

# Prevalence of Non-drug Poisoning in Patients Admitted to Hospitals of Mazandaran University of Medical Sciences, 2010-2011

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## Original paper

### ABSTRACT

**Introduction:** Every year million people have poisoning. Most of them will duo to severity of complications. Identifying the pattern of poisoning will help to prevent of them. Because of the non-medicine substance have a wide variety range and easily is used among people, so the aim of this study was to determine frequency of non-medicinal poisoning according to 10th revision of International Classification of Diseases (ICD-10) in hospitalized patient. **Method:** This is a descriptive cross section study. The medical records of

inpatient hospitalized in hospitals of Mazandaran University of Medical Sciences during 2010-2011 were reviewed. The ICD-10 codes for retrieval patient records were T51-T65 which was included alcohol, organic solvent, halogen derivatives, corrosive substance, detergent, metals, inorganic substance, carbon monoxide, gases, fumes and vapors, pesticide, noxious substance has eaten as seafood, noxious substance has eaten as food, unspecified substances. The data were analyzed with SPSS and descriptive and X2 statistics. **Results:** Of the 1546 in patient with diagnosed poisoning, the 581(37.5%)

were non medicine poisoning. Median of age 29±17 years, 231(51.6%) female, 300(51.6%) are intentional, and the most material were insecticide 276 (47.5%), sting 96(16.3%) and alcohol 76(13%) and organic solvent 40 cases and the 38(95%) of them was children. **Conclusion:** According the result of this study the most cause of poisoning was insecticides. Preventive program for all the groups are suggested and for intentional self-harms and suicide attempted the program of consultation is necessary.

**Key words:** Poisoning, Non medicine, ICD, Suicide.

## 1. INTRODUCTION

Introduction: Every year, millions of people are being poisoned by various substances (1). Many patients die due to complications from poisoning (2-5). Mortality due to poisoning has increased dramatically in the United States since the 1970s. The most significant increase was reported in unintentional poisoning mortality rates, which more than tripled from 1990 to 2002(27). Recognizing patterns can help to prevent accidental poisoning. Consumption and poisoning are different due to the different communities. Some sources stated that most accidental poisoning often with cases of deliberate self-poisoning in children and adults over 50 years of youth suicides has

been observed (7). Prevention strategies can be used to achieve the exchange of information cheaper and more convenient ways of the countries with the highest degree of effectiveness can be selected. But before achieving prevention strategies in communities known to be toxic pattern selection strategies are effective. Prerequisite to having pattern of uniform classification system is for consumables. The World Health Organization (WHO) in International Classification of Diseases' Book (ICD), the same Classification system and the international has offered from needed material and its reason. This system can be used for information exchange and the strategies based on the same source data collection

can take maximum advantage (28). Toxicity study using the International Classification of Disease study has been done. These codes comprised 960-995 was used from ICD-9-C-M which considered outdated, which refer to poisoning by drugs, medical and biological substances, as well as toxic effects of substances that are chiefly non-medicinal (29). In Hassani's study was used ICD-10, but for classifying of burn is calculated classes of poisoning (30), Bohnert's study was only due to poisoning (31). Qureshi also study the cause of poisoning (intentional and unintentional) and is considered one of the classes, it is unknown who removed also study the cause of poisoning (intentional and unintentional) and is considered one

of the classes, and it is unknown who removed. In study of Karami and Ahmadi also used the study drugs were classified according to the range of materials used (12-13). It is worth noting that according to most sources, some researchers attempted to classify the range of materials (3-4, 14-15), Botulism is a bacterial origin not that has part of poisoning (16), Finally, it has examined only one type of poisoning (2, 17-20). However, despite the high prevalence of non-drug intoxication due to access easy to use and its effects on high-risk age groups (young and old) have not been considered as a separate (4). Also, due to the lack of uniform data classes are not comparable. Those cases in which the disease is international class model or problems that existed earlier were in the selected classes (9-11). Given that no similar study in the province and did not using the international classification system; and also because of the availability of pesticides and other poisons material is readily available. Therefore, this study aimed to evaluate the toxicity of non-drug using by (ICD). The results of this study to determine the pattern of international non-medicinal poisoning is common in the province. The results obtained with all the other countries that share the same regression. Prevention strategies that can be used in other countries and experience are based on the same data structure can be used.

