)	Gender		Residence ^a		Type of Poisoning ^a		Age ^b (Mean ± SD)
		Male No. (%)	Female No. (%)	City No. (%)	Village No. (%)	Intentional No. (%)	Unintentional No. (%)	
Drug	171 (30.7)	69 (40.35)	102 (59.65)	113 (66)	58 (34)	113 (66)	58 (34)	25.62 ± 21.49
Opioid	153 (27.4)	106 (69.3)	48 (30.7)	116 (75.3)	38 (24.7)	131 (85)	23 (15)	33.13 ± 19.91
Psychiatric drugs	96 (17.2)	36 (37.5)	60 (62.5)	68 (70.8)	28 (29.2)	80 (83.3)	16 (26.7)	29.52 ± 17.22
Alcohol	29 (5.2)	26 (89.6)	3 (10.4)	18 (62)	11 (38)	25 (86.2)	4 (13.8)	22.97 ± 10.2
CO-CO ₂	24 (4.3)	13 (54)	11 (66)	13 (54)	11 (46)	1 (4)	23 (96)	27.29 ± 16.92
Hydrocarbon compounds	17 (3)	10 (58.8)	7 (41.2)	8 (47)	9 (53)	4 (23.5)	13 (76.5)	10.47 ± 18.95
Poisonous plant	3 (0.5)	2 (66.6)	1 (33.4)	3 (100)	0 (0)	2 (66.6)	1 (33.4)	17 ± 14.52
Poisonous food	8 (1.4)	5 (62.5)	3 (37.5)	2 (25)	6 (75)	0 (0)	8 (100)	20.63 ± 24.42
Pesticide	37 (6.6)	15 (40.5)	22 (59.5)	16 (43.2)	21 (66.8)	22 (59.4)	15 (40.6)	19.11 ± 15.13
Detergent	18 (1.2)	8 (44.4)	10 (65.6)	14 (77.7)	4 (22.3)	12 (66.6)	6 (33.4)	27.29 ± 16.92
<i>P</i> value	-	0.001		0.001		0.001		0.001

Note. SD: Standard deviation; ^a Chi-square test; ^b Independent *t* test.

alcohol (89.6%), while females used drugs (59.6%) and psychiatric drugs (62.5%). Thus, the poisoning agent had a significant difference based on gender ($P \leq 0.001$, Table 3).

The type of poisoning was different in cities and villages ($P \leq 0.001$), as 281 (75.7%) and 90 (24.3%) of intentional poisonings occurred in cities and villages, respectively. On the other hand, 109 (58.9%) and 77 (41.1%) of poisoning cases in villages and cities were unintentional, respectively (Table 1).

The common poisonous agents in the cities were drugs; based on the results, 113 out of 171 (66% out of 30.7%), 68 out of 96 (70.8% out of 17.2%), and 116 out of 153 (75.3% out of 27.4%) total poisoning cases with drugs, psychiatric drugs, and opioids were in the cities, respectively. However, 21 out of 37, 9 out of 17, and 6 out of 8 total poisoning with pesticides (43.2% of 6.6%), hydrocarbon compounds (53% of 3%), and poisoned foods (75% of 1.4%) occurred in rural areas (Table 3).

Further, the poisonous agent was different in each type of poisoning ($P \leq 0.05$). The results (Table 3) revealed that 113 out of 171 of total poisoning with drugs (66% out of 30.7%), 131 out of 153 of total poisoning with opioids (85% of 27.4%), and 80 out of 96 of total poisoning with psychiatric drugs (83.3% of 17.2%) were the most frequent agents in intentional poisoning. On the other hand, unintentional poisoning ($P \leq 0.001$) occurred by CO-CO₂ (23 out of 24 or 96% of 4.3%), hydrocarbon compounds (13 out of 17 or 76.5% of 3%), and poisonous foods (8 out of 8 or 100%).

Discussion

This study aimed to investigate poisoning prevalence and its related factors. During 2018-2019, 557 patients were referred to Farsan's hospital. The majority of them were males who were poisoned with opioids and alcohol. Poisoning mainly occurred in youth under 30 years old. In

young people, it was intentional and via opioids, alcohol, drugs, and psychiatric drugs. Furthermore, intentional poisoning almost occurred in spring and cities.

