Original Article

Eurasian Journal of Toxicology

Overview of Poisoning Cases in Bursa

Salih METİN[1], Hüseyin AYGÜN[2]

[1]Bursa Provincial Health Directorate Public Hospitals Services Presidency, Bursa Türkiye
[2]Bursa Provincial Health Directorate, Presidency of Emergency Health Services, Bursa, Türkiye

Abstract

Introduction: In this study, our aim is to examine the most common causes of poisoning in our city, to contribute to the epidemiological studies in our country and to ensure the efficient use of the country's resources.

Material-Method: In our study, all patients who admitted to the emergency departments of public and private hospitals in Bursa between 01.02.2020 and 31.08.2022 due to poisoning and were reported to the statistical reporting unit of Bursa Provincial Health Directorate were retrospectively evaluated.

Results: The gender differences in the causes of poisoning was seen that food-related poisoning was more common in men (n:322-78), and drug-induced poisoning was more common in women (n:363-556) and the difference was found to be statistically significant (x2=217.06, p<0.01). When we evaluated the differences in the causes of poisoning between age groups, it was seen that the lowest intoxication age group was <55 years of age (6.3%, n:111). Corrosive poisonings in the 0-13 age group constitute 72.7% (n:109) of all age groups. Methyl alcohol poisonings are most common in the 36-55 age group. In the chi-square analysis, a statistically significant difference was found between the age groups categorized in terms of the causes of poisoning (x2=641.80, p<0.01). When we look at the outcomes of the patients included in the study, the causes of poisoning in the patients who died were carbon monoxide poisoning (CO) (n:2), drugs (n:1), ethyl alcohol (n:1), were respectively. In addition, the most common cause of poisoning requiring ICU admission was drugs (n:82). When we look at the seasonal differences in the causes of poisoning, poisoning cases with drugs are seen more than other factors in every season, while CO is seen more in winter, food releated in summer and musrooms in autumn. The causes of poisoning show a statistically significant difference in terms of seasons (x2=565.35, p<0.01).

Conclusions: Analysis of local causes in a region is very important in poisoning. In this way, measures specific to that region can be taken. In this way, antitoxin planning and manpower planning can be made more effective.

Keywords: Poisoning cause, gender, mortality, Bursa region

Introduction

Poisoning is a common cause of death and disability on a global scale, and a frequent cause of emergency room visits and hospitalizations. According to WHO 2016 data, 106,683 people worldwide died in one year due to unintentional poisoning[1]. Acute poisoning cases are increasing day by day due to changes in social life and variations in chemical substances, and it seems to occupy our agenda more[2,3]. Especially, these problems are becoming a more important public health problem in underdeveloped and developing countries due to the low level of health system and infertility in the weekly life cycle[4]. According to WHO, one person dies every forty seconds due to a suicide. The vast majority of these deaths are caused by chemical agents, and globally, 79% of all are reported from underdeveloped and developing countries. This makes suicide the most common cause of death for the population between the ages of 15-29 [5].

It is seen that the share of poisonings in emergency admissions in the world is between 0.02-0.09%[6,7]. Although the frequency of poisoning and the cause of poisoning vary according to the region, it has been reported in a limited epidemiological study in our country that the frequency of poisoning varies between 0.8% and 5% among all emergency department admissions [8,9]. In the United Kingdom, the equality of men and women in poisonings between the ages of 15-35, and the high mortality in poisoning in the elderly is remarkable[10]. In the childhood group up to the age of 6, poisoning occurs most frequently when children reach and take drugs such as paracetamol and ibuprofen that are not properly stored at home, the prevalence of poisoning in the 6-11 age group is relatively low compared to other childhood periods. comes to the fore[11]. It has been reported that 150,000 cases of poisoning are seen annually in our country, 80% of which occur in childhood[12]. Poisoning with the drugs given by the parents in the first years of life, cleaning agents between the ages of 2-3, and drugs kept in the cupboard between the ages of 3-5; In school childhood and adolescence, drug poisoning for suicidal purposes is more common[13].

