A Ten-Year Study of Drug Poisoning Cases Admitted to the Intensive Care Unit of 5 Azar Hospital in Gorgan, Iran

Mohammad Shokrzadeh[1], Reza Hoseinpoor[2], Danial Jafari[2], Azam Delaram[3], Akram Pouyan Sadr[3], Mehrnoosh Deylami[2], Yaghoub Shayeste*[2]

1. Pharmaceutical Sciences Research Center, Department of Pharmacology and Toxicology, Faculty of Pharmacy, Mazandaran University of Medical Sciences, Sari, Iran

2. Health Management and Social Development Research Center, Golestan University of Medical Sciences, Gorgan, Iran

3. 5 Azar Hospital, Golestan University of Medical Science, Gorgan, Iran

ABSTRACT

Background and objectives: Drug poisoning is a serious global health problem that sometimes requires hospitalization and intensive care. This study investigates clinical and demographic profile of acute poisoning cases admitted to the intensive care unit (ICU) of 5 Azar hospital in Gorgan, Iran.

Methods: This cross-sectional descriptive study was carried out on 440 acute drug poisoning cases (224 men and 190 women) who had been admitted to the ICU of the hospital from March 2008 to March 2018. Data were collected with a checklist and using the census method. The collected data were analyzed using SPSS (version 16) and the Chi-square test.

Results: Of 440 cases, 54.1% were male and 43.7% were aged 20-29 years. Suicide attempt by self-poisoning was the most important type of poisoning (70.8%). Benzodiazepines (38.9%) and narcotic drugs (18.6%) overdose was the most common cause of acute poisoning. The majority of incidents (72.7%) were caused by a single drug. The average length of stay in the ICU was 4.21 ± 3.45 days. Acute poisoning-related mortality rate was 4.1%, which was primarily due to the use of narcotic drugs.

Conclusion: Benzodiazepines and narcotics are the primary agents involved in acute poisoning requiring critical care. Moreover, methadone-based narcotics are the main cause of drug poisoning-related mortality.

Keywords: Intensive care, Drug poisoning, Poisoning, Gorgan

INTRODUCTION

Poisoning is one of the main causes of morbidity and mortality around the world (1). Changes in lifestyle and social behavior of individuals have contributed to the rising prevalence of this health challenge, which is often associated with increased risk of hospitalization, morbidity and mortality (2, 3).

Acute drug poisoning is an important type of chemical poisoning (4), which accounts for a large number of cases referred to treatment centers (3). Approximately 15% of poisoning cases admitted to health centers and hospitals require intensive care (7). In this regard, early diagnosis and timely initiation of appropriate treatment can play a vital role in reducing the risk of mortality (5). In Iran, there are no accurate statistics on the incidence of poisoning, but the poisoning mortality rate is estimated to be 8 per 1000 people in hospitals and 209 per 1000 patients in intensive care units (ICUs) (8). Given the increased prevalence of drug poisoning-associated morbidity and mortality and the importance of providing intensive care for treatment of acute poisoning, the present study investigated demographic and clinical characteristics of drug poisoning cases admitted to the ICU of 5 Azar Hospital in Gorgan, Iran.

MATERIAL AND METHODS

This was a cross-sectional descriptive study that was conducted on all acutely poisoned patients who had been admitted to the ICU of 5 Azar Hospital in Gorgan (Iran) between March 2008 and March 2018. Poisoning was confirmed based on the results of clinical examinations and laboratory findings. Inclusion criteria were having a complete medical record in the hospital and age of 12 years or older. Data collection tools included a checklist comprising of 20 items on demographic information (6 items) and clinical features (14 items). The checklist was completed for 414 cases based on their medical records. The collected data were analyzed using SPSS software package (version 16) and the Chi-square test at significance level of 0.05.

RESULTS

Mean age of subjects was 19.53 ± 14.39 years (range: 12-93 years). The majority of subjects were male (54.1%), married (47.3%), employed (32.1%), aged 20-29 years (43.7%), with high school diploma (46.6%) and living in urban areas (81.4%) (Table 1).

Most cases were admitted in summer (126 cases, 30.4%) and spring (110 cases, 26.6%) (P = 0.052). In terms of admission time, most cases were admitted from 12:00 to 18:00 (148 cases, 35.7%) and from 18:00 to 24:00 (134 cases, 32.4%). Other cases were admitted from 24:00 to 6:00 (82 cases, 19.8%) and from 6:00 to 12:00 (50 cases, 12.1%).

