

Original Article

Psychiatric Comorbidities among Iranian Elderly Patients on Methadone Maintenance Treatment

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Abstract

Background: Comorbidity of psychiatric disorders and substance abuse can intensify both conditions, and when advanced age is added to the combination, the patient will face a distinctive array of issues. This study evaluated the prevalence of psychiatric disorders in elderly substance users as well as certain related factors.

Methods: This cross-sectional study was performed on 160 consenting elderly substance users 60 years and over who had been on methadone maintenance. The subjects were selected from rehabilitation centers affiliated with the Welfare Organization in Tehran through convenience sampling, and were assessed for current or lifetime axis-I psychiatric disorders using the SCID questionnaire.

Results: In this study, 28.1% of substance abusers were diagnosed with at least one current psychiatric disorder. Psychiatric disorders were more common in subjects whose dependence had started prior to the age of 35, or those who had a family history of substance use. Also, 34.4% had a lifetime history of at least one psychiatric disorder, with a higher incidence among those simultaneously dependent on other substances in addition to opioids. Major depression was the most prevalent disorder among the study subjects.

Conclusion: Based on the findings of the present study, axis-I psychiatric disorders are rather common among elderly substance users, and approximately a third of this population have a lifetime history of at least one such disorder. The type of abused substance can affect the incidence of psychiatric disorders, and simultaneous use of non-opioids and other substances can increase their prevalence.

Keywords: Comorbidity, elderly, mental health, substance abuse

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Introduction

Substance use disorder and substance dependence are associated with an increased morbidity and mortality, which place them among the current problems of the modern world.¹ Addiction inflicts considerable loss on the international community through lowered productivity, transmission of infectious diseases, domestic and social problems, increased crime rates, as well as the need for allocation of health care and treatment services.

In Iran, the geographic location and economic situation of the region makes addiction a significant concern for the country. Iran shares borders with the world's largest producer of opium and heroin. It also serves as a major passageway to Europe for narcotics, and a favorable consumer market as well. Studies have shown that after mood disorders, substance abuse is the second most prevalent psychiatric disorder in Iran.²

Recent research indicates a noticeably high incidence of psychiatric disorders among substance users, particularly in Western countries.^{3,4} American studies specifically point to the relationship between substance use and antisocial personality disorder, various types of phobia and anxiety disorders, major depression

and dysthymia.³ Comorbidity of drug abuse and other mental disorders have been also reported to lead to a deterioration of psychiatric symptoms and an increased risk of suicide.⁵ Comorbid mental disorders should be investigated as an important factor in the etiology, prognosis and pathology of substance abuse, and are interrelated with patients' acceptance of treatments, chronicity of symptoms and signs, as well as eventual relapse.³

According to researches, the severity of mental disorders differs based on types of substances. For instance, less severe disorders have been reported in connection with substances such as opium, and more severe ones with drugs such as heroin.⁶

Substance dependence among the elderly is a current issue in this area. Levin and Kruger (2000) referred to this problem as an "invisible epidemic", stating that older people, their relatives and caregivers are inclined to play down the importance of substance abuse among this population.⁷

Elderly substance abusers can be categorized into two groups: early onset and late onset abusers.^{7,8} Undesirable life conditions, retirement, grief, reduced social relationships, physical pain and ailments are among the factors that can push older adults to drugs.⁹ One common important problem in old age is loss: losing one's job, health, friends, and loved ones, all of which can lead to substance abuse.¹⁰

In view of the growth in the older population in Iran, the issues surrounding substance abuse and its relationship with psychiatric disorders, as well as a lack of research on elderly substance users in the country, the present study was conducted to examine axis-I psychiatric disorders and their association with demographic factors and patterns of abuse in this population.

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Method

This cross-sectional study was performed in the city of Tehran between October 2012 and September 2013. Due to the lack of similar research on elderly substance users in Iran, a pilot study was first conducted on 50 elderly patients undergoing treatment in outpatient drug treatment centers in order to arrive at the estimates necessary for sample size calculation.

Based on the findings of the pilot study, the estimated prevalence of a lifetime history or current diagnosis of at least one psychiatric disorder among elderly substance users were 0.32 and 0.28 respectively. The final sample size was determined at 160 considering the figure 0.32 above, and assigning a 15% chance of dropout.

Then, a list of all outpatient drug treatment centers affiliated with the Welfare Organization in Tehran district was prepared, and the ones with patients 60 years and older were identified via phone calls. Arrangements were made by the directors of these centers to conduct interviews with the elderly substance users. Subsequently, interviewers visited each center during the hours when qualifying patients stopped by to receive their doses of methadone, and performed clinical interviews with subjects who met the inclusion criteria after obtaining their consent.

