International Journal of
Medical Toxicology & Forensic Medicine
Autumn 2018, Volume 8, Number 4

Research Paper: Quantification of Mortality Rate From Illicit Substance Abuse in Iran in 2016

Abdolrazagh Barzegar[1], Fatemeh Shahbazi[2], Davood Mirtorabi[3], Mohammad Reza Ghadirzadeh[1], Ahmad Shojaei[1], Seyed Saeed Hashemi Nazari[2*]

1. Legal Medicine Research Center, Legal Medicine Organization, Tehran, Iran.
2. Department of Epidemiology, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
3. Department of Neurosciences and Addiction Studies, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran.

Use your device to scan and read the article online

Citation Barzegar A, Shahbazi F, Mirtorabi D, Ghadirzadeh MR, Shojaei A, Hashemi Nazari SS. Quantification of Mortality Rate From Illicit Substance Abuse in Iran in 2016. International Journal of Medical Toxicology and Forensic Medicine. 2018; 8(4):123-130.

doi:

Article info:
Received: 10 Jan 2018
First Revision: 05 Feb 2018
Accepted: 20 Jul 2018
Published: 01 Oct 2018

Keywords:
Opium, Opioids, Opioid dependence, Mortality, Epidemiology

ABSTRACT

Background: The present study aimed to evaluate the epidemiology of mortality due to substance abuse to provide useful information for local, national, and international administrators.

Methods: This cross-sectional study was carried out in 12 months from March 2016 to February 2017. The study population was a random sample of people who died from substance abuse. Data were collected by checklists which were designed according to the study objectives. The obtained data were analyzed in Stata software.

Results: Our findings show that the mortality rate for illicit opiate users was 40.90 per 1000000 population. Most deaths occurred among people aged 30 to 39 years (25%), single (46.75%) with low education levels. Kermanshah, Lorestan, and Alborz provinces had the highest mortality rate. History of overdose, suicide, hospitalization in psychiatric in hospital and incarceration was observed in some people who died from substance abuse.

Conclusion: A large number of deaths from drug abuse occurred in unmarried, self-employed, young males 30 to 39 years old with low education levels. We suggest that training programs and harm reduction approaches be focused in these high risk groups.

1. Introduction

Addiction is one of the most important health, social, behavioral and political problems in the world [1]. It refers to excessive use of a psychoactive or non-medically prescribed substances [2]. This problem is associated with a number of negative health outcomes, including morbidity, disability and premature mortality [3-5]. Usually, morbidity and mortality rates for drug users are much greater than those observed in the general population [6].

*** Corresponding Author:**
Seyed Saeed Hashemi Nazari, PhD
Address: *Department of Epidemiology, School of Public Health and Safety, Shahid Beheshti University of Medical Sciences, Tehran, Iran.*
Tel: *+98 (21) 22432041*
E-mail: *saeedh_1999@yahoo.com*

Iran is one of the main opium trade routes from Afghanistan (Afghanistan is the largest producer of opium in the world that neighbors the Islamic Republic of Iran). Therefore, Iran has a long history in opiate drug use and combating drug abuse. However, information about the epidemiology of substance abuse, addiction and their complications in Iran is limited [7, 8]. Few researches have directly considered epidemiology of substance abuse at national level [7]. Thus, this study aimed to evaluate the epidemiology of mortality due to substance abuse to provide useful information for local, national and international administrators.

2. Materials and Methods

Study design

This cross-sectional study was carried out from March 21, 2016 to February 20, 2017.

Study setting and population

This study collected LMO data of all provinces of Iran. All deaths in Iran including the suspicious deaths should be referred to LMO centers and death certificate cannot be issued before evaluation and confirmation of this organization. Therefore, LMO centers were chosen to do this research. Mortality from substance abuse is one of the definitions of suspicious causes of death which also include mortality due to road traffic accident, substance abuse, burning, toxin related death, drug intoxication, falling, suicide and work-related death. Totally, LMO registered 3269 deaths due to illicit drug abuse during the study period. In this study, a random sample of 2750 substance abusing deceased records were evaluated. All the mortality rates are presented according to the total number of 3269 deaths, but the frequency tables and all other details are estimated in the sample size of 2750 persons.