Table 1. Demographic characteristics of the studied population

Variable		Number	Percent	P-Value
Gender	Male	224	54.1	P=0.051
	Female	190	45.9	
Age group	12-19	88	21.3	P<0.001
	20-29	181	43.7	
	30-39	67	16.2	
	40-49	35	8.5	
	50-59	17	4.1	
	60 and above	26	6.3	
Marital status	Single	185	44.7	P<0.001
	Married	196	47.3	
	Divorced/Widowed	15	3.6	
	Not stated	18	4.3	
Employment status	Unemployed	122	29.5	P<0.001
	Employed	133	32.1	
	Homemaker	88	21.3	
	High school student	38	9.2	
	University/college student	10	2.4	
	Not stated	23	5.6	
Education level	Illiterate	24	5.8	P<0.001
	Elementary	38	9.2	
	Secondary	71	17.1	
	High school diploma	193	46.6	
	University degree	46	11.1	
	Not stated	42	10.1	
Place of residence	Urban	337	81.4	P<0.001
	Rural	77	18.6	

Benzodiazepines (38.9%), followed by narcotics (18.6%) and tramadol (16.9%) were the most frequently used drugs. Results of the Chi-square test indicated that poisoning with benzodiazepines, barbiturates, antidepressants (other than tricyclic antidepressants), analgesics, antipsychotics, narcotics, tramadol and amphetamines were significantly more prevalent in men than in women. In contrast, acetaminophen, tricyclic antidepressants, non-steroidal anti-inflammatory drugs and antihistamines poisoning was significantly more common in women than in men (Table 3).

Table 3. Frequency of acute drug poisoning based on the type of drug

Drug category	Total	Men		Women		P-value
		Number	Percent	Number	Percent	
Acetaminophen	13	3	23.1	10	76.39	P<0.001
Benzodiazepines	161	89	55.3	72	44.7	P<0.001
Barbiturates	11	6	54.5	5	45.5	P<0.001
Tricyclic antidepressants	38	14	36.8	24	63.2	P<0.001
Other antidepressant	12	8	66.7	4	33.3	P<0.001
Anticonvulsants	31	17	54.8	14	45.2	P<0.001
Antibiotics	12	6	50	6	50	P=0.65
Analgesics	5	3	60	2	40	P<0.001
NSAIDs	29	12	41.4	17	58.6	P<0.001
Antipsychotics	26	15	57.7	11	42.3	P<0.001
Narcotics	77	48	62.3	29	37.7	P<0.001

Tramadol	70	53	75.7	17	24.3	P<0.001
Beta blockers/angiotensin-receptor blockers	43	22	51.2	21	48.8	P=0.55
Antihistamines and anti-allergens	11	2	18.2	9	81.8	P<0.001
Amphetamines	5	4	80	1	20	P<0.001
Unknown	34	18	52.9	16	47.1	P=0.48
Other	42	18	42.9	24	57.1	P<0.001

NSAID: non-steroidal anti-inflammatory drugs

The average length of stay in the ICU was 4.42 ± 3.47 days in men and 3.88 ± 3.46 days in women (overall average 4.21 ± 3.45 days). Regarding the clinical signs at the time of admission, change in consciousness was observed in 359 cases (86.7%) and 99 cases (23.9%) had a GCS score of 8 or less. This phenomenon was more commonly observed in men (64 cases, 28.6%) than in women (35 cases, 18.4%) (P=0.001). Respiratory distress (115 cases, 27.8%) and gastrointestinal problems (95 cases, 22.9%) were also present at the time of admission.

The treatment measures taken for the management of patients included oxygen therapy (385 cases, 93%), intubation and mechanical ventilation (268 cases, 64.7%), charcoal-sorbitol mixture (209 cases, 50.5%), lavage (170 cases, 41.1%), inotropic agents (114 cases, 27.5%), anti-dote (107 cases, 25.8%), alkaline diuresis (65 cases, 15.7%) and other treatment methods (132 cases, 31.2%). Concerning the outcomes of poisoning, 17 (1.4%) cases died despite the treatment, of which 12 were men (70.6%) (P=0.001). Narcotics intoxication was the main cause of death (8 cases, 47.1%).