Interviews were performed by an educated interviewer who had experiences in Clinical Interviews for psychiatric assessment and was trained and assessed theoretically and practically about using SCID in a 4-day training program. Four pilot interviews were conducted before starting the study under full supervision of the psychiatrist, who also had a fellowship in geriatrics. All of the main study interviews were also reviewed by the above-mentioned psychiatrist and accepted after his confirmation.

According to the latest treatment protocol on the use of agonists for opioid dependence issued by the Office of Mental and Social Welfare and Substance Abuse, Ministry of Health and Medical Education,¹¹ patients need to be examined daily by a physician for the first 2 weeks, and then once a week for the following 12 weeks. We approached substance users, who were 60 years and older and had enrolled at the outpatient drug treatment centers no more than 12 weeks ago who had completed the first 2 weeks of treatment, were free of withdrawal symptoms and their methadone dosage had been determined.

All participants signed informed consents to be enrolled in the study. Participants were given the option to drop out at any time. We excluded individuals whose level of psychiatric disorder, concentration or consciousness interfered with the accuracy of interviews and obtaining information.

Statistical Methods

Main dependent variables in this study were the presence of the following among elderly substance users: current diagnosis of at least one axis-I psychiatric disorder (within the past month prior to the interview); a lifetime history of at least one axis-I psychiatric disorder (from birth till the month prior to the interview); lifetime major depression disorder; and current major depression disorder. All of these variables were qualitative, specifically nominal and binary. Independent variables consisted of age, marital status, literacy, occupation, living status, loss of loved ones (in the past 6 months), history of attempted suicide, current or lifetime substance abuse or dependence, age at onset of substance use, age at onset of substance dependence, duration of use, duration of dependence, first substance used, type of substance abused (sub-

stance the individual has been dependent on), history of injection drug use, history of incarceration, history of detoxification, and family history of substance use.

Depending on the type of variables (i.e. qualitative or quantitative), mean, proportion and frequency were used to describe the collected data in the present study. Data analysis was performed based on Hosmer-Lemeshow model for multiple covariates.¹² For this purpose, the bivariate correlation between each independent variable and every one of the dependent variables was investigated. Independent variables with P -values less than 0.2 were entered in the primary regression model along with the dependent variables. Subsequently, variables with $P > 0.05$ were removed from the model using the backward elimination method. In the next stage, variables with $P > 0.2$ in the bivariate analysis were once again added to the model one by one. After re-entering variables, those with significant P -values (< 0.05) were included in the model, and the rest were deleted. Other variables were also added to the final model if their interaction was significantly associated with dependent variables. The output of the final model for each of the dependent variables in the study has been discussed separately in the "Results" section below.

Data Collection Tools

To evaluate psychiatric disorders among elderly substance users in the present study, the Persian translation of the Clinical Version of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-CV) was used. SCID is a semi-structured clinical interview for diagnosing major axis-I psychiatric disorders based on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV).¹³ This instrument has been used in psychiatric studies more than any other standard diagnostic interview, and has two main versions: SCID-I and SCID-II, which evaluate DSM-IV axis-I and axis-II psychiatric disorders respectively. SCID-CV is divided into six self-contained modules covering: Mood Episodes, Psychotic Symptoms, Psychotic Disorders, Mood Disorders, Substance Use Disorders and Anxiety, as well as Other Disorders.¹⁴ Although many experts are skeptical of the validity of the above diagnostic categorization, researches confirm the desirable validity and reliability of this instrument.¹⁵⁻¹⁷ In their study on substance users (1995), the Kranzler, et al. demonstrated the higher validity of psychiatric diagnoses, compared to standard clinical interviews.¹⁸

In Iran, validity and reliability of the Persian translation of SCID-CV was investigated by Sharifi, et al. who reported moderate to good diagnostic agreement for most specific and general diagnoses (κ higher than 0.6). Overall agreement or overall weighted κ values for current and lifetime diagnoses were 0.52 and 0.55, respectively. In assessing the validity of this instrument and using psychiatrists' diagnoses as the "gold standard", specificity values were higher than 0.86 for most diagnoses, and greater than 0.90 in 50% of the cases. This indicates the instrument's good specificity, although sensitivity values were lower to some extent (between 60 and 80%).¹⁹

In this study, a separate questionnaire containing independent variables was used to collect demographic data and information on patients' history and patterns of substance abuse.

Considering that substance abuse is a crime in Iran, all subjects completed an anonymous written consent form after they were briefed on the project and its objectives. Subjects diagnosed with psychiatric disorders could receive a free consultation from the

project psychiatrist in the course of the study.

