

Epidemiological Study of Poisoning in Patients Referring Educational and Clinical Center of Ayatollah Kashani Hospital, Shahrekord (West of Iran) throughout 2008-2014

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ABSTRACT

Background: Appropriate and early diagnosis and treatment of poisoning could be vital. Awareness of general pattern of poisoning in any geographical regions could be helpful in this regard. According to the lack of information and not being specified the epidemiologic forms of poisoning in Chaharmahal and Bakhtiari province (west of Iran), this study was carried out to determine the epidemiologic status of poisoning.

Methods: In this routine data base study, available data were used in medical records of 394 patients with poisoning diagnosis throughout 2008-2014 at Ayatollah Kashani Hospital (only recipient hospital of poisoning in Chaharmahal and Bakhtiari province), which affiliated with Shahrekord University of Medical Sciences. Association between the studies was variable and also reasons for poisoning was investigated by chi-square, analysis of variance, independent t-test, Pearson's correlation in stata software.

Results: Of 395 patients with poisoning, 207 (52.5%) were female and the rest were male. For the years under study, the highest poisoning ratio (20.26%) was seen in 2010 and the lowest (3%) in 2014. Mean age of all, male and female patients was 27.6, 29.8, and 25.6 years, respectively, with a significant difference between male and female patients ($P < 0.05$).

The mean and standard deviation of duration of hospitalization in respiratory patients was 3.2 ± 4.2 , injection 3 ± 3.8 , oral 2.5 ± 3 , others 2 ± 1.2 , and bite was 2 days ($P > 0.05$).

The highest poisoning ratio (62%) was obtained for oral poisonings and the lowest (0.5%) was due to beating. For marital status, the highest poisoning ratio was obtained in the single individuals and the lowest in the divorced ($P < 0.05$). Of 395 patients, 358 (90.6%) survived and the rest died. The highest mortality (17 deaths) was due to oral poisoning.

Conclusion: Poisoning occurs often in young people and has a high load in this group. Trend of poisoning in this province is steadily diminishing. Epidemiological, regional data helps to use the sources appropriately to prevent and control poisoning. Further, analysis of the effective factors could contribute to decreasing poisoning incidence by planners and policymakers.

► *Implication for health policy/practice/research/medical education:* Epidemiological Study of Poisoning

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1. Introduction:

Poisoning is a main health problem in many countries (1). Poisoning is projected to be the 10th leading cause of death in 2020 worldwide (2). Annually, approximately one million severe unintentional poisonings and two million hospitalizations due to pesticide suicide are reported worldwide in the countries with agriculturally-based economy. Suicide is the fifth leading reason for mortality in Sri Lanka, Bangladesh, Thailand, and even China that rapidly advances towards industrialization (3). The pattern of poisoning in Mashhad, Tehran, Oman, England and Wales were reported (4-8). Approximately five million individuals die occurs because of poisons in the USA, yearly (9). Most of these incidents, that are acute and happen because of a composition at homes, are unintentional exposure in the individuals under six years old. Drugs are responsible for 47% of the exposure and 84% of the drug poisonings are serious and fatal (10). Furthermore, up to 30% of the admissions to psychiatry wards are related to suicidal poisoning through intentional overdose (11-13).

The latest figures of the USA have shown that 74.3% of the poisonings were oral, 9.7% skin, 7.6% respiration, 2.6% eye, and the rest were through due to beating and injection (14).

Intentional acute poisoning is a significant medical emergency and an important cause of mortality with an annually growing trend. Shadnia *et al.*, in their study found that 79% of the patients attempted abuse of drugs and

chemicals intentionally (15). Over 30% of the poisonings happen to the youth, particularly 20 to 30-year-old population, in most countries (16).

In developed countries, most of the used drugs and/or poisons have a low toxicity, while in developing countries, poisonings are mainly due to pesticides that have very high toxicity and are often associated with high mortality (17). Intentional poisoning is dependent on cultural and native factors of a region and the available facilities including poisons and drugs. Therefore identifying the epidemiological factors and variables of suicide attempt by individuals is critical not only in a geographical area but also with regards to a time period (8).

This study was conducted to epidemiologically investigate poisoning in patients referring Ayatollah Kashani Teaching and Treatment Center, Shahrekord throughout 2008-2014.

2. Materials and Methods:

In this Routine data base study, the available data in medical records of 395 patients with poisoning diagnosis throughout 2008-2014 in Ayatollah Kashani hospital affiliated with Shahrekord University of Medical Sciences were used. This hospital is the only clinical center of receiving patients with a diagnosis of poisoning in this province.

The data were included in analysis per the census of all poisoning cases throughout seven years under study. The inclusion criteria were definite diagnosis of poisoning with reference to International Classification of Diseases. The variables under study consisted of age, gender, the reason for poisoning, duration of hospital stay, marital status, and education level.

Statistical analysis

Descriptive and analytical (parametric and non-parametric tests) statistics were used to investigate the association between the

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variables and the reasons for poisoning. Quantitative variables were reported by mean±standard deviation (SD) and the grouped variables by frequency and percentage.

