ORIGINAL ARTICLE

An Epidemiological Study of Alcohol Poisoned Patients Admitted to the Sina Educational Hospital Tabriz-Iran

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Abstract

Background: Alcohol poisoning causes several clinical signs and symptoms. The present study was carry out to examine the epidemiology and characteristics of poisoned patients with alcohol, who were treated at the Sina hospital Tabriz in Iran.
Purpose: The purpose of this study was to determine the clinical features and laboratory tests in alcohol poisoning.
Methods: In the current expressive cross-sectional report, during 2018-2020 details were obtained over referring to all 91 alcohol poisoned patients' files. The data were obtained based on the time interval between poisoning and time of admission to hospital. The data were then analyzed through SPSS software and descriptive statistics.
Results: All over this period, 91 cases of alcohol-poisoned patients were hospitalized, out of which 81 patients (90%) were male and 9 patients (10%) were female. Mostly ethanol was used in poisoning (68.7%) and methanol (28%). 56% of alcohol poisoned patients used alcohol for euphoria, 33.3% used it for suicide, and 10.7% used it recreationally. Most poisoning symptoms occurred between 6 to 12 hours after poisoning. Neurological symptoms occurred among 70 patients (76.9%), 52 cases (57%) had gastrointestinal symptoms, and 19 patients (20.8%) had visual symptoms.
Conclusion: Most of poisoned patients were men below the age of 30 years and unemployed. Alcohol consumption for euphoria were more common among people with higher education occasionally for recreation and those with high school education level were for suicide to get rid of problems from living environment. Particular attention of health authorities should be directed towards alcohol drinking prevention measures as well as production and availability of surrogate alcohols in the community.

Keywords: Alcohol, Complications, Poisoning, Epidemiology, Iran

INTRODUCTION

Alcohol use is considered among the most important medical issues and its high consumption leads to chronic and acute diseases [1]. In USA, as a result of alcohol poisoning, an average death of 2221 people older than 15 years during the years 2010 to 2012 has been recorded [2, 3]. In Europe, the increased daily use of alcohol by more than 10 grams enhances the risk of dying from alcohol related diseases and crime. It is claimed that about two-thirds of deaths from alcohol consumption in European Union have occurred between the ages of 45 to 64 years [4]. The results of Chen et al. in China showed that 54% of poisoning in this country is caused by alcohol and 25% is caused by drug and that alcohol poisoning causes 12.5% of deaths [5, 6].

In Iran since 1979, any preparation, production, distribution, and drinking of alcoholic beverages is illegal and legal alcohol consumption is limited to medical or industrial purposes. For this reason, only few people prepare or produce illegal alcoholic products in order to drink. These people suffer from many complications due to drinking ethanol or toxic alcohols [7, 8]. An extensive study conducted in 10 provinces of Iran showed that 18.8% of students aged 13-18 used illegal substances at least once in their lifetime [9]. The study of Mostafazadeh and Eghbal showed that 18% of alcohol poisoned patients died despite receiving medical assistance and 14% got blind during the discharge [10]. The review of the prevalence of alcohol poisoning in northwest Iran reported the deaths from methanol poisoning to be 20% [11].

Mechanisms involved in the complications of long-term consumption of alcohol including toxic biochemical effects on the body, which leads to different diseases with highest damage, is made to the central nervous system and causes both risk of unintentional and intentional injuries, social harms, and alcohol dependence [2].

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The decrease of life expectancy by 10 to 15 years is more common among alcohol-dependent people. In addition, the rise in suicidal attempts, murder, drunk-driving accidents, assault, rape, crimes of violence, and child abuse are the consequences of alcohol use [10, 11]. In comparison to nonalcoholic persons, the suicidal attempts are more prevalent (10- 69%) in alcoholic people [12].

Researchers have linked alcohol consumption to more than 60 diseases and the highest incidence of death and disability is related alcohol use [13]. Deaths related to alcohol poisoning affect all age groups, however, are most usual among adults. Also late toxicity caused by methanol use (12 to 24 hours) results in stroke, visual disturbances, Parkinsonism, paralysis, polyneuropathy, and dead [14]. However, the average volume of alcohol intake leads to liver cirrhosis, mental disorders, a variety of cancers, pancreatitis, diabetes, congestive heart failure, hypertension, seizures, pneumonia, fetal alcohol syndrome, recurrence of psoriasis, and progressive damages to the ovaries [15-18]. However, the ingestion of little pure methyl alcohol and the inhalation of its vaporizes may cause clinically blindness or death [19]. In addition, psychological problems such as depression, anxiety disorders, and psychosis are more common among alcoholic patients, who suffer from arthritis, headaches, and lower back pain [20].