Results

Participants were 160 substance users, 60 – 86 years old with a mean age of 64.06 ± 4.78 years, and 95.6% were males. A majority of males belonged to the 60 – 74 year old age group (that is, young old), 86.3% of the subjects were married, 83.8% were literate, 43.8% were retired or on pension, and a mere 3.8% lived alone.

According to the subjects' patterns of abuse, age of onset of substance use ranged from 13 to 61 (30.40 ± 11.36) years old and mean age of onset of dependence was 36.08 ± 12.07 years, whereas only 1.3% of the subjects were late-onset abusers. Opium was the first substance used in 87.5% of cases. Of the subjects, 35.6% had a family history of substance use, 6.9% had a history of drug injection, and 78.8% had at least one detoxification attempt. Mean duration of substance abuse was 33.66 ± 11.12 years, and mean duration of dependence was 27.95 ± 11.58 years.

A summary of the subjects' demographics and patterns of substance abuse are presented in Table 1. Gender was not included in the analysis as the number of female participants was considerably lower than male subjects. Moreover, due to the low frequency of samples across some categories of qualitative variables, certain categories were merged and variables were laid out in binary format to improve the process of data analysis and increase the power of statistical tests. The median was used as the cut-off point to change quantitative variables into binary qualitative variables.

The most prevalent psychiatric disorders among the subjects of this study were lifetime major depression (15.6%), current major depression (13.1%), lifetime mood disorders due to substance abuse (6.3%), and current generalized anxiety disorder (5.0%) (Table 2).

All participants were on methadone maintenance therapy; therefore none of the subjects met the criteria for current substance dependence. As shown in Table 3, opioid was the only substance of

dependence for 83.8%, and comorbid alcohol and opioid dependence were the next most prevalent form of substance dependence in a lifetime (8.1%). Alcohol was the most common substance abused in their lifetime history (12.5%). In fact, alcohol was the only substance that 1.3% of the subjects were currently abusing. With 2.5% of subjects having a lifetime history of abuse, marijuana was the second most prevalent substance.

In view of the low prevalence of individual disorders among the study population, four chief dependent variables were considered in this study: at least one current psychiatric disorder (28.1%); at least one lifetime psychiatric disorder (34.4%); current major depression (13.1%); and lifetime major depression (15.6%).

Univariate analysis produced *P*-values smaller than 0.2 for the relationships between the independent variables "loss of loved ones", "age at onset of dependence" and "family history of substance use", as well as the dependent variable "at least one current psychiatric disorder".

Table 4 demonstrates results from the multivariate analysis of the relationships between independent variables and "at least one current psychiatric disorder" using the logistic regression model. After deleting the variable "age at onset of dependence" in the primary model, a significant association was found between the dependent variable and "family history of substance use" by eliminating the effect of the variable "loss of loved ones" (*P* = 0.03).

There was a significant interaction between the two variables "family history of substance use" and "age at onset of dependence" in the final model (*P* = 0.03). Therefore, the association between the variables "family history of substance use" and "current psychiatric disorder" was investigated in different categories of "age at onset of dependence". Consequently, psychiatric disorders were found to be significantly less common among subjects whose dependence had started at age 35 or older, and who had no family history of substance use.

Results from the univariate analysis showed no significant relationship between demographic variables and the dependent variable "at least one lifetime psychiatric disorder". However, the *P*-value of the relationships between the independent variables,

Table 1. Summary of demographics and patterns of substance abuse in the study subjects.

Variable	Percent	Variable	Percent
Age (years)		Age at onset of substance use	
< 70	86.3	< 30	50.6
≥ 70	13.8	≥ 30	49.4
Marital status		Age at onset of substance dependence	
married	86.3	< 35	48.8
single	13.8	≥ 35	50.6
Literacy status		Duration of use	
Literate	83.8	< 35	48.1
Illiterate	16.3	≥ 35	51.9
Occupation		Duration of dependence	
Employed	38.8	< 30	50.6
Unemployed	61.3	≥ 30	48.8
Living status		Family history of substance use	
Alone	3.8	Yes	35.6
With companion	96.3	No	64.4
Loss of loved ones in the past 6 months		History of drug injection	
Yes	8.7	Yes	6.9
No	91.3	No	93.1
First substance used		History of incarceration	
Opioid	87.5	Yes	26.9
Non-opioid	12.5	No	73.1
Type of substance (lifetime dependence)		History of detoxification	
Just opioid	83.8	Yes	78.8
Opioid + other substance(s)	16.3	No	21.3

Table 2. Prevalence of current and lifetime psychiatric disorders among the study subjects