## 2. MATERIALS

this survey is descriptive and cross sectional and was conducted using data from the medical records of 581 hospitalized patients who have been diagnosed with poisoning in 2010 in hospitals which are affiliation of Mazandaran University of Medical Sciences (22 hospitals except for private and social security health service's hospitals). Because of the importance of the subject, the research society hasn't been under scrutiny or census. The criterion of entering this study was determined by final diagnosis of non-drug poisoning which are in ICD, and leaving the study was the disclaimer of the diagnosis and discharge against medical advice in case of absence of final and definite diagnosis. The variables of this study were age, gender, marital status, general status while hospitalizing and discharging, discharging status Length of stay (LOS), poisoning agent's type, the cause of poisoning (intentional, unintentional, unde-

termined intent, poisoning background (medicinal or non-medicinal), the time between incident of the poisoning and hospitalization, month of the hospitalization. The method was that after preparation the schedule, a pilot study with at least 30 medical records was done and the defects of the schedule was resolved, afterwards with proposal confirmation and getting the warrant of deputy for research, the medical records was taken from the archive and the data was entered in the table. It is important to mention that the book of International Classification of Diseases (ICD-10) is currently used in health care centers, has a letter-number code for every status of disorders with this arrangements study of different categories such as disorders, symptoms, or even poisonings are much easier. The non-drug poisonings according their codes are: poisoning with alcohol (T51), organic solvents (T52), halogen derivatives (T53), corrosive chemicals (T54), detergents (T55), metals (T56), organic chemicals (T57), carbon monoxide (T58), smokes and vapors (T59), pesticides (T60), toxic materials eaten as food (T61), other toxic materials (T62), animal's bite (T63), aflatoxin and mycotoxin (T64), and toxic effect of unknown materials (T65) (8). For legal issues, and also confidentiality principles, we are refused to mention the name of the hospitals, patients, physicians, and presenting date individually. The results were reported after analysis. The data was analyzed using SPSS software, descriptive statistics and chi-square.

## 3. RESULTS

The results show that from all the 22 health care centers across the province only 12 hospitals had hospitalized patients with non-drug poisonings. There were 1546 poisoning cases including medicinal and non-drug, there were 581(37.5%) non-drug poisoning who were hospitalized. There were not any cases with disproved diagnosis or absence of final and definite diagnosis. The average age of pa-

tients was  $29 \pm 17$  which was varied from a one year old to 85 years old. The classification of the age showed that there were 63 people (11%) under the age of 12, 96 people (16.7%) between 13- 19, 200 people (34.8%) between 20-30, 79 people (13.7%) between 31-40, and 135 people (23.8) 41 and over. There were 231 (39.8%) female and 350 (60.2%) male. From the 231 women (39.8%) in the study group 141 people (61%) were poisoned intentionally and 82 people (35.5%) were poisoned unintentionally whereas, from the 350 men in the study group 159 people (45.4%) were poisoned intentionally and 166 people (47.4%) were poisoned unintentionally. In other cases (30 people) the cause of poisoning was unknown. Chi-square test showed two correlations between the cause of poisoning and gender ( $X^2=14$ ,  $p\text{-value}=0/001$ ,  $DF=2$ ). The Length of stay of hospitalization was  $2 \pm 2$  days and the maximum time between the poisoning occurred and hospitalization was two hours. In whole 300 people (51.6%) were poisoned intentionally and 248 people (42.7%) were poisoned unintentionally and the intents of others poisonings were unknown. In case of background, 38 people (6.6%) had previous history of poisoning, 410 people (70.6) people without history and others were unknown. Other characteristics of the patients are gathered in Table 1. Results of the status of the patient entering the hospital and while discharging are gathered in Table 2 and the causes of poisonings are in Table 3. The second Chi-square test ( $X^2=27$ ,  $p\text{-value}=0/006$ ,  $df=12$ ) showed a meaningful correlation between the age and the status of the patients while dis-

F (%)	Season	F (%)	Marital
178(30.6)	Spring	198(34.1)	Single
194(33.4)	Summer	269(49.3)	Married
125(21.5)	Autumn	53(9.1)	Child
84(14.5)	Winter	61(10.5)	Not Specified
581(100)	Total	581(100)	Total

**Table 1.** Frequency of marriage and months of hospitalization in patients diagnosed with non-drug poisonings in the Mazandaran province in 2011-2012