The most common reasons for suicide attempts are mental illness, poverty, unmet demands, chronic illness, love failure, and emotional failures[14]. It has been reported that acute poisoning is the most common reason for admission to the emergency department in developed countries, and it is the

Corresponding Author: Salih METİN **e-mail:** slhmtn@hotmail.com
Received: 16.10.2022 • **Revision**: 19.10.2022 • **Accepted:** 19.10.2022
Cite this article as: Metin S, Aygün H. Overview of Poisoning Cases in Bursa. Eurasian J Tox. 2022;4(3): 59-64

second most common reason for admission to the emergency department after infectious diseases in developing countries. Worldwide, poisonings constitute 5-10% of all deaths [15].

Poisonings show a national variation according to the plant and living animal species grown according to the agent used. Epidemiology of poisoning; It is important both on behalf of emergency physicians and on behalf of those who have experienced poisoning for their changing knowledge and treatment attitudes. In today's world, where information about the etiology and epidemiology of poisoning is changing rapidly, it is important for health care providers to follow the innovations in treatments[16].Therefore, regional epidemiological data; Rational planning of national resources allocated to poisoning is important because it contributes to acceleration in procurement processes, such as the necessity of having antidotes used for certain poisonings in common places.

In this study, our aim is to examine the most common causes of poisoning in our city, to contribute to the epidemiological studies in our country and to ensure the efficient use of the country's resources.

Material and Methods

In our study, all patients who admitted to the emergency departments of public and private hospitals in Bursa between 01.02.2020 and 31.08.2022 due to poisoning and were reported to the statistical reporting unit of Bursa Provincial Health Directorate were retrospectively scanned. At the planning stage of the study, preliminary permission was obtained from the Ethics Committee of Bursa City Hospital, dated 28.09.2022 and numbered 2022-11/2 from KAEK, and from the Provincial Health Directorate with the letter dated 31.08.2022 and numbered 2061 (Barcode: 172539649). The admission dates, causes of poisoning, symptoms at admission, age and gender, and discharge status of the patients were recorded. The causes of poisoning are carbon monoxide intoxication (CO), food poisoning (Food), drugs (Medicine), fungi (Mushrooms), ethyl alcohol (Ethyl A), methyl alcohol (Methyl A.), insecticides (Insectiside), corrosive substances (Corrosive) and as others (Other), age groups are 0-13, 14-25, 26-35, 36-55 and >55 also seasonally according to admission dates, winter (Winter), spring (Spring), summer (Summer), autumn (Statistical analyzes were performed by categorizing them as Autumn).

The data of the study were analyzed using the 'The jamovi project (2022) jamovi (Version 2.3) (Computer Software). Descriptive statistics were expressed as mean ± standard deviation or median values and an interquartile range (IQR) of 25–75 %, while categorical variables were expressed as numbers and percentages (%). Kolmogorov–Smirnov test and Shapiro-Wilk test were used for the normality distribution of the data. While the significance of the difference between the groups in terms of continuous numerical variables in which parametric test statistics assumptions were provided was examined with Student's t test, the significance of the difference in terms of continuous numerical variables where parametric test statistics assumptions were not met was evaluated with the Mann-Whitney U and Kruskal-Wallis tests. Chi-square and Fisher's exact test were used to analyze whether there was a relationship between categorical variables. The variables that may be effective for mortality were evaluated using the "enter" method in logistic regression analysis. $p < 0.05$ was considered statistically significant. Results were given at 95 % confidence interval.

Results

In our study, 1856 patients who admitted to the emergency departments of Bursa province hospitals due to poisoning and were notified to Bursa Provincial Health Directorate were included. Of all patients, 53.2% (n: 987) were male, and the median age of the patients was 28 (IQR: 25-75) (22:17-39). While the most poisoning cases were seen with 26% (n: 483) in the patients aged 36-55 years, the lowest rate of poisoning was seen with 6.3% (n: 117) in the 55< age group. Considering the seasonal distributions of poisonings, it was seen that while it was most common in summer with 38% (n: 705), poisoning cases were observed with a rate of 15.3% (n: 284) in autumn. The three most common causes of poisoning were 49.5% (n:919) drugs, 21.6% (n:400) foods, and 12.3% (n:229) CO. Food poisonings increased especially in summer months and CO poisonings increased in winter months. When we look at the symptom distribution of the patients at the time of admission, 55.8% (n: 1035) presented with nausea and vomiting, while 27% (n: 501) did not have any symptoms. While 62.6% (n: 1162) of the patients were discharged from the emergency department, 31.3% (n: 581) were admitted to the service, 5.8% (n:107) were admitted to the ICU, and 0.3% (n: 6) were found to be exitus.