Methanol, ethanol, ethylene glycol, diethylene glycol, propylene glycol, and isopropanol are among the alcohols, which commonly cause poisoning. The poisoning mostly occur recreationally and unintentionally or intentionally aiming to commit suicide and euphoria. The only normal route of alcohol is drinking orally, but other more exotic routes are used in occasions such as inhalation, skin absorption, and injection [21].

Timely detection and recognition of clinical symptoms plays a key role in the diagnosis of alcohol poisoning. The clinical sign and symptoms observed during acute ethanol poisoning include the impairments in judgment, attention and social or occupational functioning, loss of coordination, changes in behavior, amnesia, slurred speech, double vision, hypothermia, abdominal pain, upper gastrointestinal (GI) bleeding, nausea and vomiting, hyperreflexia, respiratory depression, coma and death [22].

However, methanol poisoning is followed by mood changes and GI manifestations within the first 6 to 24 hours and end organ damage, specially characterized by neurological symptoms within 72 to 96 hours after poisoning [23]. In addition, the interval between poisoning and transfer to the emergency unit affects the severity of clinical symptoms. The purpose of the research was to present the analysis of acute alcohol poisoning, incidence of deaths in alcohol poisoning, and identify factors associated with the alcohol poisoning admitted to Toxicology section Sina hospital Tabriz University of Medical Sciences, Iran.

METHODS

The current research is a descriptive study, consisted of all patients poisoned with alcohols referred to the Sina hospital, Tabriz University of medical sciences/ Iran from January 1, 2018 to 31, December 2019. The study included an initial sample size of 94 patients of whom 3 patients were excluded due to lack of cooperation in completing the questionnaire. Finally, 91 alcohol poisoned patients remained in the study. The inclusion criteria included type of consumed alcohol, the interval between poisoning and admission, the reason or causes of poisoning, and clinical signs and symptoms.

Exclusion criteria included patients' lack of consent to cooperate in the project, history of taking hepatotoxic drugs, and liver diseases. Therefore, these patients were excluded from the study. Furthermore, in this study, a specialized poisoning questionnaire was formulated and type of consumed alcohol, the interval between poisoning and admission, the reason or causes of poisoning, and clinical signs and symptoms were recorded. To investigate validity and approve the questions of the tools in terms of simplicity, clarity, and relevance, the questionnaires were given to the 10 faculty members. After analysis, necessary revisions were made to phrases of the questionnaires. To examine the accuracy of the questionnaires the internal consistency reliability method was used. Cranach's alpha coefficient was calculated 0.7. The obtained data was analyzed by using SPSS and descriptive statistics were calculated.

Additionally, a poisoning questionnaire was developed to indicate the type of consumed alcohol, the interval between poisoning and admission, the reasons/causes of poisoning, and clinical signs and symptoms were recorded.

In the present study, all the necessary permissions were obtained from the Ethics Committee of Tabriz University of Medical Sciences (IR.TBZMED.REC.1393.257) and required coordination was made with Poisoning Ward of Sina Hospital. After obtaining the informed consent from patients, they were included in the study.

The diagnoses of alcohol poisoning was based on the history provided by the patient. However, observing the container label, clinical signs, symptoms, and paraclinical findings were used to detect the poisoning. The detection of consumed alcohols i.e., methanol and ethylene glycol was confirmed by laboratory tests.

The data collection tools contain demographics and specialized poisoning questionnaires, which were completed bedside interviews with patients. After completion of the study, the data collected from the questionnaires were accurately reviewed and entered into SPSS v 22. Then, the results were analyzed using descriptive statistics (frequency, percentage). After completing the form, blood samples were immediately taken from the patients for laboratory tests, which were performed in the laboratory. Finally, the results were reviewed and noted. Likewise, the results of vital signs, neurological, digestive, vision, and the laboratory tests of alcoholic intoxication in different time intervals were analyzed by chi-square test and ANOVA.

RESULTS

In this study, 91 poisoned patients willingly participated. Table 1 reports the demographic features of the poisoned patients by gender, age, marital, education, and employment. The results indicate that 81 alcohol poisoned (89%) were male and 10 patients (11%) were female. The highest incidence of poisoning occurred between 20 and 29 years of

age (34.5%), below 20 (25.3%), and between the ages of 30 to 39 years (24.2%), respectively. 50% of alcohol poisoned patients were unmarried and 44% were married. Most alcohol poisoned patients were educated and self-employed living in Tabriz city (76%).