F (%)	Discharged condition	F (%)	Patient's condition at Discharge Time	F (%)	Patient's condition at arrival Time
532(91.5)	Physician order	452(77.8)	Improvement with follow-up	401(69)	Relative and Alert
38(6.5)	Discharge Against Medical Advice	128(22.1)	Death	148(25.4)	Ill but Alert
11(1.9)	Escape from the hospital	1(0.1)	Not specified	32(5.5)	Coma
581(100)	Total	581(100)	Total	581(100)	Total

**Table 2.** Frequency of Patient's condition at arrival time, discharge time, discharged condition of hospitalization in patients diagnosed with non-drug poisoning in the Mazandaran province in 2011-2012

F (%)	Agent	F (%)	Agent
5(0.9)	Vapors and gases(T59)	76(13)	Alcohol (T 51)
276(47.5)	Insecticide(T60)	40(6.9)	Toxic effect of organic solvents(T 52)
35(6)	Substances eaten as food(T62)	26(4.4)	Toxic effect of corrosive substances(T 54)
96(16.3)	Sting(T63)	2(0.4)	Toxic effect of metals(T 56)
14(2.5)	Unspecified substances(T65)	11(0.9)	Toxic effect of carbon monoxide(T 58)
581(100)	Total		

**Table 3.** Frequency of Toxic agents in patients with non-drug poisonings in the province in 2011-2012

F (%)	Agent name
125(45.2)	Organophosphate insecticides
71(25.8)	Other insecticides
8(2.9)	Herbicides and fungicides
43(15.5)	Other pesticides
8(2.9)	Are rodenticides
21(7.7)	Unknown pesticides
276(%)	Total

**Table 4.** Frequency of pesticides in patients with non-drug poisonings in Mazandaran province in 2011-2012

charging, also death in age group of 40 and over, was higher than other groups, 18 people (47%). The correlation between status of the patient when was hospitalized in state of but alert with the status of the patient while discharging showed that 22 people (57%) were died which was meaningful statistically ( $X^2=1/4$ ,  $p$ -value=0/000,  $df=21$ ). Results showed that in cases of poisoning with alcohol mostly the kind of alcohol was not mentioned. There were 38 people (95%) poisoned with organic solvents, 125 people (45.2%) with organophosphate insecticides and 43 people (15.5%) with cyanide. Frequencies of different types of pesticides are gathered in table 4. The most cases of bite were 17 people (2.9%) were only known to be from arthropods family and there was no mention of the name of the species. There were no observation of the codes T53, T55, T57, T61, and T64.

#### 4. DISCUSSION

WHO in the 2<sup>nd</sup> volume of ICD-10 has defined poisoning: poisoning and certain other consequences of external causes, poisoning by drugs, medications and biological substances (accidental poisoning and poisoning of undetermined intent by alcohol or dependence-producing drugs). Within this description some terms like intent of the user (or terms of encounter) were studied in three categories: intentional, unintentional and unknown. Intention definition was used for of suicide and homicide cases. In cases of unintentional encounter of poisons we can mention encountering agricultural poison while using pesticides, eating poisonous

or vegetables, encountering some gas or insect bites. The side effects of the medicines in treatment dosage should not be considered as poisoning. Results showed that non-drug poisoning was the 37.5% of the total poisonings which was 28.4% in Karami's study in 2000-2002, 20.7% in Ahmadi's study (13,14). In Hosseinian Moghadam's one year study from the total 11456 patients admitted to Loghman, 2003 people (0.17%) had non-drug poisoning (10).

Bohnert in a ten years study, unintentional poisoning mortality rates higher in men than in women; however, the increase in rate over time was higher in women than in men (6). In Moghadamnia's ten years study which had a glanced at poisoning in west Mazandaran province reported that because of the variety and widespread usage of pesticides, petroleum and carbon monoxide outbreak of the non-drug poisonings has increased (7).

Result showed that considering gender, male were more than female in number which do not agree with the results of the study of Rafighdoost, Sarjam'ee, and Moosavi (18, 21, 22). In a 12 years study by Yeganeh, in 2005 the majority of the population in the study were women and in 2001 majority were men (18). This increase in rate may represent the fact that men have more encounters with poisons which related jobs and maybe the courage of using poisons especially in case of suicide.