DISCUSSION

In the present study, drug poisoning requiring ICU admission was more prevalent in men. This is in line with findings of two studies in Europe (9, 10). However, a study in in Australia and New Zealand reported a higher frequency of poisoning in women (11).

In our study, the majority of cases were in the 20-29 years age group. Similarly, in a study in

Oman (2012), most cases of acute drug poisoning in ICU were young adults aged less than 40 years (12). In contrast, mean age of cases was 49.1 years in a study in the United States (10). Factors such as stress and modern lifestyle, family disputes and increased rate of youth unemployment might be associated with the increased prevalence of drug use in young individuals (3).

Nearly three-quarters of all poisoning cases in this study were intentional suicide attempts. This is similar to findings of another study in Iran (8) and a study in Nepal (13). Socioeconomic status and cultural factors may play a crucial role in the increasing rate of intentional self-poisoning (12).

In the present study, benzodiazepines and narcotics were the most common causative agents. In a study in Tehran (Iran), benzodiazepines and tricyclic antidepressants were major causes of poisoning (5). Similar to our findings, two studies in Iran have reported benzodiazepines as the main cause of drug poisoning requiring intensive care (8, 14). A study in India reported sedatives as the main cause of drug poisoning (15). A study in the United States reported methadone as the main cause of drug poisoning (6). In this regard, factors such as easy access to the drugs, the lack of need for prescription and absence of effective preventive regulations may be involved in the increased prevalence of acute poisoning by these drugs (3, 14).

We found that intubation and mechanical ventilation along with activated charcoal and sorbitol suspension are the primary measures taken for the treatment of acute poisoning. This finding is comparable to the findings of a study in the United States (6) but inconsistent with findings of a study in Turkey (16).

In the present study, 4.1% of the subjects died despite receiving intensive care. A higher rate (8%) has been reported by a similar study in

the United States (6). A study in Oman reported no deaths among acute drug overdose patients in ICU (12). A mortality rate of ≤1.3% has been reported by studies in Australia and New Zealand, which is similar to the rates observed in many western countries (11). The 5 Azar Hospital in Gorgan is in fact a referral center for treatment of acute poisoning cases in the Golestan Province. Moreover, ICU admission criteria for poisoning patients can vary from hospital to hospital and from one country to another, which will also affect the mortality rates (5). More importantly, ICU equipment and facilities as well as the experience of medical staff may affect the survival rate and treatment outcome (17).

Methadone-based narcotics were the most important cause of death in the present study. In a study in Rafsanjan (Iran), methadone was also found as the most important cause of drug poisoning-associated mortality (18). Methadone-induced cerebral hypoxia and sometimes delay in treatment initiation are thought to be the main causes of death following methadone poisoning (14).

CONCLUSION

Married men aged 20-29 years who were living in urban areas comprise the majority of acute drug poisoning cases admitted to the ICU of 5 Azar Hospital in Gorgan, Iran. The most important causes of drug poisoning are benzodiazepines and narcotics, which were mainly used for suicide attempt. Moreover, methadone-based narcotics are the main cause of drug poisoning-related mortality. It is suggested to also investigate clinical profile of poisoning patients who are admitted to the emergency department or other hospital wards and compare the data with that of ICU patients.

REFERENCES
1. Ibrahim SY, Saad MG, Zaytoun TM. Severe Poisoning cases admitted to the critical care department Alexandria University in 2012: A Retrospective Epidemiological Observational Study. Journal Of Medical Research Institute. 2013; 34(1):1-6.

2. Ahuja H, Mathai AS, Pannu A, Arora R. Acute poisonings admitted to a tertiary level intensive care unit in northern India: patient profile and outcomes. Journal of clinical and diagnostic research: JCDR 2015; 9(10):UC01. [DOI:10.7860/JCDR/2015/16008.6632]

3. Shokrzadeh M, Hajimohammadi A, Hoseinpoor R, Delaram A, Shayeste Y. An epidemiological survey of drug poisoning and a comparison with other poisonings cases admitted to a university hospital in Gorgan, Iran, 2008-2015. International journal of epidemiologic research 2017;4(2):94-103 [In Persian].

4. Shokrzadeh M. Epidemiology of Drug-poisoning Death in Central Cities of Mazandaran, Iran 2011-2016. Journal of Mazandaran University of Medical Sciences. 2017;27(153):140-145[In Persian].