When we evaluated the gender differences in the causes of poisoning, it was seen that food-related poisoning was more common in men (n:322-78), and drug-induced poisoning was more common in women (n:363-556). In addition, in the Pearson Chi-square analysis we conducted, a statistically significant difference was found between men and women in terms of poisoning causes ($x2=217.06$, $p<0.01$) (Table 1).

Table 2: Outcomes of the patients according to the poisining etiology

	N	Male	Female	Test Statistic
Cause of Poisoning	**1856**	**(N = 987)**	**(N = 869)**	
CO		113	116	X2 = 217.06, P <0.01
Food		322	78	
Medicine		363	556	
Mushrooms		7	16	
Ethyl Alcohol		18	8	
Metyl Alcohol		14	1	
Insecticide		28	26	
Corrosive		95	55	
Other		27	13	

Table 2: Age distribution of poisioning causes

Cause of Poisoning	N 1856	0-13 (N=375)	14-25 (N=432)	26-35 (N=449)	36-55 (N=483)	>55 (N=117)	Test Statistic
CO		27	48	51	68	35	
Food		17	50	176	138	19	
Medicine		187	301	199	203	29	
Mushrooms		0	2	0	11	10	
Ethyl Alcohol		5	4	4	9	4	X2 = 641.80, P <0.01
Metyl Alcohol		0	1	0	13	1	
Insecticide		13	10	6	16	9	
Corrosive		109	14	9	14	4	
Other		17	2	4	11	6	

When we evaluated the differences in the causes of poisoning between age groups, it was seen that the lowest intoxication age group was 6.3% (n:111) in people >

55. Corrosive poisonings in the 0-13 age group constitute 72.7% (n:109) of all age groups. Methyl A poisonings are most common in the 36-55 age group. In the chi-square analysis, a statistically significant difference was found between the age groups categorized in terms of the causes of poisoning (x2=641.80, p<0.01) (Table 2).

When we look at the distribution of discharge from the emergency department of the patients included in the study, the causes of poisoning in the patients who died were CO (n:2), Medicine (n:1), Ethyl A (n:1), Methyl A (n:1) and Other (n:1)) form. In addition, the most common cause of poisoning requiring ICU admission was Medicine (n:82). A statistically significant difference was found in terms of the outcome status of the poisoning causes of the patients (x2=238.42, p<0.01) (Table 3).

When we look at the seasonal differences in the causes of poisoning, poisoning cases with drugs are seen more than other factors in every season, while CO is seen more in winter, Food in summer and Musrooms in autumn. The causes of poisoning show a statistically significant difference in terms of seasons (x2=565.35, p<0.01) (Table 4).

Table 3: Outcomes of the patients according to the poisining etiology.

Cause of Poisoning	N 1856	Exitus (N=6)	Hospital admissions (N=581)	Discharge (N=1162)	ICU (N=107)	Test Statistic
CO		2	47	171	9	
Food		0	57	342	1	
Medicine		1	346	490	82	
Mushrooms		0	14	9	0	
Ethyl Alcohol		1	11	12	2	X2 = 238.42, P <0.01
Metyl Alcohol		1	4	5	5	
Insecticide		0	22	29	3	
Corrosive		0	60	87	3	
Other		1	20	17	2	

Table 4: Seasonal distrubiton of poisioning causes

Cause of Poisoning	N 1856	Winter (N=400)	Spring (N=467)	Autumn (N=284)	Summer (N=705)	Test Statistic
CO		128	56	31	14	
Food		36	45	14	305	
Medicine		179	279	179	282	
Mushrooms		6	1	13	3	
Ethyl Alcohol		8	9	5	4	X2 = 565.35, P <0.01
Metyl Alcohol		13	1	1	0	
Insecticide		6	20	9	19	
Corrosive		19	43	26	62	
Other		5	13	6	16	

Discussion

The share of emergency admissions due to poisoning in all emergency admissions is 0.04% in Bursa. In previous studies in our country, this rate has been reported to be between 0.8% and 5%[8, 9]. When we look at the share of poisonings in all emergency admissions on a global basis, it is seen that it varies between 0.2% and 0.9%[17-19]. A previous study in our province reported a rate of 1.76% [20]. The fact that it is close to the averages in the world shows the strength of our sampling similar to the world. We attribute the fact that the rate of poisoning in Bursa province is below the studies conducted in Turkey, that the studies reported from Turkey are generally carried out in the hospital of that province, which is the poison center, and therefore, the number of admissions related to poisoning is relatively higher than in other hospitals.