	Psychiatric disorders*	Frequency (N = 160)	Percentage
	Bipolar I Disorder	lifetime	2
	current	1	0.6
Bipolar II Disorder	lifetime	3	1.9
	current	3	1.9
Major Depression	lifetime	25	15.6
	current	21	13.1
Dysthymic Disorder	lifetime	4	2.5
	current	5	3.1
Delusional disorder	lifetime	1	0.6
	current	1	0.6
Brief Psychotic Disorder	lifetime	1	0.6
	current	1	0.6
Panic disorder	lifetime	2	1.3
	current	1	0.6
Obsessive compulsive disorder	lifetime	5	3.1
	current	5	3.1
Post-traumatic Stress Disorder	lifetime	1	0.6
	current	0	0
Generalised Anxiety Disorder	lifetime	4	2.5
	current	8	5.0
Phobia	lifetime	3	1.9
	current	4	2.5
Adjustment Disorders	lifetime	1	0.6
	current	0	0
Mood Disorder due to a General Medical Condition	lifetime	1	0.6
	current	1	0.6
Psychotic Disorder due to a General Medical Condition	lifetime	1	0.6
	current	1	0.6
Substance-Induced Mood Disorder	lifetime	10	6.3
	current	3	1.9
Substance-Induced Psychotic Disorder	lifetime	3	1.9
	current	0	0
Substance-Induced Anxiety Disorder	lifetime	2	1.3
	current	0	0

*The prevalence of current and lifetime Cyclothymic disorder, Schizophrenia, Schizophreniform disorder, Somatisation Disorder, eating disorder and Anxiety Disorder due to a General Medical Condition in study participants were 0%.

Table 3. Substance dependence lifetime comorbidity in the study subjects

Substance Dependence	Frequency (N = 160)	Percentage
Just Opioid	134	83.8
Opioid and Alcohol	13	8.1
Opioid and Amphetamine	2	1.3
Opioid and Cannabis	4	2.5
Opioid and Sedative/Hypnotic/Anxiolytic Dependence	2	1.3
Opioid and Alcohol and Cannabis	3	1.9
Opioid and Alcohol and Sedative/Hypnotic/Anxiolytic Dependence	2	1.3

Table 4. Multivariate analysis of the relation of a current diagnosis of at least one psychiatric disorder with the studied variables using logistic regression.

Model	Parameter	P-value	Adjusted OR
One	Loss of loved one in the past 6 months	0.06	3.01
	Age at onset of substance dependence	0.13	0.57
	Family history of substance use	0.03	2.18
Two	Loss of loved one in the past 6 months	0.07	2.76
	Family history of substance use	0.03	2.15
Final	Family history of substance use	0.88	1.07
	Loss of loved one in the past 6 months	0.06	3.01
	Age at onset of substance dependence	0.01	0.28
	Age at onset of substance dependence* family history of substance use	0.03	4.89

OR: odds ratio; *Interaction.

Table 5. Multivariate analysis of the relation of a lifetime history of at least one psychiatric disorder with the studied variables using logistic regression.

Model	Parameter	P-value	OR
One	History of incarceration	0.28	1.57
	History of drug injection	0.66	1.39
	Duration of dependency	0.27	1.47
	First substance used	0.18	2.10
	Type of substance abused	0.16	1.97
Two	History of incarceration	0.16	1.70
	Duration of dependency	0.26	1.49
	First substance used	0.15	2.18
	Type of substance abused	0.14	2.03
Three	History of incarceration	0.11	1.82
	First substance used	0.10	3.36
	Type of substance abused	0.10	2.19
Four	First substance used	0.10	2.35
	Type of substance abused	0.06	2.41
Final	Type of substance abused	0.008	3.20

including: “age at onset of abuse”, “age at onset of dependence”, “first substance used”, “history of drug injection”, “history of incarceration”, “duration of dependence”, “type of substance abused” and the above-mentioned dependent variable were less than 0.2.

Based on results from the multivariate analysis presented in Table 5, there was a significant relationship only between the variable “type of substance abused” and “at least one lifetime psychiatric disorder” ($P = 0.008$). Furthermore, psychiatric disorders were significantly more common among subjects simultaneously dependent on opioids and other substances.

The relationship between the dependent variable “current major depression” and the independent variables of “age”, “loss of loved ones”, and “duration of substance dependence” was investigated through logistic regression. The results showed no statistically significant relationship between the variables entered in the model and current major depression.

The only variable that significantly related to “a lifetime major depression” was “first substance used” ($P = 0.01$). Moreover, the prevalence of “a lifetime major depression” was significantly higher among subjects who used non-opioids than those who used opioids.

Discussion

According to the result of this study, which was the first to be conducted on elderly substance users, the prevalence of psychiatric disorders in our subjects is lower than the range of results from other available studies performed on different age groups in Iran.²⁰⁻²³ A more careful investigation proves the current study results to be closer to findings of studies that employed diagnostic tools rather than screening instruments.

