

Epidemiologic study of poisonings in patients referring to emergency ward of Shahid Mohammadi university hospital in Bandar Abbas

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Abstract

Introduction: Poisoning is a major health problem worldwide and one of the most common reasons for visiting emergency departments (EDs). The object of this study was to determine the epidemiological characteristics of poisoned patients referred to emergency department of Bandar Abbas Shahid-Mohammadi hospital in 2011-2012.

Methods: In a cross-sectional study between March 2011 and February 2012 all the patients admitted through ED for further evaluation and treatment were investigated. Data were gathered from direct interviewing and patient's medical files by using a checklist and analyzed by SPSS version 16 using descriptive statistical tests, Chi-Square and t-test.

Results: Poisonings comprised 3.6% of emergency department patients. During the study period, 493 patients with drug or chemical exposure were admitted. Of them, 52.1% were male and 47.9% were female. 75.7% were between the ages of 14-29 years. Benzodiazepines (23.1%) followed by Tramadol (20.1%) were the most common cause of poisonings. Intentional poisonings constituted the majority of cases (67%). The mean age of suicidal cases was lower (23.3 vs 30.3). The majority of patients were single (52.9%), unemployed (58.4%) and living in urban centers (75.3%). 26% of patients had a diagnosed psychiatric disease, 13% had previous suicidal self-poisoning and 32.3% were addicted. 2.2% of patients were died during hospital stay.

Conclusion: In this study, poisonings most commonly occur as intentional and mostly by pharmaceutical agents. The prevalence was higher in younger individuals than other groups. According to these findings, the authorities have to prevent its further occurrence by screening of psychiatric diseases in poisoning cases and early treatment of them, as well as limiting easy availability of drugs.

Key words: Epidemiology – Poisoning – Suicide - Overdose

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Introduction:

Poisoning consists of maladaptation effects due to contacting chemical materials, drugs or incompatible substances to body (1). Totally poison constitute every natural chemical, artificial and pharmaceutical materials causing injury or disorder in natural organism, or sometimes death.

In nature, every thing can potentially changes to poison (2). The harmless material like water and oxygen in high quantity can create poisoning while Arsenic and cyanide with poisonous property can consumed with no harmful effects (1).

Yearly there are more than 5 millions confrontation to unintentional or acute poisoning with a single factor which occurs at home with or with no mild poisoning in under 6 year children. Drugs intervene in 47% of confrontation and 84% of fatal or serious poisoning. Attempt to suicide (intentional injury) except amusement using from ethanol is the most common reported reason for intentional poisoning (1) in which also most deaths arising from taking a drug or poisonous material in order to attempt suicide. Major depression, developing social problems, willing to abusing the social realities and covering personality failures are important poisoning factors in adults (2).

Amusement using of prescribed or nonprescribed drug for psychoactive impacts or abusing or misusing are increasingly common which may lead to unintentional self-poisoning.

About 20-25% of confrontation need professional clinical analysis and 5% of total need hospitalizing. The poisoning devote it self 5-10% all ambulance transportations and emergency visits and intensive cares receptions. 30% of psychological receptions are due to suicide by drug overtaking. Total mortality is lower than 1% of confrontations which was much higher (1-2%) in admitted patients for intentional drug overtaking (to attempt suicide). Acetaminophen is a pharmaceutical agent creating some fatal poisoning. Monoxide carbon is main factor for mortality arising from poisoning not reflected in the statistics of the hospitals and poisoning centers (1). Poisoning is a psychic disease in all society and one of the common reasons to refer to emergency wards. A lot of people due to intentional or random poisonings got mild illness to hospitalization as well as death which bearing a lot of economical,

physical and psychological load to the society and family (3-6). In France, preventative programming in 1983 led to lower mortality and related costs (4). Although the correct estimation is difficult for poisoning presentation, the broad chemical availability and their application in the medical, agricultural and industrial fields has risen poisoning risk (7-9).

As it is reported, almost 30000 persons are poisoned due to drug and chemical substances in Tehran every year which 12000 of them are hospitalized and 1200 individuals taken to ICU and at least 120 ones loss their lives. According to coroner organization in Iran, only in first 9 month in 2004, 383 subjects for pharmaceutical poisoning and 602 subjects for chemical and toxic materials have. The drugs and toxins are the most common way to suicidal attempt (10-11). The poisoning rate and process specially intentional type during the time and in different counties relate completely to available materials and drugs and also prescribed culture by physicians. Poisoning influenced severely by cultures change, available materials and totally environmental factors (12). Intentional poisoning with almost 80% of injuries (13) is defined as intentional and willfully taking of high dose drug aiming to damage (14). Regarding to available toxic and risk combinations as well as various drugs, the individuals with suicidal willing prefer to have an easy death by swallowing drug and poisons which it is the most common way (15).