When we look at the seasonal distribution of poisonings, it was seen that the most frequent application was in summer and in July. There are studies in the world that indicate that autumn is the most common season[21]. In a study conducted in Iran, it was reported that poisonings were most common in the first spring season[22]. It has also been reported that poisoning is high in summer [23]. The fact that the season in which poisoning is most common, which is so variable in the literature, is due to regional differences. We think that the high number of poisonings in Bursa in the summer months, because of the socio-cultural structure of the dinner organizations such as societies and weddings, and that the shelf life of food is difficult in hot months. Again, the high rate of poisoning in the autumn months in Bursa is due to the geographical severity of the southeastern region in this season; We attribute it to the excessive poisoning caused by the recoil from the chimney in those who are heated by stove etc. fuel.

When we look at the genders of those who have experienced poisoning, the rate of male 53% (n=987) and female 47% (n=869) was found in our study. In studies conducted in Turkey, it was previously reported that the ratio of females to males was higher in favor of females [20]. In studies conducted in the world, the rate in favor of women has been reported[6, 24]. The high rate of poisoning in women may be effective because they are more prone to depressive states and suicidal events. Our finding, which is different from the literature, may be due to the conservative nature of Bursa province and the deficiency in reported poisonings.

Considering the age distribution in poisonings, it is observed that the majority of them are young adults. In our study, 85.6% (n=1586) were younger than 45 years of age, which is similar to studies in both our country and the world literature[20, 24, 25]. These results; It may indicate that we are developing socioeconomically and that we are young in terms of population.

Abdominal pain and vomiting, which are gastrointestinal system irritation complaints, were found to be the most common first admission complaint with 55.7% of poisonings. It was compatible with the literature of our country and the world. In developed countries, it has been reported that the first reason for admission is abdominal pain and nausea with symptoms of gastrointestinal irritation[26-28]. We think that the reason for this similarity is similar emergency admission findings in countries where therapeutic drug intake is the most common cause of poisoning.

Considering the causes of poisoning, it was observed that most of them were poisoned by drugs, etc. therapeutic chemicals. In studies conducted in developing countries such as our country, the most common cause of drug intoxication was found to be consistent with our study [20, 24, 25, 29]. The reason for this may be that sociodemographic characteristics, family ties, and economic power of individuals are similar.

In our study, it was found that the most common cause of drug intoxication was multi-drug poisoning, and in poisonings caused by a single drug, the drug derivative was found to be the most common cause of paracetamol in childhood and antidepressants starting from adolescence. While there were other researchers who found that antidepressant derivatives cause poisoning most frequently, there were studies that found different types of drugs as analgesic and anti-inflammatory as the most common cause [30]. It is thought that the reason for this is due to the differences in the prescribed drugs and the sociocultural structure.

In our study, carbon monoxide poisoning was found to be 12.4% as one of the most common causes of poisoning. In studies conducted in the USA, it has been reported that it is the second most common among all poisonings[31]. The rate of CO poisoning in Bursa was 3.23% in a study[32]. In another study conducted in Izmir, it was reported that it took the second rank among all poisonings[33]. The fact that our rate is higher than the country rate seems to be related to the fact that the Bursa region is rich in terms of southwestern winds and other winds. 37% of our patients who presented with poisoning required a 24-hour long hospital stay, including intensive care follow-up. This rate was found to be 20.2% in a previous study involving only one hospital in our city[20]. In a study conducted in our country, the rate of discharge was reported as 54%[34]. The high rate of our application may be due to the high number of applicants. Our finding is consistent with the literature, with methyl alcohol, insecticide intoxications and therapeutic drug intakes taking the first place proportionally in poisonings requiring hospitalization[35, 36].

The mortality rate in our study was 0.32%. In another study conducted in our city, it was found to be 2.5%[20]. In the world, mortality rates ranging from 0.3% to 16% have been reported[21,37]. The low rate of our study may be due to the fact that the previous study was conducted in a third-level university hospital, which received a lot of referrals.