In our study, 70% of poisoning cases occurred intentionally, which is confirmed by Masoumi et al,¹⁹ Mahmoudi et al,²⁴ Ghasempour et al,²⁵ Rahmani et al,²⁶ Mehdizadeh et al,²⁷ Shokrzadeh et al,¹ and Bari et al.²⁸ Intentional poisoning was related to drugs, psychiatric drugs, and opioids, which is in line with the findings of Masoumi et al¹⁹ (psychiatric drugs), Mohammadi et al²⁹ (psychiatric drugs), Mahmoudi et al²⁴ (psychiatric drugs, pesticides, and opioids), Rahmani et al²⁶ (psychiatric drugs and opioids), Mehdizadeh et al²⁷ (psychiatric drugs), Shakeri et al⁵ (psychiatric drugs and opioids), and Gunnell et al³⁰ (opioids). However, the type of the poisonous agent differed in studies by Sawalha et al¹⁰ (organophosphate, snake bite, and alcohol) and Bari et al²⁸. Unintentional poisoning almost occurred through hydrocarbon compounds and CO-CO₂.

Based on the results of the current study, poisoning had no significant difference between the two genders, which is not consistent with the results of Masoumi et al,¹⁹ Najafi et al,³¹ Mahmoudi et al,²⁴ Mohammadi et al,²⁹ Rahmani et al,²⁶ Jafarzadeh et al,³² Shokrzadeh et al,¹ Bari et al,²⁸ Sawalha et al,¹⁰ and Ghasempour et al²⁵; in these studies, the number of women was higher. Conversely, Shakeri⁵ reported the same proportion between the two genders.

In terms of age, adolescents were poisoned through drugs and alcohol, dangerous detergents, and often intentionally, especially in urban areas, as 64% of the poisoned people were under 30 years old. This finding conforms to the findings of Mahmoudi et al,²⁴ Mehdizadeh et al,²⁷ Shokrzadeh et al,¹ Sawalha et al,¹⁰ and Bari et al,²⁸ but contradicts those of Jafarzadeh et al,³² and Gunnell et al³⁰ studies, indicating that the highest rate of poisoning was observed in middle age.

Most poisonings in children under five years old were unintentionally and often through hydrocarbon compounds and rural areas. In this study, spring and summer, especially July, had the highest number of poisonings reduced during the cold seasons of the year. It was unintentionally through hydrocarbon compounds and CO-CO₂, which corroborates with the results of Mohammadi et al,²⁹ Shokrzadeh et al,¹ and Sawalha et al.¹⁰

In the current study, the rate of poisoning was higher in the urban population, which is in conformity with the findings of Masoumi et al,¹⁹ Mahmoudi et al,²⁴ and Jafarzadeh et al.³² Contrarily, Bari²⁸ reported more poisoning cases in the rural area.

Hospitalization was often short, 85% of patients either died or were dispatched within the first or two days or discharged with partial recovery and personal consent. The short-term hospitalization can be attributed to cultural and social beliefs and the taboo nature of poisoning. The patients and their companions refused to continue treatment in this center and had discharged with relative recovery. The long period of hospitalization was

related to psychiatric drugs, pesticides, and hydrocarbon compounds.

Conclusion

In this study, most poisoning cases were intentional, attributed to males and adolescents who were city residents, and occurred in the first six months of the year, especially July. Frequent poisonous agents were opioids and psychiatrists, especially in intentional poisoning. It is thought that cultural, social, and economic problems are significant, and precise research should be performed to investigate the main factors that lead to or accelerate poisoning. Vulnerable groups should be identified and receive appropriate training in this regard. Eventually, it is vital to restrict free access to drugs such as psychiatric drugs, without the physician's prescription.

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Authors' Contribution

All authors read and approved the final manuscript and accepted the study concept, design, and analyses, as well as the interpretation of data and critical revision of the manuscript for important contents.

Conflict of Interest Disclosures

The authors declare that they have no conflict of interests.

Ethical Approval

This research was performed after receiving approval from the Ethics Committee of Shahrekord University of Medical Sciences (IR.SKUMS.REC.1399.038). All information will be confidential and without any identification data of patients, including their names, phone numbers, or addresses.

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Endnotes

[1] Farsan is one of the cities of Chaharmahal and Bakhtiari province, which is located 30 km southwest of Shahrekord. Three main cities of Farsan are Juneqan, Baba Heidar, and Pordanjan. Overall, 5 villages around these cities have made the area of Farsan about 560 km. According to the general population and housing census in 2016, the population of this city was 30504 people (in 8400 households).

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