Study protocol

This study was done using two data collection checklists which was designed according to the study objectives by the researchers and reviewed and confirmed by several external and internal experts in LMO center. The first section of the checklists included questions about demographic characteristics such as age, sex, education and marital status. The second section had questions about substance abuse, including type of substance used, smoking, alcohol consumption, history of substance abuse in the family and friends and history of overdose and suicide.

Demographic variables were collected by interviews with friends and relatives of the study deceased. In addition, the information about the type of substance use was obtained through conversation or interviews with the people familiar with the deceased (verbal autopsy). The classification of mortality from substance abuse was carried out using the 10th edition of the international classification of disease (ICD-10: T40, F10, X42, X62 & Y12). Eventually, physicians that were responsible for autopsy room in each province collected the data and send them monthly to the capital legal medicine center in Tehran, Iran.

Study measures

Key measures in this study were mortality rate per 1000000 population and proportionate mortality ratio. Substance abuse mortality rate was estimated by dividing the number of deaths in each province of Iran or in the whole country by the mid-year population of the province and once for all the country. In proportionate mortality ratio, the numerator was the number of deaths due to substance abuse and the denominator was the total number of deaths in 12 months from March 2016 to February 2017 in Iran.

Data analysis

The obtained data were entered into Stata-MP version 14. The study results were presented using descriptive statistics as mean, Standard Deviation (SD), percentage, in tables and figures.

3. Results

The results indicate that out of 2750 died cases, who were qualified for this study, 296 (10.75%) subjects were female and 2454 (89.25%) cases were male. High school education level comprised the highest percentage of education level observed among the deceased (n=856, 31.30%). People with university education had the lowest frequency. Of all study subjects, 46.75% were single, 40.55% married, 11.49% divorced and 1.22% widower. The Mean±SD age of victims in our study was 36.78±13.12 years and the median age was 35 years. The most affected age group was those between 30 and 39 years. Table 1 presents the characteristic of the study sample by demographic variables.

The overall mortality rate of substance abuse for the entire period was 40.90 per 1000000 population (60.59 men and 7.51 women per one million population). Kermanshah, Lorestan and Alborz provinces with 94.24,

67.02 and 59.72 deaths per 1000000 populations had the highest mortality rate, respectively. The mortality from substance abuse in different provinces of Iran are displayed in Figure 1.

The majority of cases had Iranian nationality (n=2686, 97.66%) with proved identity (n=2625, 95.45%). The Mean±SD age of their first drug use was 25.66±8.1 years, the median and modes of drug usage were 25 and 20 years, respectively. The minimum and maximum age in starting drug use were 9 and 70 years. The average (SD) time between beginning of substance use and death was 13.18 (9.28) years. In terms of employment status, self-employed and drug dealer had the highest and the lowest frequency, respectively (Table 2).

Based on the interview with the families of the deceased, opium and shire with 32.14% were the most prevalent substances used. The frequency of heroin consumption was 16.60%, crack 5.5%, crystal 18.00% and methadone 12.32%. Alcohol consumption had the lowest frequency among study samples. Regarding the simultaneous consumption of alcohol and different illicit drugs in the last month before death, in 1023 (37.56%) cases, this was unknown. In the remainder, 40.84% of the cases used just one substance or alcohol, 18.58% used two or three substances and or alcohol and 3.02% used four substances or more at the same time. In this research, almost 15.64% of cases used the drug with injecting form.

About 635 (23.08%) of the cases had a history of incarceration. Based on the interview with the family and friends of the deceased, history of overdose, suicide, and hospitalization in psychiatric hospitals was observed in 21.40%, 5.15%, and 8.52%, respectively. About 15.24% of the deceased had a history of substance abuse in their family.