When we look at the causes of poisoning in the patients who died, it was seen that methanol poisoning was the most common and the highest proportional reason.

Conclusion

While poisoning constitutes an important part of emergency medicine practice, it is also an important public health problem. Analysis of the regional spread and distribution of poisoning cases enables the preparation of emergency health services and the availability of necessary medications for vital interventions such as antidotes. We are of the opinion that this study, which examines and analyzes poisoning cases in our province, will make important contributions to the country's data.

References

1. Weltgesundheits organisation, W.H. Organization, and E.C.F. Environment, WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization 2021 Licence: CC BY-NC-SA 3.0 IGO.
2. Alinejad S, Zamani N, Abdollahi M, Mehrpour O. A Narrative Review of Acute Adult Poisoning in Iran. Iran J Med Sci. 2017;42(4):327-346.
3. Desalew M, Aklilu A, Amanuel A, Addisu M, Ethiopia T. Pattern of acute adult poisoning at Tikur Anbessa specialized teaching hospital, a retrospective study, Ethiopia. Hum Exp Toxicol. 2011;30(7):523-7.
4. Kaale E. A retrospective study of poisoning at Muhimbili National Hospital in Dar-Es Salaam, Tanzania. J Public Health Front, 2013. 2(1): p. 21-26.
5. WHO. mental health. Available from: https://www.who.int/mental_health/prevention/suicide/suicideprevent/en/. Accessed September 30, 2022.
6. Hanssens Y, Deleu D, Taqi A. Etiologic and demographic characteristics of poisoning: a prospective hospital-based study in Oman. J Toxicol Clin Toxicol. 2001;39(4):371-80.
7. Viccellio, P., Handbook of medical toxicology. 1st ed. Boston: Little, Brown, and Company,1993.
8. Akkose S, Bulut M, Armagan E, Cebicci H, Fedakar R. Acute poisoning in adults in the years 1996-2001 treated in the Uludag University Hospital, Marmara Region, Turkey. Clin Toxicol (Phila). 2005;43(2):105-9.
9. Mert E, Bilgin NG. Demographical, aetiological and clinical characteristics of poisonings in Mersin, Turkey. Hum Exp Toxicol. 2006;25(4):217-23.
10. Camidge DR, Wood RJ, Bateman DN. The epidemiology of self-poisoning in the UK. Br J Clin Pharmacol. 2003;56(6):613-9.
11. Thanacoody R., Anderson M. Epidemiology of poisoning. Medicine, 2020. 48(3):153-155.
12. Kalaycı, A., et al., Causes of poisoning in childhood. Journal of New Medicine, 1994. 11(1): p. 4-7.
13. Uzel N. Zehirlenmeledanismar Neyzi O, Ertuğrul T. Pediatri 2002;25:1529-38.
14. Bertolote JM, Fleischmann A, Eddleston M, Gunnell D. Deaths from pesticide poisoning: a global response. Br J Psychiatry. 2006;189:201-3.
15. Carter G, Reith DM, Whyte IM, McPherson M. Repeated self-poisoning: increasing severity of self-harm as a predictor of subsequent suicide. Br J Psychiatry. 2005;186:253-7.
16. Lee HL, Lin HJ, Yeh SY, Chi CH, Guo HR. Etiology and outcome of patients presenting for poisoning to the emergency department in Taiwan: a prospective study. Hum Exp Toxicol. 2008;27(5):373-9.
17. Karakaya A, Vural N. Acute poisoning admissions in one of the hospitals in Ankara. Hum Toxicol. 1985;4(3):323-6.
18. Ozköse Z, Ayoglu F. Etiological and demographical characteristics of acute adult poisoning in Ankara, Turkey. Hum Exp Toxicol. 1999;18(10):614-8.
19. Pinar A, Fowler J, Bond GR. Acute poisoning in Izmir, Turkey--a pilot epidemiologic study. J Toxicol Clin Toxicol. 1993;31(4):593-601.
20. Akköse Aydın Ş, Köksal Ö, Fedakar R, Emircan Ş, Durmuş O. Poisoning Cases in Adults in the Years 1996-2004. Uludağ Üniversitesi Tıp Fakültesi Dergisi 2006; 32(1): 25-27.
21. Jalali A, Savari M, Dehdardargahi S, Azarpanah A. The pattern of poisoning in southwestern region of iran: envenoming as the major cause. Jundishapur J Nat Pharm Prod. 2012;7(3):100-5.
22. Naseri K, Klani Z, Sajadi ZS, Mehrpour O, Sadeghi M.Pattern of Inpatients Acute Poisonings in Birjand City, East of Iran. 2020.
23. Mehrpour, O., Sharifi, M., & Ebrahimi, M. (2015). Pattern of Acute Pediatric Poisonings in Birjand City, East of Iran. International Journal of Medical Toxicology and Forensic Medicine, 5(4):192-200.
24. Pach J, Polewka A, Zieba A, Kroch S, Chrostek Maj J, Mikołaszek-Boba M, et al. Próba kompleksowej oceny predyktorów ryzyka ponowienia samobójstwa u pacjentów po samobójczym zatruciu lekami, hospitalizowanych w Klinice Toksykologii CM UJ w Krakowie. Cześć II. Predyktory kliniczne [A trial for the complex risk assessment of repeated suicide predictors in patients after suicidal poisoning attempts, hospitalized in the Department of Clinical Toxicology CM UJ in Krakow. II. Clinical predictors]. Przegl Lek. 2001;58(4):330-4.
25. Hatzitolios AI, Sion ML, Eleftheriadis NP, Toulis E, Efstratiadis G, Vartzopoulos D, Ziakas AG. Parasuicidal poisoning treated in a Greek medical ward: epidemiology and clinical experience. Hum Exp Toxicol. 2001;20(12):611-7.
26. Aygin D, Açıl H, Investigation of poisoning cases aged 0-18 years admitted to the pediatric emergency unit. S. EEAH Medical Bulletin, 2014. 48(1): p. 27-33.
27. Merigian KS, Woodard M, Hedges JR, Roberts JR, Stuebing R, Rashkin MC. Prospective evaluation of gastric emptying in the self-poisoned patient. Am J Emerg Med. 1990;8(6):479-83.