Recently, the intentional poisoning as a medical emergency cares has increased in Britain so that it has been the most common suicidal way in females and second suicidal way in males with 100000 cases of hospitalization and 1300 cases of mortality (16).

In Greece, intentional poisoning is a serious health problem and the most common suicidal way (17).

The poisoning pattern is different over a period in country to country which sometimes has a rapid changes (7-9, 18-20). So regional epidemiologic data about poisoning is helpful in programming and poisoning management (7,21-24).

Regarding to cultural and regional issues in the country, poisonings impressionability from environmental factors, the frequency and availability of drugs poisonous chemicals, overuse

and addiction to drugs in different cities led to a lot of poisonings (25). It seems that the poisoning epidemiologic study in different regions is essential for taking decision and preventive steps.

Therefore, we decided to analyze epidemiologically poisoned patients in emergency ward admitted in Bandar Abbas Shahid Mohammadi hospital in 2011.

Methods:

In an analytic – descriptive study between March 2011 and March 2012 in poisoned patients in emergency department of Bandar Abbas Shahid Mohammadi hospital, the poisoning epidemiology of patients was analyzed.

The studied population included all referring patients to Shahid Mohammadi hospital due to poisoning in 2011 in which all people required hospitalization and more cares. The patient suspected to food poisoning and bite and those with mild poisoning were released following elementary performances and the patient who had not consent to hospitalize and those who had not given reliable description about drug or taken materials type exit from the study.

In order to gather data, a researcher – made checklist including variables age, gender, education level, marital status, occupational status, residence, poisoning factor, poisoning cause, seasons, psychologic disorders history, addiction to drugs history, similar attempt history, clinical presentation of poisoning, vital symptoms including pulse and blood pressure, prognosis and patient condition while releasing was completed for every patient.

The patient and comparisons were asked about poisoning agent and it is diagnosed by clinical symptoms and physicians if there was no consciousness or consciousness decline. For completing data and patients prognosis and their condition while releasing, the information in patient's medical files was used with getting consent.

Finally, using SPSS version 16, the data was analyzed by descriptive-statistical methods and Chi-Square and t-test. The significant level was 0.05.

Results:

Between March 2011 and February 2012, from 38658 subjects referring to emergency ward of Bandar Abbas Shahid Mohammadi hospital, 1405 people were due to chemical and pharmaceutical poisoning (3.6% of total individuals) in which 493 patients were admitted for analysis and treatment proceedings (35% of all poisoned patients).

Among 493 studied hospitalized patients, 257 subjects (52.1%) and 236 subjects (47.9%) were male and female, respectively with mean 25.7 (SD 11.61) in which the youngest and oldest were 14 and 89 years, respectively. The mean age was 25.59 (SD=11.87) and 25.8 (SD=11.39) in women and men respectively in which there was no statistically difference.

Table 1. Distribution of Poisoning Frequency in Different Age Groups

Age group	Number	Percent
14-29 years	373	75.7
30-44 years	78	15.8
45-59 years	31	6.3
Above 60 years	11	2.2
Total	493	100

The most poisoning outbreak was in age group of 14-29 (75.7%) Table 1 shows frequency distribution in different age groups.

Among total patients, 232 individuals (47.1%) were married 261 individuals (52.9%) were single, 371 (75.3%) lived in city and 122 (24.7%) lived in village, 205 (41.6%) were employee and 288 (58.4%) were unemployee. Table 2 shows frequency distribution of demographic characteristics among poisoned people.

Table 2. Demographic Characteristics in 493 Poisoned Individuals

Variable	Number	Percent	
Jender	Male	257	52.1
	Female	236	47.9
Marital Statuse	Married	232	47.1
	Single	261	52.9
Occupational Statous	Employee	205	41.6
	Unemployee	288	58.4
Residence	City	371	75.3
	Village	122	24.7

128 patients (26%) had psychological disease history and 159 patients (32.3%) had addiction to various drugs, psychoactive medicines and alcohol in which 64 patients (13%) of total had previous intentional self-poisoning (Table 3).