The past medical history was recorded according to their families' reports. It was revealed that 4.40% of cases suffered from coronary heart disease, and 0.76% of deceased were affected by chronic illnesses. More information about the history of medical condition, war injury, employment status and place of residence in the last month before death are presented in Table 2.

On the whole, 379 (13.78%) died from drug abuse, while they were under treatment for quitting addiction. The treatment situation was not clear among 860 (31.27%) of the subjects. Among people who were under medication at the time of death, 51.45% received methadone, 5.80% opium tincture, 1.32% buprenorphine and 3% were treated with detoxification. In terms of location for drug treatment, about 26% of addicts were under medical care in Drop In Center (DIC) and 8.71% were treated traditionally at home. About 32.98% of drug users were under care for drug rehabilitation in legal and authorized centers and 2.37% in unauthorized centers. In addition, 0.79% of addicts were receiving drug addiction treatment by command of the judicial

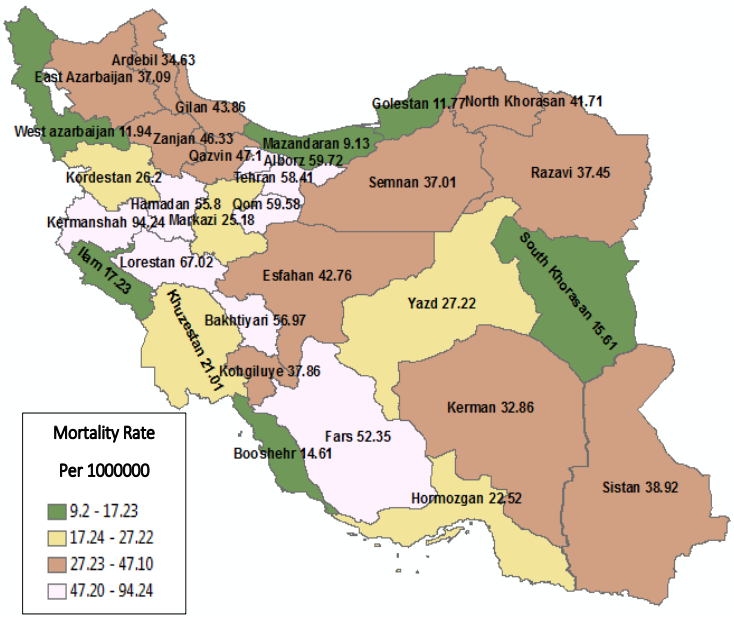

Figure 1. The mortality rate due to substance abuse in Iran from March 2016 to February 2017

Table 1. The absolute and relative frequency distribution of deaths related to drug abuse with respect to demographic variables in Iran from March 2016 to February 2017

Variables		No. (%)
Sex	Male	2454(89.25)
	Female	296(10.75)
Age, Y	0-9	35(1.27)
	10-19	134(4.87)
	20-29	620(22.55)
	30-39	913(33.20)
	40-49	522(18.98)
	50-59	275(10.00)
	60-69	110(4.00)
	70-79	34(1.24)
	80-100	12(0.44)
	Unknown	95(3.45)
Nationality	Iranian	2686(97.66)
	Afghan	54(1.97)
	Pakistani	3(0.11)
	Iraqi	3(0.11)
	Unknown	4(0.15)
Marital status	Single	1285(46.75)
	Married	1115(40.55)
	Divorced	316(11.49)
	Widower	33(1.22)

International Journal of Medical Toxicology & Forensic Medicine

official, the place of drug treatment of others was also unclear (29.15%).

Figure 2 shows the mortality rate from drug abuse in 12 months leading to February 2017 separately by each month. About, half of deaths from drug abuse occurred at home or in another private location (n=1267, 46.07%). The hospital and public places with frequencies of 671 (24.40%) and 296 (10.76%) were located in the second and third ranks, respectively. About one-fifth of the victims were alone at the time of death (n=562, 20.45%) while the rest of them were not alone (n=2188, 79.55%). The places of their residence in one month before death are presented in Table 2.