Table 2 shows poisoning characteristics of the participants and indicates that most commonly used alcohols in poisoning were attributed to ethanol (68.7%) and methanol (28%). Only 2.2% of cases consumed either ethylene glycol or diethylene glycol. Mostly the causes of poisoning in 58.25% were connected to the recreation and 30.77% intentionally made suicide attempt. However, 10.98% accidental or unintentional cases were recorded.

The time interval between consumption and symptoms induction is given by Table 3. However, different data were recorded from the patient's arrival up to 72 hours to the emergency department. A high percentage (about 44%) of symptoms occurred in between 0 to 6 hours. The lowest percentage belonged to the hours between 24 and 36. The clinical findings of alcohol-poisoned patients is shown in Table 4. As it is shown, the most common clinical

manifestations related to nervous system were reduced consciousness (23.1%), vertigo and headache (16.5%), impaired papillary response (8.8.%), mental problems (7.7%), restlessness (5.5%), seizure (4.4%), and weakness (3.3%).

DISCUSSION

This regional study in northwest of Iran was carried out before the concurrent outbreak of COVID-19 and methanol poisoning in Iran. In the present study, the age of alcohol poisoned patients ranged from 20 to 29 years old. Most of the poisonings were observed under 20 years and between 30 and 39 years. This indicates that alcohol use is more common among young and middle-aged people. The results of our study are comparable to other studies that have already been done in Iran [9, 24].

According to Chan et al., alcohol poisoning occurs at the age of 32 and younger than 25 years [5]. Other reports suggest that the use of alcohol is often driven by motives to create pleasure, fun, and stress relief. In addition, alcohol consumption is more common among high social and rich people, other factors such as unemployment, brain and nervous disorders are the main cause of alcohol poisoning [11, 25]. According to our study, men represent alcohol poisoning 9 times more than women. Almost similar data obtained among both married/ unmarried patients.

Table 1. Demographic details of the poisoned patients with alcohols (n=455)

Common features	Number	Percent
Gender		
Male	81	89%
Female	10	11%
Age		
20<	23	25.3%
20-29	31	34.5%
30-39	22	24.2%
40-49	6	6.6%
50-59	7	7.7%
60-70	2	2.2%
Marriage		
Single	46	50.5%
Married	40	44%
Divorced	5	5.5%
Education		
Illiterate	20	21.97%
Under diploma	34	37.39%
Diploma and higher	37	40.64%
Employment		
Free job	41	45%
Household	6	6.6%
Worker	13	14.3%
Farmer	2	2.2%
Student	7	7.7%
Unemployed	19	20.9%
Others	3	3.3%

Table 2. Poisoning features among (Methanol, Ethanol, Ethylene glycol and Diethylene glycol) poisoned patients

Common features		Number	Percent
Agent of poisoning			
Methanol		25	27.5%
Ethanol		62	68.1%
Ethylene glycol		2	2.2%
Diethylene glycol		2	2.2%
Causes of poisoning			
Unintentional	accidental	10	10.98%
	Homicide	0	0%
Intentional	suicide	28	30.77%
	Amusement	53	58.25%

Table 3. Incidence of neurological symptoms in different time intervals after alcohol poisoning.

Time intervals after alcohol poisoning	Number	Percent
0-6	40	44%
6-12	32	35.1%
12-24	8	8.8%
24-36	2	2.2%
36-48	5	5.5%
48-72	4	4.4%

Table 4. Clinical manifestation of the (Methanol, Ethanol, Ethylene glycol and Diethylene glycol) poisoned patients

Clinical Manifestation	Number	Percent
Nerve system		
Vertigo	15	16.5%
mental problems	7	7.7%
Headache	15	16.5%
Cautiousness problem	21	23.1%
Weakness	3	3.3%
Seizure	4	4.4%
Restlessness	5	5.5%
Decreased papillary response to light	8	8.8%
Total	70	76.9%
Gastrointestinal and liver		
Stomach pain	5	5.5%
Nausea and vomiting	47	50.6%
Diarrhea	1	1.1%
Gastrointestinal bleeding	0	0%
Impaired liver enzymes	0	0%
Total	52	57.1%
Visional Disturbances		
Blurred vision	19	20.9%
Blindness	0	0%
Double vision*	0	0%
Kidney		
Impaired renal function	0	0%
Prognosis		
Death	0	0%
Full recovery	91	100%

* During hospitalization

Mohammad khani showed that in Iran the poisoning ratios between men and women are 29.8% and 7.5%, respectively. Also in other studies, Chen et al. in China (65% males) and the Kanny et al. in the USA (76.4% males) indicate that highest percentage of alcohol poisoning occurred in men [9, 5, 1]. Moreover, male gender is one of the risk factors for the use of alcohol, cigarettes and other drugs, and various studies confirm this finding [25].