Regarding to poisoning causes, 330 individuals (66.9%) with suicidal purpose had attempted self-poisoning, 32 people (6.5%) resulted from poisoning randomly and unconsciously and 128 patients (26%) were hospitalized due to drugs and medicine misuse. Mean age in suicidal cases was lower than others in a way that it was 23.39 (SD 7.8) in suicidal group and 30.39 (SD 15.91) in non-suicidal group which mostly were between 14-29 years old (81.18%) ($P < 0.001$).

The females to males with high drug misuse (42.4% in males v.s 8.1% in females) were resulted more from poisoning following suicide (83.1% in females v.s 52.1% in males) with statistical difference ($P < 0.001$). Table 4 showed the frequency of poisoning reason based on sexuality.

81.8% of cases were in 14-29 age group and vice-versa most people in this age group had been poisoned by suicide (72.4%) ($P < 0.001$).

There is significant association between occupational status and poisoning in a way that 63.3% of suicidal cases were unemployed since it was totally 47.8% in non-suicidal cases ($P < 0.01$).

Table 3. Frequency Distribution Based on Patient History

Variable	Number	Percent
Diagram Psychiatric Disease History	128	26
Previous Self-Poisoning History	64	13
Addiction	159	32.3

Table 4. Frequency of Poisoning Causes Based on Gender

Gender	Suicide	Misusing	Random	Uncertain	Total	P-value
Male	196 (83.1%)	19 (8.1%)	21 (8.9%)	0 (0%)	236 (100%)	<0.001
Female	134 (52.1%)	109 (42.4%)	11 (4.3%)	3 (1.2%)	257 (100%)	

Table 5. Comparison of Some Studied Variables Based on Poisoning Cause

Variable	Intentional Poisoning (Suicide) (330 individuals)		Unintentional Poisoning (163 individuals)		P-value
Gender	Male	134 (59.4)	123 (24.5)		<0.001
	Female	196 (40.6)	40 (75.5)		
Occupational Status	Employee	20 (36.4)	85 (52.1)		<0.01
	Unemployed	210 (63.6)	78 (47.9)		
Marital Status	Married	155 (47)	77 (47.2)		<0.05
	Single	175 (53)	86 (52.8)		
Residence	City	240 (72.7)	131 (80.4)		<0.05
	Village	90 (27.3)	32 (19.6)		
Psychology Disease History		116 (35.2)	12 (7.4)		<0.001
Addiction		56 (17)	103 (63.2)		<0.001
Previous Self-Poisoning History		63 (19.1)	1 (0.6)		<0.001
Mean Age		23.39±7.8	30.39±15.9		<0.001

35.2% of suicidal cases with diagnosed psychiatric disease and 19.1% with previous self-poisoning history were significantly higher than others ($P < 0.001$).

Addiction was significantly higher in poisond group for medicine or drugs misuse than others so that 75.8% were addicted to drugs ($P < 0.001$).

Addiction was higher in males than females (57.2% in males v.s 5.1% in female) ($P < 0.001$)

while there was no significant difference between them in respect to diagnosed psychiatric disease and previous self-poisoning history.

A significant association were not found between poisoning and material status and residence. The comparison of some studied variable based on poisoning cause has been shown in table 5.

Table 6. Distribution of Frequency of Poisoning Agent in Total and Based on Gender and Poisoning Cause