Based on the study results, proportionate substance abuse among unnatural causes of death was 8.97% all over the country. This ratio was higher in Alborz Province (proportionate mortality ratio=16.58) and Mazandaran Province had the lowest ratio (proportionate mortality ratio=2.30). The value of this index in Tehran Province indicates that 14.36% of all unnatural death occurred in Tehran Province is due to substance abuse (Figure 3).

Figure 4 shows the proportionate mortality rate from drug and psychotropic abuse in each province in order of their rates. The value of this index in Kermanshah indi-

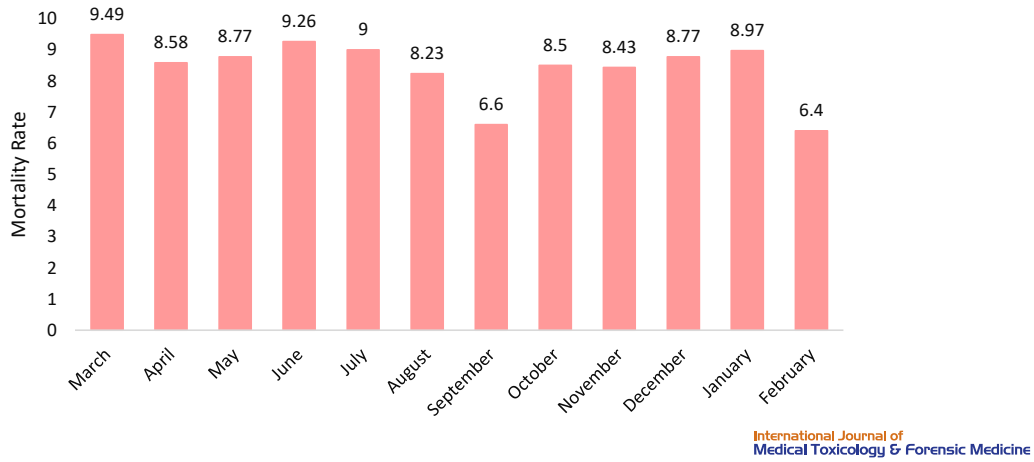

Figure 2. The mortality rate due to substance abuse by months of the year

cates that 1.71% of all deaths occurred in this province is due to substance abuse.

4. Discussion

In this study, the mortality risk factors for substance abuse were investigated. The results showed that the mortality rate of substance abuse was higher in men than women. Furthermore, the highest frequency of drug-related death was observed in the 30 to 39 years age group. This findings is consistent with prior research that investigated epidemiological characteristics of people who died from substance abuse in Iran [7, 8]. According to the World Health Organization (WHO) report, Iranian drug abuser are generally young (mean age=33 years) and male [9]. In most societies, men have more freedom in the social communications and work in the society more than women. Thus, they have more access to drugs. In the other words, in Iranian society, women's relationships are more restricted by their family members than men which results in their fewer opportunities for illicit drug use. Another point is the limited information about addiction and drug abuse among Iranian women.

It is unclear whether the lack of information about female drug users in Iran is due to low prevalence of drug abuse among them or their reluctance in attending drug rehabilitation programs. Studies in western countries have shown that drug abuse has been associated with more social stigmatization in women than men. Therefore, women's access to drug treatment is reduced. Nevertheless, the importance of substance abuse in women should not be underestimated and it is necessary to establish a particular clinic for addicted women with female personnel to encourage them to seek treatment [8, 10].

Most deaths from drug abuse occurred in young people (30-39 years). This age group is active in social and economic programs in society; so reducing their death has a beneficial economic and social impact, too [7].