5. Taghaddosinejad F, Sheikhazadi A, Yaghmaei A, Mehrpour O, Schwake L. Epidemiology and

treatment of severe poisoning in the intensive care unit: lessons from a one-year prospective observational study. J Clinic Toxicol S. 2012; 2(1):007.

6. Orsini J, Din N, Elahi E, Gomez A, Rajayer S, Malik R, Jean E. Clinical and epidemiological characteristics of patients with acute drug intoxication admitted to ICU. Journal of community hospital internal medicine perspectives. 2017;7(4):202-207. [DOI:10.1080/20009666.2017.1356189]

7. Okumura Y, Shimizu S, Ishikawa KB, Matsuda S, Fushimi K, Ito H. Comparison of emergency hospital admissions for drug poisoning and major diseases: a retrospective observational study using a nationwide administrative discharge database. BMJ open. 2012;2(6):e001857. [DOI:10.1136/bmjopen-2012-001857]

8. Mehdizadeh G, Manouchehri AA, Zarghami A, Moghadamnia AA. Prevalence and causes of poisoning in patients admitted to Shahid Beheshti hospital of Babol in 2011-2012. Journal of Babol University of Medical Sciences. 2015;17(7):22-28 [In Persian].

9. Liakoni E, Dolder PC, Rentsch K, Liechti ME. Acute health problems due to recreational drug use in patients presenting to an urban emergency department in Switzerland. Swiss medical weekly 2015;145(w14166):w14166. [DOI:10.4414/smw.2015.14166]

10. Dines AM, Wood DM, Yates C, Heyerdahl F, Hovda KE, Giraudon I, Sedefov R, Dargan PI, Euro-DEN Research Group. Acute recreational drug and new psychoactive substance toxicity in Europe: 12 months data collection from the European Drug Emergencies Network (Euro-DEN). Clinical Toxicology. 2015;53(9):893-900. [DOI:10.3109/15563650.2015.1088157]

11. Cioccari L, Luethi N, Bailey M, Pilcher D, Bellomo R. Characteristics and outcomes of critically ill patients with drug overdose in Australia and New Zealand. Critical Care and Resuscitation 2017;19(1):14-22.

12. Jayakrishnan B, Al Asmi A, Ahmed Al Qassabi RN, Mohammed I. Acute drug overdose: clinical profile, etiologic spectrum and determinants of duration of intensive medical treatment. Oman medical journal 2012; 27(6):501-504. [DOI:10.5001/omj.2012.120]

13. Singh DP, Aacharya RP. Pattern of poisoning cases in Bir Hospital. Journal of institute of medicine 2007;28(1):3-6. [DOI:10.3126/joim.v28i1.426]

14. Mehrpour O, Akbari A, Jahani F, Amirabadizadeh A, Allahyari E, Mansouri B, Ng PC. Epidemiological and clinical profiles of acute poisoning in patients admitted to the intensive care unit in eastern Iran (2010 to 2017). BMC emergency medicine 2018 Dec;18(1):30. [DOI:10.1186/s12873-018-0181-6]

15. Aravind A, Rai M. Pattern of acute poisoning admissions in the medical intensive care unit of a tertiary care hospital. Int J Pharm Sci Drug Res 2014 Jul;6(239):e242.

16. Cengiz M, Baysal Z, Ganidagli S, Altindag A. Characteristics of poisoning cases in adult intensive care unit in Sanliurfa, Turkey. Saudi medical journal 2006;27(4):497-502.

17. Barnato AE, Hsu HE, Bryce CL, Lave JR, Emlet LL, Angus DC, Arnold RM. Using simulation to isolate physician variation in ICU admission decision making for critically ill elders with end-stage cancer: A pilot feasibility study. Critical care medicine 2008 Dec;36(12):3156. [DOI:10.1097/CCM.0b013e31818f40d2]

18. Torkashvand F, Sheikh Fathollahi M, Shamsi S, Kamali M, Rezaeian M. Evaluating the pattern of acute poisoning in cases referred to the Emergency Department of Ali-ebn Abi Taleb Hospital of Rafsanjan from October 2013 to September 2014. Journal of Rafsanjan University of Medical Sciences 2015 Jun 15;14(4):311-24.