Consumed Drug Type	In Total	Males	Femals	Suicide	Non-Suicide
Opium	34 (6.9)	25 (9.7)	9 (3.8)	8 (2.4)	26 (16)
Methadone	38 (7.7)	21 (8.2)	17 (7.2)	19 (5.8)	19 (11.7)
Tramadol	99 (20.1)	84 (32.7)	15 (6.4)	64 (19.4)	35 (21.5)*
Other Drugs	15 (3)	14 (5.4)	1 (0.4)	5 (1.5)	10 (6.1)
Alcohol	47 (9.5)	46 (17.9)	1 (0.4)	7 (2.1)	40 (24.5)*
Benzodiazepines	114 (23.1)	55 (21.4)	59 (25)	102 (30.9)*	12 (7.4)
SSRIs	29 (5.9)	15 (5.8)	14 (5.9)	27 (8.2)	2 (1.2)
TCAs	45 (9.1)	17 (6.6)	28 (11.9)	43 (13)	2 (1.2)
Antipsychotic	20 (4.1)	14 (5.4)	6 (2.5)	19 (5.8)	1 (0.6)
Anticonvulsants	33 (6.7)	16 (6.3)	17 (7.2)	31 (9.4)	2 (1.2)
Beta-Blockers	27 (5.5)	7 (2.7)	20 (8.5)	26 (7.9)	1 (0.6)
Digoxin	5 (1)	2 (0.8)	3 (1.3)	0 (0)	5 (3.1)
Other Cardiovascular Drugs	6 (1.2)	2 (0.8)	4 (1.7)	6 (1.8)	0 (0)
Acetaminophrn	38 (7.7)	8 (3.1)	30 (12.7)	33 (10)	5 (3.1)
Antibiotics	59 (12)	21 (8.2)	38 (16.1)	51 (15.5)	8 (4.9)
Other Drugs	20 (4.1)	7 (2.7)	13 (5.5)	20 (6.1)	0 (0)
Organophosphates	87 (17.6)	24 (9.3)	63 (26.7)	77 (23.3)	10 (6.1)
Rat Poison	14 (2.8)	5 (1.9)	9 (3.8)	11 (3.3)	3 (18)
Other Toxins	15 (3)	4 (1.6)	11 (4.7)	14 (4.2)	1 (0.6)
Caustic	3 (0.6)	0 (0)	3 (1.3)	2 (0.6)	1 (0.6)
Detergents	16 (3.2)	11 (4.3)	5 (2.1)	12 (3.6)	4 (2.5)
Other Chemical Substances	1 (0.2)	0 (0)	1 (0.4)	1 (0.3)	0 (0)
Uncertation	1 (0.2)	0 (0)	1 (0.4)	0 (0)	1 (0.6)
Multi drugs	24 (4.9)	12 (4.7)	12 (5.1)	18 (5.5)	6 (3.7)
	198 (40.2)	94 (36.6)	104 (44.1)	177 (53.6)	21 (12.9)

The most current agent creating poisoning: SSRIs: Selective Serotonin Reuptake Inhibitors
Sudical and non-sudical group: NSAIDs: Non-Steroidal Anti-Inflammatory Drugs

Generally, the most common poisoning leading to hospitalization included poisoning by Benzodiazepines (23.1%), Tramadol (20.1%), Acetaminophen (12%), alcohol (9.5%) and Tri-cyclic Antidepressants (9.1%). Among suicides, the most common factor was Benzodiazepines (30.9%), Tramadol (19.4%), Acetaminophen (15.5%) and Tri-cyclic antidepressants (13%)

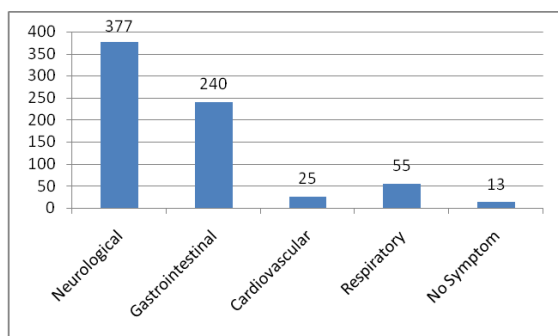
respectively. The frequency distribution of other factors creating poisoning has been shown in Table 6.

81 patients (16.4%) were tachycardia ($PR > 100$) and 15 people (3%) were bradycardia ($PR < 60$) and 9 patients had systolic hypertension under 90mmHg (Table 7).

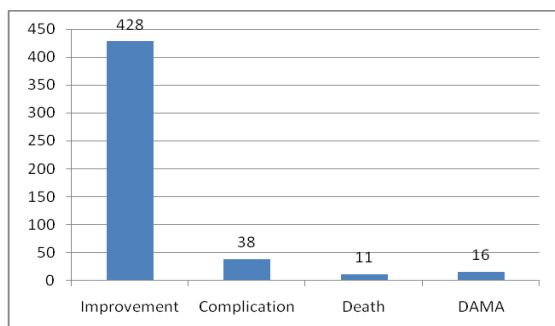
Table 7. Distribution of Frequency of Patient Based on Vital Markers

Vital Markers	Number	Percent	
Hypertension	≥140	58	11.8
	90-139	426	86.4
	<90	9	1.8
Pulsation	>100	81	16.4
	60-100	397	80.5
	<60	15	3