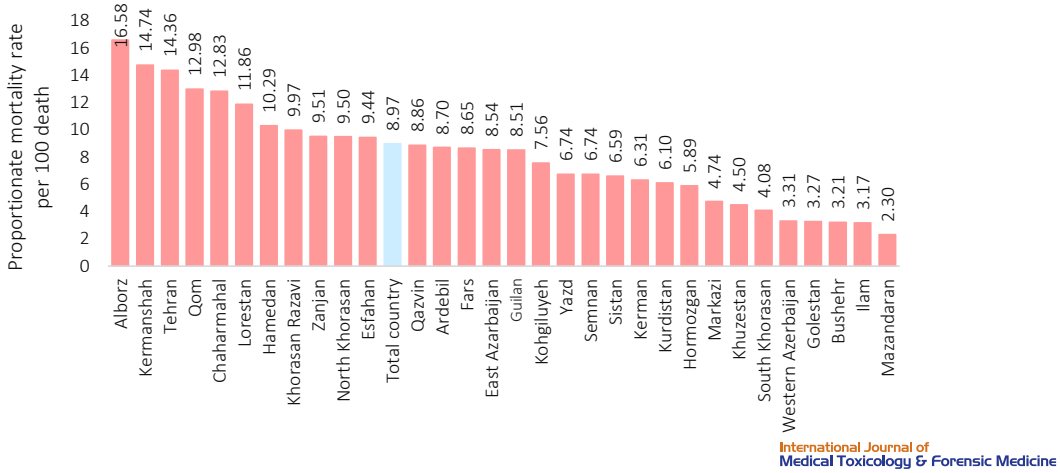

Figure 3. Proportionate mortality rate due to substance abuse among unnatural causes of death by provinces of Iran

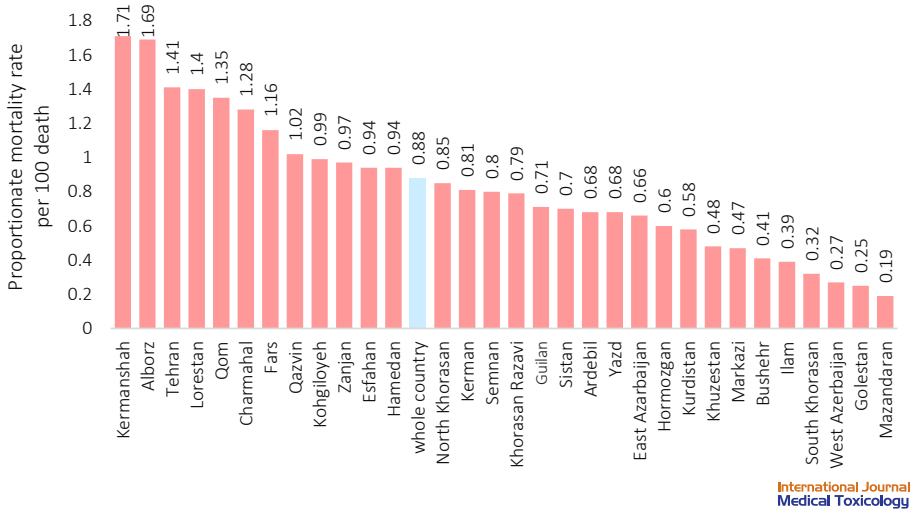

Figure 4. Proportionate mortality ratio from drug and psychotropic abuse in each province ordered by their rates per 100 population in Iran from March 2016 to February 2017

This study highlights that opioid-related fatalities occur at home or in another private residence (46.07%). This matter suggests that family members or friends of addicts are the key groups for targeting intervention programs (for example, training such individuals about overdose identification, basic life support measures, and emergency medical service activation may prove effective at reducing the death toll from this problem). Of course, important obstacles in providing immediate care and the low rates of emergency medical service are fear from police involvement and concerning about homicide charges. These behaviors lead to delays in reaching medical assistance [11].