Based on a systematic review study by Bartels, et al. in 2006, the prevalence of at least one psychiatric disorder among elderly substance users in various studies ranges between 21% and 66%,²⁴ and our result lies within this range. On the other hand, in an epidemiological survey of psychiatric disorders among people who were 18 years and older in Iran, Mohammadi, et al. found that 10.78% of the subjects suffered from at least one such disorder.²⁵ According to another epidemiological study confined to Tehran province, this figure was 9.68%.²⁶ These studies used a different instrument (SADS), but the great discrepancy between their

results and those of the present study may be due to the higher prevalence of psychiatric disorders among elderly substance users than the general population. Therefore, it can be concluded that although psychiatric disorders are much more common among older substance users than the general population, they are still less common compared to younger users. Some reasons may be: switching to new substances such as synthetic drugs, and earlier onset of abuse, as well as dependence among younger generations.

Among the elderly substance users under study, major depression (current or lifetime) was the most common psychiatric disorder. Numerous studies in Iran and elsewhere have mentioned major depression as one of the most prevalent disorders among substance users,^{22,27-31} although there are variations in the figures, with those in the present study being lower than others. One factor to be taken into account is the difference in methods employed by various studies, as diagnostic tools have yielded lower prevalence than screening instruments. Another matter to be considered is the lower prevalence of major depression in elderly substance users in comparison to users in other age groups. Gum, et al. demonstrated the same results in their study.³²

Compared to the general population, the prevalence of major depression was found to be higher in our subjects. In the study by Sharifi, et al. regarding psychiatric disorders in Iranian men, the prevalence of major depression was 11.9%.³³ Various surveys of older populations have shown different results regarding the prevalence of major depression, although this disorder seems to be more common among the elderly than other age groups.^{34,35}

A comparison between the aforementioned surveys and the present study demonstrates that prevalence of major depression is higher in elderly substance abusers than the general population, but still lower than substance users of other age groups. As for non-addicted elderly people, there has been no research using diagnostic tools in Iran based on a systematic review study conducted in 2012,³⁶ and therefore a comparison cannot be made. However, this research indicates that the prevalence of major depression is higher among our subjects than community dwelling elderly in other countries.³⁷⁻³⁹

The most common comorbidity among elderly substance users in the present study was between opioid dependence and major depressive disorder, and a lifetime history of alcohol abuse was found to be the second most common comorbid disorder. How-

ever, in the review study by Bartels, et al.²⁴ depression and alcohol abuse were mentioned as the most common comorbid disorders in older adults. Since these studies have different settings, the discrepancy may be due to sociocultural differences between Iran and other countries, and the fact that alcohol is legally and religiously forbidden in Iran.

Based on the findings of the present study, late onset of substance dependence can be associated with a decreased chance of current psychiatric disorders. Early substance abuse has been reported as a risk factor for psychiatric disorders in later years.⁴⁰ Since early exposure to drugs entails early dependence, current study results are in line with the above-mentioned reports. Other studies confirm that prevalence of different types of mental illness is higher among individuals who started substance abuse at a younger age.^{41,42}

In the present study, the prevalence of a lifetime history of at least one psychiatric disorder was significantly higher among elderly subjects who used opioids and other substances simultaneously than those who had only opioid dependence. Thomasiusa, et al. have also reported poly-substance use as the cause for a higher prevalence of axis-I psychiatric disorders among the subjects in their study.⁴³

Based on the current study results, most of the study subjects were male. This was not necessarily due to small sample size or advanced age of the study population, as in a study by Abasi, et al. in 3005 cases of substance users undergoing treatment at rehabilitation centers between 2001 and 2005, 92.7% were men.⁴⁴ Likewise, only 7% of the 747 subjects in a study by Heidari, et al. were women,⁴⁵ and as shown in a review study by Rahimi Movaghar, the situation is more or less the same in most research conducted on the subject of addiction in Iran.⁴⁶ The reason might be that substance abuse is less common among Iranian women than men, or women are less likely to seek help at rehabilitation centers on various cultural or social grounds. In order to shed light on the reality of addiction in the society, it seems necessary to perform exclusive researches focusing on women substance users.

In the present study, the majority of cases were married, and only 1.8% had never married. The high prevalence of substance abuse among this population is probably due to the fact that older people in Iran are typically married. Moreover, other studies have shown that married people are more inclined to withdraw from substance abuse than single people.^{22,44,47}

Patterns of abuse indicate that the mean age at onset of substance use in the present study was higher than studies on younger samples (30.40 against 18 – 22).^{40,48,49} Therefore, it can be concluded that the mean age of onset of substance use is higher among the elderly than younger people. One explanation might be that in recent years, there has been a decline in age of onset of substance use, although further research on different age groups and at different time spans is needed to investigate this theory.