The chi-square test was used to test for differences in frequencies, and student's t-test and analysis of variance (ANOVA) were used to test for differences in continuous variables between groups. The association between the studied variables such as quantitative variable was investigated by Pearson's correlation. All analyses were done by Stata 14 Software.

3. Results:

Of 395 poisoning patients, 207 (52.4%) were female and rest were male. For the years under study, the highest poisoning ratio (20.26%) was obtained in 2010 and the lowest (3%) in 2014. Table 1 shows reasons for poisoning. Difference in frequency between male and female patients was not significant in the years under study ($P>0.05$). Table 2 was shown the poisoning statistics by gender per years. Of the studied patients, 139 (35.2%) were married, 243 (61.5%) were single, and the rest were divorced. Mean age of all, female, and male patients was 27.6 ± 0.6 , 25.6 ± 0.8 , and 29.8 ± 1 years.

The mean age in the female patients was derived significantly lower than the male patients ($P<0.05$).

Highest poisoning rate (62%) was obtained for oral, injection (22.5 %), inhalation (13%), and the lowest (0.5%) for beating poisoning. The highest prevalence of poisoning was obtained in the unemployed (22.5%), university students (21%), elementary student (12.4%), housewife (20%), others (17.2%), and the lowest in civil servants (6.8%). The highest poisoning ratio was derived in the single individuals (61.5%), married (35.2%) and the lowest in the divorced (3.3%), ($P<0.05$). For the seasons of poisoning incidence, the highest prevalence (176 individuals, 44.5%) was obtained in summer and the lowest (40 individuals, 10.2%) in winter. The highest poisoning ratio (49%) in summer was due to inhalation and the lowest was due to beating. The highest mean (standard deviation) hospital stay was obtained 4.2 ± 3.2 days for inhalation-poisoned patients, followed by 3.8 ± 3 days for orally-poisoned patients, 2 ± 1.2 days for the patients poisoned for other reasons, and 2 days for beating-poisoned patients ($P>0.05$). Of 395 patients, 358 (90.6%) survived and the rest died. The highest mortality (17 deaths) was due to oral

Table 1: Comparison of poisoning reasons in patients referring Teaching and Treatment Ayatollah Kashani Center, Shahrekord for years under study

Poisoning Reasons year	Beating		Injection		Oral		Inhalation		Other reasons	
	%	No.	%	No.	%	No.	%	No.	%	No.
2008	0	0	14.8	9	59	36	24.6	15	3	1
2009	0	0	21.2	14	66.7	44	9	6	1.2	2
2010	0	0	24.7	20	60.5	49	13.6	11	1.4	1
2011	0	0	25	18	64	46	9.7	7	2.5	1
2012	0.5	2	27.5	22	57.5	46	11.3	9	0	2
2013	0	0	17.4	4	73.9	17	8.7	2	9.1	0
2014	0	0	18.2	2	63.6	7	9.1	1	2.1	1
Total	0.5	2	22.6	89	62	245	13	51	2	8

Table 2: The comparison of frequency of poisoning between two sexes in patients referring to educational and clinical center of Ayatollah Kashani hospital, separated by years of study

Sex \ Year	Total		Male		Female	
	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency
2008	15.5	61	52.5	32	47.5	29
2009	16.7	66	44	29	56	37
2010	20.5	81	42	34	58	42
2011	18.22	72	42	30	58	42
2012	20.26	80	52.5	42	47.5	38
2013	5.82	23	43.5	10	56.5	13
2014	3	12	91	10	9	2
Total	100	395	47.5	187	52.5	208

The poisoning frequency difference between two sexes in different years was no significant ($P>0.05$).

Table 3: Comparison of treatment outcome in patients referring educational and medical Ayatollah Kashani Center, Shahrekord for poisoning type

Poisoning type	Outcome		Total		Deceased		Survived	
	%	No.	%	No.	%	No.	%	No.
Inhalation	13	51	1.96	1	98	50		
Oral	62	245	6.93	17	93	228		
Injection	22.5	89	14.6	13	85.4	76		
Beating	0.5	2	0	0	100	2		
Others	2	8	75	6	25	2		
Total	100	395	9.4	37	90.6	358		

poisoning. This was shown in table 3.

4. Discussion:

In this study, the epidemiology of poisonings was investigated and reported in Chaharmahal and Bakhtiari province,

western Iran. In Chaharmahal and Bakhtiari province like many other provinces of Iran, common cause of mortality is cardiovascular disease, particularly heart attacks and cancers (18, 19).

Epidemiologic pattern of these diseases are reported in many studies and are considered as priorities in the health system (20). But about the pattern of morbidity and mortality resulting from poisoning, no reliable information is available in the province. Thus, this study report important information about the poisoning.