In this study, some people used several addictive substances at the same time. These results would suggest that poly substance use maximizes mortality from substance

Table 2. Distribution of history of medical conditions, war injury, place of death and employment status in deaths related to drug abuse in Iran from March 2016 to February 2017

Variables		No.(%)
History of war injury	Yes	40(1.45)
	No	2468(89.75)
	Unknown	242(8.80)
Employment status	Student	63(2.29)
	University student	41(1.49)
	Housewife	201(7.31)
	Employee	64(2.33)
	Worker	264(9.60)
	Skilled worker	36(1.31)
	Solider	20(0.73)
	Retried	54(1.96)
	Unemployed	496(18.04)
	Farmer	34(1.24)
	Urban driver	30(1.09)
	Suburban driver	22(0.80)
	Military	28(1.02)
	Self-employed	1102(40.07)
	Drug-dealer	3(0.11)
	Beggar/Vendor	16(0.58)
	Other	276(10.03)

Variables		No.(%)
Medical condition	Cardiovascular disease	121(4.40)
	Diabetes	11(0.40)
	Cancers	9(0.33)
	Chronic pain	21(0.76)
	Physical disability	12(0.44)
	CVD & diabetes	6(0.22)
	CVD & Physical disability	1(0.04)
	Chronic pain & Physical disability	2(0.07)
	No disease / No response	2567(93.35)
Place of death	Home	1267(46.07)
	Prison	63(229)
	Addiction treatment center	65(2.36)
	Harm reduction center	2(0.07)
	Public places	296(10.76)
	Greenhouse	2(0.07)
	Hospital	671(24.40)
	Other	230(8.36)
	Unknown	154(5.60)

International Journal of
Medical Toxicology & Forensic Medicine

abuse, although longitudinal data are required to support this inference [11, 12]. One noticeable finding of our study is that death from substance abuse was more frequent in individuals with lower education level. It is perhaps due to the understanding and awareness of educated people regarding social, familial, psychological, sanitarian and economic adverse effects of substance abuse. Higher education level was a protective factor against drug abuse [7, 13].

The results showed that 18.04% of cases were unemployed. Employment was a protective factor against substance abuse and unemployment was strongly and significantly associated with substance abuse and was proposed as a risk factor. However, further studies are needed to determine the effects of drug abuse on occupation and whether it can increase the rate of unemployment [8, 14]. According to this study, most deaths by substance use occurred among unmarried people. This matter represents the importance of family support in addiction rehabilitation programs [7, 8].

Based on the findings, 23.08% of deceased have the history of imprisonment. It can be a serious warning for directors and authorities. On one hand, drug use can be an underlying cause for crime, while on the other hand, drug use imprisonment can result in numerous health problems such as infections [15]. According to this study, family history of drug abuse increases chance of addiction in other family members. Kardia et al. in their study demonstrated that parental substance abuse was a factor for the tendency and dependence on the drug [15].

There are several limitations in this study that warrant discussion. First, we included all individuals that were found to have positive screens at the time of death. It is impossible to know how many individuals have died from substance abuse yet did not receive a toxicology assessment. Thus an underestimation of the magnitude of substance abuse mortality might have occurred in this study. Second, the cross-sectional nature of research limits the ability to draw any causal inference.

5. Conclusion

In summary, a large number of deaths from illicit substance abuse occurred in unmarried, self-employed, young male people aged 30-39 years with low education levels. These findings highlighted that training programs and harm reduction approaches for drug rehabilitation should be focused on these at-risk groups.

Ethical Considerations

Compliance with ethical guidelines

The research protocol approved by the Ethics Committee of the Legal Medicine Organization (LMO), Tehran, Iran. Verbal consent was obtained from all families of deceased study subjects.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Authors contributions

Participated in data gathering and date preparation: Abdolrazagh Barzegar, Davood Mirtorabi, Mohammad Reza Ghadirzadeh and Ahmad Shojaei; Designed and conducted the research, performed the statistical analyses, participated in all of the research, and prepared and edited the manuscript: Fatemeh Shahbazi; Designed and conducted the research and corrected the English manuscript: Seyed Saeed Hashemi Nazari; Read and approve the content of the manuscript: Fatemeh Shahbazi and Seyed Saeed Hashemi Nazari.

Conflict of interest

The authors declared no conflict of interest.

Acknowledgements

We are grateful to Legal Medicine Organization and also Legal Medicine Research Center for providing the data of this research.