The first substance used was opium in 87.5% of the subjects, and only 3.8% stated heroin as the first substance they ever used. Opium has been found by most Iranian studies to be the first substance used,^{5,21,40,49} although the present study reveals a greater prevalence of opium addiction. In comparison with other age groups, substance abuse in elderly seems to have started with opioids more often.

In terms of substance dependence, a large percentage of the subjects had a lifetime history of only opioid dependence, and 15.2% were using two or more substances simultaneously, with conjoint

opioid and alcohol dependence having the highest prevalence. Researches on other age groups have also shown opioid dependence to be the most common form of substance dependence, although results vary from those of the present study.^{20,40,44} In comparison to other age groups, synthetic drugs abuse and simultaneous abuse of more than one substance are less popular among the subjects of this study.⁴⁰ Studies in other countries have revealed different patterns of abuse regarding substance types. As an example, results from the 2011 National Survey on Drug Use and Health in the United States have reported marijuana to be the most common substance of abuse among the elderly at 5.9%.⁵⁰

There are several limitations in the present study. First, we did not analyze the gender variable due to the small number of older female substance users seeking help at outpatient drug treatment centers and the consequent shortage of female samples. Therefore, studies with larger sample sizes, or more exclusive research on women would be recommended to further investigate this issue. Another limitation was that the study imposed several inclusion and exclusion criteria; for instance being on methadone maintenance treatment. Therefore, the patterns of substance use and psychiatric disorders cannot be generalized to all elderly substance users, or even all opioid dependent patients. Those who are opioid dependent and received detoxification as a method of quitting might have less psychiatric comorbidities. Those who have exited MMT in the first weeks of treatment and are excluded from this study might suffer more from a comorbid psychiatric illness. In addition, although the participants were entered into the study after adjustment of their methadone maintenance dosage and resolution of withdrawal symptoms, prevalence of current psychiatric disorders may still have been overestimated due to probable unmeasured protracted withdrawal symptoms. The history and patterns of substance abuse were collected through a self-report questionnaire, and there is a concern about the possibility of low validity of this kind of results. Moreover, lifetime disorders in elderly people are at risk of recall bias.

In Conclusion, our findings showed that the prevalence of psychiatric disorders is significantly high among elderly substance users. Considering the results of other studies, the pattern is quite different from substance users of other age groups or non-addicted elderly people.

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References

1. Levine HG. The discovery of addiction: Changing conceptions of habitual drunkenness in America. *Journal of Substance Abuse Treatment*. 1985; 2(1): 43 – 57.
2. Rahimi MA, Sharifi V, Mohammadi MR, Farhoudian A. Researches on substance use in Iran; 3 decades evaluation. *Hakim*. 2006; 8(4): 37 – 44.
3. Sadock BJ, Sadock VA. Kaplan and sadock's comprehensive textbook of psychiatry. 8th ed. New York: Lippincott Williams and Wilkins; 2005.
4. Hannesdottir H, Tyrfinngsson T, Piha J. Psychosocial functioning and psychiatric comorbidity among substance-abusing Icelandic adolescents. *Nord J Psychiatry*. 2001; 55(1): 43 – 48.
5. Ghaleiha A, Farhadi Nasab A, Zarabian M, Matinnia N. Comparative Survey of Mental Disorders and Personality Characteristics in Persons With Drug Dependent and Non Drug Dependent in Hamadan, Iran. *Sci J Hamdan Univ Med Sci*. 2008; 15(2): 42 – 47.
6. Troisi A, Pasini A, Saracco M, Spalletta G. Psychiatric symptoms