Different studies in Iran have reported various rates of different abused substances. In 79% of the participants in Moghaddamnia and Abdollahi study and in 13.69% of the participants in Shadnia *et al.*, study, most frequently abused drugs were somnifacient drugs, particularly benzodiazepines (15, 21). The mortality rate from poisonings in Iran varies widely according to the previous studies, so that in a study in Tehran, 3.1% of the patients and in a study in Mazandaran, 9% of the patients died because of the complications resulting from poisoning (15, 21). In the present study, the mortality rate from poisoning was obtained 4.9%, which is higher than the studies in Tehran and Mazandaran (15, 21). Mintegi *et al.*, study to investigate the reasons for poisoning in children found that 7.54% of the children were poisoned because of using drugs, 5.4% of them were poisoned by CO, and the rest were poisoned by other routes. In the study, children were the majority of the individuals referring the hospital for poisoning and most of them were exposed to drug poisoning (22). Zare Fazl Elahi *et al.*, conducted a cross-sectional study of the epidemiology of poisoning using medical records of 729 children hospitalized for poisoning in Imam Khomeini Hospital in Urmia, northwest Iran throughout 2002-2006. Findings indicated that the poisoning rate was similar in the male and female patients (50.1% vs. 49.9%). The highest poisoning rate (46%) was seen in children under five years, most of which was unintentional (22.5%), due to drugs (17.5%), and happened to boys (11%) more than girls (6.6%). In 12-16-year age group, a higher poisoning rate was seen in girls than boys (28% vs. 11%), most of which (22%) was due to drugs and suicidal (30%). The most prevalent reason for poisoning was drugs (49.9%) followed by oil (14.1%), foods and vegetables (11.7%), detergents

(8.1%), beating by insects and snakes (6.7%), pesticides (6.1%), and opioids (3.4%) and 2.9% of the poisonings were fatal. Given high unintentional poisoning rate due to drugs in both boys and girls under five years and that intentional, suicidal poisoning was more prevalent in female adolescents than male ones, necessary measures should be taken to keep drugs at home appropriately and offer training to families on the vulnerability of adolescents, particularly girls (23).

Najafi *et al.*, studied the factors of intentional poisoning in the youth population of 15-20 years referring the poisoning center of Kermanshah, west Iran. In this cross-sectional study, all the youth population of 15-20 years old referring the only poisoning center of Kermanshah was studied. The findings indicated that of 321 individuals referring this center, 123 (38%) were male and the rest were female. 180 (58%) individuals of the intentional poisoning committers had withdrawn from education, 119 (66%) of whom were boys. On the other hand, 62 (51%) boys and 167 (84%) girls had conflict with one family member, which was reported to be the reason for poisoning by the participants. Since school and family are the most important educational institutes, they could contribute significantly to reducing suicide attempt in the youth population (24). Aryaie *et al.*, in an epidemiological study of poisoning on the patients referring teaching hospitals in Shiraz indicated that the poisoning rate was higher in men and the single, and the highest poisoning rate was observed in age population of 20-35 years old and most poisonings happened in spring (25). In the present study, the mean age of the patients was 27.6 ± 0.6 years. In different studies, different age classifications have been considered. However, the highest prevalence of poisoning, particularly intentional, has been reported in adolescents and youth population (25-33). This could be explained by relatively young population of Iran and the resulting socioeconomic variations that cause some problems in this age group.

The findings of two independent studies in Iran indicated that training problem solving

was effective on the coping skills and could be used for behavioral therapy, health promotion, and prevention of suicide in the suicide committers (34, 35). Establishment of psychological counseling centers to enhance coping skills in adolescents could help to prevent suicide.

There have been inconsistent findings on poisoning rate in men and women. Poisoning rate was higher in women than men. Some studies have found a higher poisoning rate in men (28, 30, 33) and many studies have reported a higher poisoning rate in women (29-36). However, most studies have indicated that women commit intentional, suicidal poisoning more frequently than men (37-40). For marital status, the highest poisoning rate was obtained in the single individuals. The lower rate of poisoning incidence in the married individuals could be attributed to their better social support than the single population and higher prevalence of poisoning at younger ages, predictably involving more single individuals. No family ties could explain higher vulnerability of the single population than the married, as well. In the present study, the rate of oral poisonings was higher than other poisonings, which is consistent with Moghaddamnia and Abdollahi study in Mazandaran, north Iran, Shadnia et al study in a hospital setting, and Ahmadi and Pakravan study in Sari, capital of Mazandaran (30-33). This study indicated that the highest prevalence of poisoning was obtained in summer followed by spring, which could be explained by the further use of the pesticides, heat effect on foods (food poisoning), increased population of insects and snakes (poisoning due to beating), and high frequency of spraying for agricultural purposes in these seasons.

5. Conclusion:

Mean age at poisoning incidence was lower in the female patients. For the causes of poisoning in the patients, the highest incidence rate of poisoning was obtained for oral poisonings and the lowest was obtained for beating. Therefore, the most vulnerable population at risk of poisoning was young women poisoned through oral route. The epidemiological data of a region is

conducive to appropriate use of resources to prevent and control poisoning. Also, analysis of the effective factors helps planners and policymakers reduce poisoning rate.

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