According to the present study, alcohol poisoning occurred mostly among people with academic education, diploma, and under diploma. It has been reported that the prevalence of alcohol use among pregnant women was higher at ages of 35 to 44 years, and in college-educated and employed women [26]. In terms of occupational status, most alcohol poisoned patients were self-employed, worker, or unemployed. The higher rate of alcohol use in self-employed people can be due to long working hours and not having enough time to participate in appropriate recreation and insufficient information on the side effects of alcohol use. In the unemployed and workers, the higher rate of alcohol use could

be due to the economic problems and lack of appropriate recreation. Therefore, according to our study, alcohol poisoning among residents of Tabriz City was 3 times higher in comparison to its own towns and rural areas. Usually, the access to a variety of alcohols is more in large cities. In addition, high social relationships, lack of proper control over the family members, and people's willingness to participate in friendly parties are among the other causes of higher alcohol use in large cities [24].

The study of McMahon et al. showed that methanol and ethylene glycol poisoning is unusual comparing with ethanol poisoning [27]. Sanap and Chapman showed that ethanol poisoning is common, but the death from ethanol poisoning will be less if timely diagnosed and treated. However, severe ethanol poisoning is followed by spinal cerebral palsy, respiratory failure, and death [28]. The reports of Tuusov et al. in Estonia and Jones et al. in Sweden showed that ethanol poisoning is the greatest cause of death [29, 30].

In the present study, the most common cause of poisoning was using alcohol in order to enhance the fun and recreation and intentionally committing suicide. Euphoria was the greatest cause of alcohol use in single and divorced males under 20 with academic education and diploma. The studies showed that among the psychological causes, frustration and impatience as well as depression and melancholia played the most important role in tendency for alcohol use. Moreover, economic and social causes, communication with perverted peers, and strained family relationship are seriously correlated with the use of alcohol and drugs [11, 25].

The results obtained by Yoon et al. in the USA showed that alcohol poisoning caused mortality in widowed, single, and divorced patients. Meanwhile, mortality was higher in diploma and under diploma patients compared to patients with academic education [31]. In this study, suicide was the most common cause of alcohol use in married and widowed females of 20 to 29 years old under diploma with education level of reading and writing. The results of Lio et al. in China showed that 25% of alcohol poisoning was to commit suicide [6]. In another study, McDowell et al. in New Zealand showed that 67% of death was due to intentional poisoning in the age group of 25-44. The greatest cause of intentional poisoning in this study was reported to be carbon monoxide, methadone, morphine, heroin, and ethanol, respectively [32].

Moreover, the findings of our study showed that most symptoms of poisoning occurred 6 to 12 hours after alcohol use and the majority of poisoned patients had neurological, gastrointestinal, and visual symptoms. Out of 91 poisoned patients, 78 cases experienced neurological symptoms, 53 persons had gastrointestinal symptoms, and 19 patients had visual problems. Dizziness, headaches, and impaired consciousness were the highest percentage related to the neurological symptoms. Nausea, vomiting, and abdominal pain were the most common gastrointestinal disorders and blurred vision was the most common visual symptom. Previous studies showed that ethanol poisoning leads to nausea and vomiting, which thereby stimulates the parasympathetic nervous system (PSNS) through increasing the risk of heart blocks [33]. The results of Hovda et al., who examined methanol poisoning from 2002 to 2004 showed that

visual impairment (55%), dyspnea (41%), and gastrointestinal symptoms (43%) were the most common clinical symptoms in poisoned patients [34]. Methyl alcohol poisoning causes blindness within 12-48 hours and due to severe damage to the optic nervous system has also been reported [35]. However, these symptoms may be continued for the next 72 to 96 hours in case it is combined with ethanol [36].

LIMITATIONS

The accuracy of data presented in this article is limited by the fact that patients, who were admitted and treated in other tertiary hospitals in the region other than Sina hospital, were not included. Our next limitation is related to data collection from files in which minor complications in may not be included.

CONCLUSION

The results of this study showed that the tendency to drink alcohol is higher in teenagers and young adults. This is very worrying because most teenagers, who start drug use at the early years of adolescence, will continue taking it in the next years and this leads to an increase in the mental, social, and health problems. On the other hand, it entangles the efficient young class of society, which leads to economic problems in the family and the society. According to the results, it is emphasized that preventive programs should start at earlier ages. Meanwhile, a plan should be arranged to improve occupational status, provide marriage conditions, create entertainment venues and programs for youth, present counseling programs for parents to train children, and increase hospital equipment for early diagnosis and intensive treatment against morbidity and mortality of alcohol poisonings.

The manuscript is our original work. All data, used in the manuscript are prepared originally and part of dissertation submitted for pharma D degree.

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