28. Sümer V, Güler E, Karanfil R, et al. Evaluation of the poisoning cases who applied to the pediatrics emergency unit. Turk Arch Ped 2011; 46(3): 234-40.

29. Goksu S, Yildirim C, Kocoglu H, Tutak A, Oner U. Characteristics of acute adult poisoning in Gaziantep, Turkey. J Toxicol Clin Toxicol. 2002;40(7):833-7.

30. Watson WA, Litovitz TL, Rodgers GC Jr, Klein-Schwartz W, Youniss J, Rose SR, et al.2002 annual report of the American Association of Poison Control Centers Toxic Exposure Surveillance System. Am J Emerg Med. 2003;21(5):353-421

31. Froede SM, Byers JM 3rd, Wolfgang GH, Froede RC, Jones AM, Henry TE. An analysis of toxic deaths, 1982 to 1985, Pima County, Arizona. J Forensic Sci. 1987;32(6):1676-93

32. TÜRKMEN İNANIR N,AKGÖZ S Bursa'da otopsisi yapılan karbonmonoksit zehirlenmesine bağlı ölümler. Adli Tıp Dergisi. 2005; 19(2):20-25.

33. Duman E, Akgün SA, Öztürk P, Ertürk S, Şen F, Ege B. Evaluation of poisoning cases in autopsies performed in İzmir between 1997-2000. Annual Forensic Medicine Meetings 2001 Book (25-27 April 2001, İstanbul) 313-7.

34. Ok G. Our one-year poisoning cases. First Interdisciplinary Toxicology Congress Proceedings Abstract Book. 2005; 211.

35. Shin SD, Suh GJ, Rhee JE, Sung J, Kim J. Epidemiologic characteristics of death by poisoning in 1991-2001 in Korea. J Korean Med Sci. 2004;19(2):186-94. doi: 10.3346/jkms.2004.19.2.186

36. Lamireau T, Llanas B, Kennedy A, Fayon M, Penouil F, Favarell-Garrigues JC, Demarquez JL. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. Eur J Emerg Med. 2002;9(1):9-14.

37. Dragisic T, Dickov A, Dickov V, Mijatovic V. Drug Addiction as Risk for Suicide Attempts. Mater Sociomed. 2015;27(3):188-91.