References

[1] Degenhardt L, Bucello C, Mathers B, Briegleb C, Ali H, Hickman M, et al. Mortality among regular or dependent users of heroin and other opioids: A systematic review and meta-analysis of cohort studies. Addiction. 2011; 106(1):32-51. [DOI:10.1111/j.1360-0443.2010.03140.x] [PMID]

[2] Green TC. Substance abuse, HIV infection, medication adherence, and mortality among a cohort of aging US veterans. New Haven: Yale University; 2009.

[3] Hayden A, Hayashi K, Dong H, Milloy MJ, Kerr T, Montaner JS, et al. The impact of drug use patterns on mortality among polysubstance users in a Canadian setting: A prospective cohort study. BMC Public Health. 2014; 14:1153. [DOI:10.1186/1471-2458-14-1153] [PMID] [PMCID]

[4] Fischer B, Rehm J, Brissette S, Brochu S, Bruneau J, El Guebaly N, et al. Illicit opioid use in Canada: Comparing social, health, and drug use characteristics of untreated users in five cities (OPICAN study). Journal of Urban Health. 2005; 82(2):250-66. [DOI:10.1093/jurban/jti049] [PMID] [PMCID]

[5] Day C, Nassirimanesh B, Shakeshaft A, Dolan K. Patterns of drug use among a sample of drug users and injecting drug users attending a General Practice in Iran. Harm reduction journal. 2006; 3(1):2. [DOI:10.1186/1477-7517-3-2] [PMID] [PMCID]

[6] Ghodse H, Oyefeso A, Kilpatrick B. Mortality of drug addicts in the United Kingdom 1967–1993. International Journal of Epidemiology. 1998; 27(3):473-8. [DOI:10.1093/ije/27.3.473] [PMID]

[7] Ghoreishi SM, Shahbazi F, Mirtorabi SD, Ghadirzadeh MR, Hashemi Nazari SS. Epidemiological study of mortality rate from alcohol and illicit drug abuse in Iran. Journal of research in health sciences. 2017; 17(4):e00395. [PMID]

[8] Shahbazi F, Mirtorabi SD, Ghadirzadeh MR, Hashemi Nazari SS, Barzegar A. Characterizing mortality from substance abuse in Iran: An epidemiological study during March 2014 to February 2015. Addiction and Health. 2017; 9(3):166-74. [PMID] [PMCID]

[9] WHO Regional Office for the Eastern Mediterranean. Best practice in HIV/AIDS prevention and care for injecting drug abusers: The triangular clinic in Kermanshah, Islamic Republic of Iran. Geneva: World Health Organization; 2004.

[10] Karbakhsh M, Zandi NS. Acute opiate overdose in Tehran: The forgotten role of opium. Addictive Behaviors. 2007; 32(9):1835-42. [DOI:10.1016/j.addbeh.2006.12.014] [PMID]

[11] Dong K. Characterizing opioid overdose in Alberta [MSc thesis]. Edmonton: Concordia University of Edmonton; 2007.

[12] Fischer B, Brissette S, Brochu S, Bruneau J, El Guebaly N, Noël L, et al. Determinants of overdose incidents among illicit opioid users in 5 Canadian cities. Canadian Medical Association Journal. 2004; 171(3):235-9. [DOI:10.1503/cmaj.1031416] [PMID] [PMCID]

[13] Eslami Shahrbabaki M, Fekrat A, Mazhari S. A study of the prevalence of psychiatric disorders in patients with methamphetamine-induced psychosis. Addiction & Health. 2015; 7(1):37-46. [PMID] [PMCID]

[14] Dietze P, Cantwell K, Burgess S. Bystander resuscitation attempts at heroin overdose: Does it improve outcomes? Drug & Alcohol Dependence. 2002; 67(2):213-8. [DOI:10.1016/S0376-8716(02)00063-7]

[15] Brehm Christensen P, Hammerby E, Smith E, Bird SM. Mortality among Danish drug users released from prison. International Journal of Prisoner Health. 2006; 2(1):13-9. [DOI:10.1080/17449200600743644]