- in male cannabis users not using other illicit drugs. *Addiction*. 1998; 93(4): 487 – 492.
7. Benschoff JJ, Harrawood LK, Koch DS. Substance abuse and the elderly: Unique issues and concerns. *Journal of Rehabilitation*. 2003; 69(2): 43 – 8.
 8. Benschoff JJ, Roberto KA. Alcoholism in the elderly: Clinical issues. *Clinical Gerontologist*. 1988; 7(2): 3 – 14.
 9. Rigler SK. Alcoholism in the elderly. *Am Fam Physician*. 2000; 61(6): 1710 – 6.
 10. Norton ED. Counseling Substance-Abusing Older Clients. *Educational Gerontology: An International Quarterly*. 1998; 24(4): 373 – 89.
 11. Mohsenifar S, Mostashari G, Vaziri M. Protocol for the treatment of opioid dependence with agonist drugs. 2 ed. Tehran Ministry of Health; 2006 (in persian).
 12. Jewell NP. Goodness of Fit Test for Logistic Regression Models and Model Building. Statistic for Epidemiology. Washington DC: Chapman & Hall/CRC; 2004: 243 – 255.
 13. Mohammad Khani P. clinical structured interview for DSM–IV–TR disorders. Tehran: Danjeh; 2010.
 14. Spitzer RL, Williams JB, Gibbon M, First MB. The structured clinical interview for DSM – III – R (SCID): I: history, rationale, and description. *Archives of General Psychiatry*. 1992; 49(8): 624 – 629.
 15. Skre I, Onstad S, Torgersen S, Kringlen E. High interrater reliability for the Structured Clinical Interview for DSM-III-R Axis I (SCID-I). *Acta Psychiatrica Scandinavica*. 1991; 84(2): 167 – 173.
 16. Lobbstaël J, Leurgans M, Arntz A. Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I disorders (SCID I) and Axis II disorders (SCID II). *Clinical Psychology & Psychotherapy* 2011; 18(1): 75 – 79.
 17. Martin CS, Pollock NK, Bukstein OG, Lynch KG. Inter – rater reliability of the SCID alcohol and substance use disorders section among adolescents. *Drug and Alcohol Dependence* 2000; 59(2): 173 – 176.
 18. Kranzler HR, Kadden RM, Burleson JA, Babor TF, Apter A, Rounsaville BJ. Validity of psychiatric diagnoses in patients with substance use disorders: Is the interview more important than the interviewer? *Comprehensive Psychiatry*. 1995; 36(4): 278 – 288.
 19. Sharifi V, Assadi SM, Mohammadi MR, Amini H, Kaviani H, Semnani Y, et al. A persian translation of the structured clinical interview for diagnostic and statistical manual of mental disorders: psychometric properties. *Comprehensive Psychiatry*. 2009; 50(1): 86 – 91.
 20. Ghanizadeh A, Ashkani H, Maany I. Comorbidity of psychiatric disorders in Iranian treatment – seeking opioid addicts. *Iran J Med Sci*. 2000; 25: 25 – 30.
 21. Hoseini SH, Zarghami M, Mousavi SE, Nateghi G, Masoudzade A. Study on the simultaneity of the substance abuse with psychiatric disorder in referred outpatients to psychiatryclinic of zare hospital for period of one year. *Journal of Mazandaran University Of Medical Sciences*. 2008; 18(67): 67 – 74 (In Persian).
 22. Ghoreishi Fs, Ahmadvand A, Sepehrmanesh Z. Surveying Mental Health Status of IV Drug Abusers in Kashan Prison in 2007. *Pajoo-handeh Journal*. 2010; 15(2): 67 – 71.
 23. Goreishizade SMA, Torabi K. Study of mental illness combined with addiction in 200 patients referred to the center for drug abusers in Tabriz. *Journal of Tabriz University of Medical Sciences*. 2002; 3(55): 49 – 53 (In Persian).
 24. Bartels SJ, Blow FC, Citters ADV, Brockmann LM. Dual Diagnosis Among Older Adults: Co – Occurring Substance Abuse and Psychiatric Illness. *Journal of Dual Diagnosis*. 2006; 2(3): 9 – 30.
 25. Mohammadi M-R, Davidian H, Noorbala AA, Malekafzali H, Naghavi HR, Pouretamad HR, et al. An epidemiological study of psychiatric disorder in Iran, 2001. *Hakim* 2003; 6(1): 55 – 65.
 26. Mohammadi M, Rahgozar M, Bagheri Yazdi A, Naghavi H, Pour Etemad HR, Amini H, et al. Epidemiological study of psychiatric disorder in Tehran Province. *Iranian Journal of Psychiatry and Clinical Psychology (IJPCP)*. 2003; 9(2): 4 – 13.
 27. Bartels SJ, Blow FC, Van Citters AD, Brockmann LM. Dual diagnosis among older adults: Co-occurring substance abuse and psychiatric illness. *Journal of Dual Diagnosis*. 2006; 2(3): 9 – 30.
 28. Rosen D, Smith ML, Reynolds CF. The prevalence of mental and physical health disorders among older methadone patients. *The American Journal of Geriatric Psychiatry*. 2008; 16(6): 488 – 497.
 29. Adamson SJ, Todd FC, Douglas Sellman J, Huriwai T, Porter J. Coexisting psychiatric disorders in a New Zealand outpatient alcohol and other drug clinical population. *Australian and New Zealand Journal of Psychiatry*. 2006; 40(2): 164 – 170.