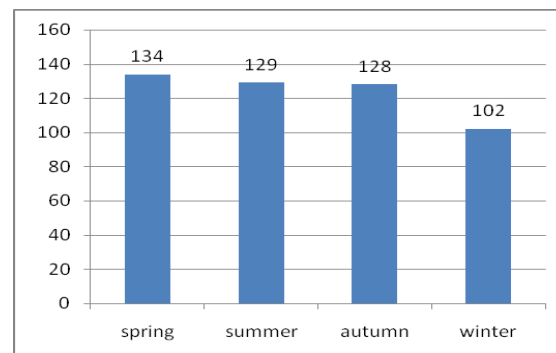
The most common clinical presentation in admitted patients were nervous presentation (consciousness decline, coma, convulsion, agitation and ...). Followed by digestive presentation (nausea, vomit, stomachache, diarrhea and ...) (Diagram 1). Health situation of the patients was improved 7.7% with symptoms (digestive tract irritation, drug itchemic hepatitis, kidney chronic disorder, visual nerve injuries and ...) and 3.2% were released with consent.

**Diagram 1- Frequency Distribution based on Clinical Manifestations**

11 patient (2.2%) were died during hospital stay (Diagram 2).

**Diagram 2. Frequency Distribution based on Condition and Prognosis of Patients. (DAMA: Discharge Against Medical Advice)**

In relation to seasons, the most outbreak poisoning was in spring (27.2%) and the least outbreak was in winter (20.7%) (Diagram 3).

**Diagram 3. Frequency Distribution Based on Season of Referral**

Discussion:

Poisoning are one of the most common causes to refer to emergency wards which can lead serious injuries or even death. Although many poisoning are preventable from death, it is followed by irreparably damages for economic and physical and psychological health of society and families. Regional epidemiologic data about poisonings in programming for intellectual application of sources in order to prevent, poisoning management and also researchs is many helpful. In recent study, we analyzed the epidemiologic characteristic of poisoned patient in Bandar Abbas Shahid Mohammadi hospital.

In this study, the poisoned patients constituted 3.6% of total in emergency department which were higher than studies in Turkey (1.4%) (26), Taiwan (0.4%) (29) and Palestine (1.5%) (28). Of them, almost 35% were admitted for more treatment proceedings which can relate to cultural level, social factors and addiction and also unemployment or psychological factors. But this issue is an alarm for authorities and policy makers in every reason.

The mean age was 25.7 while it was 26.5 (32) and 27.5 (38) in a study in Isfahan and Tehran respectively which its rate was higher in studies in Scotland (30), Turkey (26) and Taiwan (29). The most prevalence was in aged 14-29 while in many other studies with different age rangs, the prevalence has reported more between young people (26,29,31,32,34,35).

The mean age in males and females had no statistically significant difference in our study which it was similar in studies in Greece (27) and Turkey (29,31).

Although, the poisonings in females is higher than males (26,27,29,31,34,35), in our study (1 to 1.08) like a study in Tehran (26) (1 to 1.04), the significant difference were not found while in some other studies males proportion has reported higher (28,30,32).

In this study, most patients were urban (75.3%) which it is emphasized by studies in Greece (29), Gorgan (35) and Isfahan while it is vice versa in Turkey.

Addiction, psychiatric disease and self-poisoning outbreak were 32.3%, 26% and 13% respectively which is higher than other studies. In a study in 2004 in Tehran Loghman hospital, these rates reported 6.76%, 6.3% and 4.5% (36). In next study in Orumieh between 2004-2007. Addiction and intentional self-poisoning was reported 6.3% in a study in Greece.

The results indicate that most poisonings were because of suicide (66.9%) while other causes in 26% of patients have been medicine or drug misuse and in 6.5% have been random sawflow of drug or chemicals and it is uncertain in 0.6%. The most cause have been intentional poisoning (29,31,32,33,34,36,38). This finding demand serious consideration to preventative psychiatric cares even following treatment of physical symptoms with a general vision, the instructions of life skills and social consultations seem very essential.

The poisoning agents were Benzodiazepines (23.11%) and in the second level, Tramadol (20.1%), Acetaminophen (12%), Alcohol (9.5%) and Tri-cyclic anti depressants (17.8%) (36).