In average; the non-drug poisoning was high in young individuals in the society. In Sarjamiee's study 19.8% the patients were between 12-18 years old (22), in Moosavi's study 80.4% were between 15-30 year old (23), in Karami's study 47.4 were between 12-30 years old (12), in Nazari's study 25.5% were between 20-29 year old (21), and in Tofighi's study the majority of frequency was amongst 21-30 years olds (2). We cannot definitely explain a reason for it but we may relate this to audacity of young people using toxic materials for suicide, and ease of access

or in children lack of knowledge about the materials or accidental access. The results showed that 53 children (9.1%) were poisoned, mostly with Kerosen. In this case it may be the negligence of the parents or using bottles water container's for keeping Kerosen. In Kashef's study using medicine and then animal bites (25), in Basu's study petroleum (26), in Besharat's study opium (20), in Assar's study hydrocarbons were the poisoning agents in children (15). As said above accidental access, negligence of the parents, and lack of knowledge about the material may be the main causes of these poisonings.

The results showed that from two hours after poisoning the patients went to hospital, while in Afzali's study 54% patients the average of time was more than 6 hours (1). In Ahmadi's study it took for most of the patients (37.2%) about 2 to 6 hours to get to the hospital and for others 2 hours after the poisoning occurred (14). In Afzali's study 54% of the patients were admitted to the hospital after more than 6 hours (3). This time difference have different reasons like increased access to public health, increases use of personal and public transportation and even the knowledge of the patients.

The results showed that the poisonings are higher in summer followed in spring. In Mehdizadeh's study in winter, in Tofighi's study in October till March, and Nazari's study was in winter. In Moghadamnia's study the poisoning agent has a different outbreak in some seasons. For example during war poisoning with chemical gases and carbon monoxide but in winter and during planting seasons agricultural poisonings are more being reported (8). Because agriculture has seasonal prevalence in Mazandaran province, and it starts from the early spring till the end of summer or middle of the autumn so it may seem that in cases of encountering with agricultural poisons especially in farmers, it is mostly about disregarding the essential principles while using them.

It is clear in this study that 51.6% of the poisonings were intentional it was 47.2% in Karami's study, 85% in Ahmadi's study, 60% in Najari's study, 72.2% under the age of 30 in Afzali's study, 82% in Sarjam'ee's study, suicide rate in Qian's study was 25%, in Mehdizadeh's study 63%, in Asar's study 6.2%, in Rafighdoost's study 78.4% of organophosphate poisonings were intentional. In Ye-

ganeh's study 97% of usage of depilatory was intentional (18). In contrast in Ahmadi's study 5.2%, Kashef's study 90%, in Qian's study 64.7%, Farshi's study 95%, Hu, Yu 56%, in Rafighdoost's study 13.7% were unintentional. All of the poisonings with carbon monoxide were unintentional (20). This instance shows the high occurrence of self damaging poisoning and intended suicides or even pretending as it is a suicide.

The results showed that the most common poisoning agent was the pesticides. Also in Afzali's study the organophosphates and herbicides, in Tofighi's study there were 753 cases of carbon monoxide poisoning in one year, in Yeganeh's study during 12 years depilatory (18), in Moosavi's study organophosphate, alcohol and industrial materials, in Rafighdoost's study 51 cases of organophosphate in one year (18), Nazari in 5 years 3078 cases of carbon monoxide (20), Qian in addition to the drugs chemicals like cyanide, pesticides, carbon monoxide, alcohol, bites, metals, and a mixture of some materials were found (24). Hasanian, Moghadam Nia, Ahmadi and Afzali reported as following: pesticides and alcohol, Ahmadi alcohol, carbon monoxide and industrial materials, environmental poisons, Afzali organo phosphate and depilatory. It seems that the variety of the poisoning agents is the same in most of the places which it could due to the result of the ease of access, being cheap and even ease of usage for suicide.

The results of this survey showed that 6.5% of the patients died. The table of age classifications and patients status while being discharged showed that in the age group of 40 and over the death rate (47%) was higher which was in the contrast with the results of the Afzali and Najjari's study which the most of the patients who died were (3- 4). In Moosavi's study from the 178 hospitalized patients 3 subjects (1.6%) died and in Nazari's study there were 11.2% died of carbon monoxide poisoning (21, 23). In Qian's study in 10 years there were 218 deaths and in Ahmadi's study 27 patient (1.3%) died of organophosphate and karbamate insecticides poisonings. In Afzali's study 11 patients (3.8%) died of opioids, depilatory and aluminum phosphate. Therefore,

it seems that poisoning still has a high mortality range and needs health department's managers' consideration from the aspect of prevention.

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