In study in Tehran Loghman hospital, those included Benzodiazepines (20.8%) and Tri-cyclic anti depressants (17.8%) (36) while in Scotland, they were respectively alcohol (41%), Tri-cyclic anti depressants (28%), Benzodiazepines (21%), Acetaminophen (19%) and opiates (14%) (30). In many studies, pharmaceutical agents (26,29,30,32,34,36,37) and following pesticides and vegetative toxins have been the most prevalent (29,34).

In suicidal group, these agents have been more multi drugs (53.6% v.s 12.9 in non-suicidal group) and separately Benzodiazepines (30.9%) and following Tramadol (19.4%) and Acetaminophen (15.5%) while in non-suicidal group, Alcohol, Tramadol and opium have been 24.5%, 22.5% and 16% respectively in which 80% of cases have been due to misuse. In many studies, suicidal factors have included pharmaceutical and sometimes multi drug agents (26,28,31,38) and in unintentional cases have been non-pharmaceutical like pesticides and narcotics.

In a study in Tehran Loghman hospital about mortality agents, the most prevalence has been narcotics and following alcohol (36) in Taiwan pesticides which paraquat toxin is highest (29) and in Turkey organophosphates toxins is highest too (26). In recent study between 11 death cases, 5 patients for poisoning by opium and Methadone, 3 patients by alcohol and 1 patient by organophosphates have been died. The mean age in died individuals was higher than alive ones ($P < 0.01$) which was similar to the results in Taiwan's study (29).

Regarding to the most death agent opium combinations), consideration and instruction of treatment personnel is so essential.

The continuous monitoring and airway care should be noticed continuously and repeatedly. Mortality was 2.2% in this study which 0.9% in Greece (27), 1.6% in Turkey (26), 2% in Isfahan (32), 4% in Scotland (30) and above 4% in Orumieh (34), Hamadan (33) and Taiwan (29) was reported. Our study showed that psychiatric disease and previous self-poisoning in suicidal group is higher than non-suicidal group and the addiction in poisoning group for misuse is higher than non-suicidal group and the addiction in poisoning group for misuse is higher than suicidal cases and suicide in females is higher than the males (83.1% v.s 52.1%) and misuse in males is higher than the females (42.4% v.s 8.1%) and average age for suicide is lower than unintentional (23.3 v.s 30.3) ($P < 0.001$). Also this study showed that there is no association between material status and residence ($P > 0.05$). In a study in Isfahan, a significant relationship was found between stimulus and poisoning cause with psychiatric disease and addiction but with a difference that in opposite of

our study, the addiction was higher between suicidal cases and also poisoning stimulus did not relate to age and gender (32). In Turkey, poisoning due to suicide in females, the age of under 26 and married people has been higher significantly (26).

In Palestine, suicide has been seen more between females, too (28).

Unfortunately due to poor information about education level of many patients, this variable was not analyzed in relation to cause and stimulus. In these conditions, suicide was more between the individual who were under deploma (66.2%) which can be due to high suicide prevalence in training adolescents.

Generally, this study showed that most poisoning is intentional and for suicidal purpose and the most has occurred due to drug taking.

Regarding to easy accessibility to drugs by society individuals, promoting prescription culture and presenting drug by physicians and pharmacists specially the drugs with fatal symptoms seem necessary.

In prescribing drugs, sometimes psychiatric conditions and pills number and whether these pills deliver to the patients their close relatives, is not considered.

Also a association was seen between suicidal attempt and psychiatric disease prevalence and previous intentional self-poisoning. Totally, psychiatric disease prevalence, previous intentional self-poisoning and addiction in the poisoned patients in Bandar Abbas Shahid Mohammadi hospital were higher than other places in the country and other countries which can be arised from difference in socio-economic level or culture.

In regard to high suicidal prevalence and the probability of reattempting suicide in this group, it may be prevented by screening various psychologic disease specially in poisoning and psychological cares and early treatment of those like depression (with higher prevalence of suicide) and also by educational and supportive programs for them and their families. Also in repect to high addiction prevalence and drug misuse as the second case after suicide, the mortality is high, too, which demand a special notice to remove addiction.

Respecting poisoning and ignoring hospitalizations and demographic characterestics, there are some other differences including mediator

factors in poisoning and related risk factors and also symptoms and mortality. Due to differences, epidemiologic aspects of poisoning have particular characterestics in every city or country.

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