 30. Goldner EM, Lusted A, Roerecke M, Rehm J, Fischer B. Prevalence of Axis – 1 psychiatric (with focus on depression and anxiety) disorder and symptomatology among non-medical prescription opioid users in substance use treatment: systematic review and meta-analyses. *Addictive Behaviors*. 2014; 39(3): 520 – 531.
 31. Heidari J, Hoseini SH, Hedayat J, Janati Y, Mohammadpur R, Mahmudi G. Psychosocial status of addicts in Sari township in 2004. *Journal of Mazandaran University of Medical Sciences*. 2006; 52: 109 – 116.
 32. Gum AM, King–Kallimanis B, Kohn R. Prevalence of mood, anxiety, and substance–abuse disorders for older Americans in the national comorbidity survey–replication. *The American Journal of Geriatric Psychiatry*. 2009; 17(9): 769 – 781.
 33. Vandad Sharifi M, Hajebi A, Radgoodarzi R. Twelve – month prevalence and correlates of psychiatric disorders in Iran: The Iranian Mental Health Survey, 2011. *Archives of Iranian Medicine*. 2015; 18(2): 76.
 34. Manzouri L, Babak A, Merasi M. The depression status of the elderly and it's related factors in Isfahan in 2007. *Iranian Journal of Ageing*. 2010; 4(4): 27 – 33.
 35. Sohrobi MB, Zolfaghari P, Mahdizade F, Aghayan S-M, Ghasemian-Aghmashhadi M, Shariati Z, et al. Evaluation and comparison of cognitive state and depression in elderly admitted in sanitarium with elderly sited in personal home. *Knowledge & health* 2008; 3(2): 27 – 31.
 36. sajadi h, mohaqeqi kamal h, vameghi m, forozan as, rafei h, nosratabadi m. Systematic review of prevalence and risk factors associated with depression and its treatment in Iranian elderly. *Iranian Journal of Ageing*. 2013; 7(4): 7 – 15.
 37. Aranda MP, Chae DH, Lincoln KD, Taylor RJ, Woodward AT, Chatters LM. Demographic correlates of DSM-IV major depressive disorder among older African Americans, Black Caribbeans, and non-Hispanic Whites: results from the National Survey of American Life. *International Journal of Geriatric Psychiatry*. 2012; 27(9): 940 – 947.
 38. Djernes J. Prevalence and predictors of depression in populations of elderly: a review. *Acta Psychiatrica Scandinavica*. 2006; 113(5): 372 – 387.
 39. Steffens DC, Skoog I, Norton MC, Hart AD, Tschanz JT, Plassman BL, et al. Prevalence of depression and its treatment in an elderly population: the Cache County study. *Archives of General Psychiatry*. 2000; 57(6): 601 – 607.
 40. Daneshmandan N, Narenjiha H, Tehrani K, Assari S, Khoddami-Vishteh HR. Initiation to the first drug use among substance-dependent persons in Iran. *Substance Use & Misuse*. 2011; 46(9): 1124 – 1141.
 41. Stefanis N, Delespaul P, Henquet C, Bakoula C, Stefanis C, Van Os J. Early adolescent cannabis exposure and positive and negative dimensions of psychosis. *Addiction* 2004; 99(10): 1333 – 1341.
 42. Odgers CL, Caspi A, Nagin DS, Piquero AR, Slutske WS, Milne BJ, et al. Is it important to prevent early exposure to drugs and alcohol among adolescents? *Psychological Science*. 2008; 19(10): 1037 – 1044.
 43. Thomasius R, Sack PM, Petersen KU. DSM–iv Axis–i comorbidity among illicit drug users seeking treatment for substance use disorders: results from the Multi–centre Study of Psychiatric Comorbidity in Drug Addicts (MUPCDA). *Mental Health and Substance Use: Dual diagnosis* 2010; 3(3): 182 – 192.
 44. Abasi A, Taziki SA, Moradi A. The prototype of drug mis.abused of opioids in the self–introduced addicts in Gorgan (North–East of Iran). *Journal of Gorgan University of Medical Science* 2006; 8(1): 22 – 27 (In Persian).
 45. Haydari J, Jafari H, Hosseini SH, Janati Y, Mohammadpour TR, Mahmoudi G. Study on the Psychosocial condition of addicts in Sari township in 2004. *Mazandaran University of Medical Sciences*. 2006; 16(52): 109 – 116.
 46. Rahimi MA. Prevalence and patterns of substance use and addiction in women in Iran. *Social Welfare Quarterly*. 2004; 3(12): 205 – 225 (In Persian).
 47. Ahmadi J, Farrashbandi H, Majdi B, Mahdavi S, Babae MA, Menzies P, et al. Prevalence of mood and anxiety disorders in a sample of Iranian outpatient opioid addicts. *Higher Education*. 2005; 43: 5 – 7.
 48. Hojati H, Alustani S, Akhundzade G, heidari B, Sharifnia SH. Study of Mental Health and Its Relation with Quality of Life in Addicts. *Journal of Shaheed Sadoughi University of Medical Sciences*. 2010; 18(3 Suppl 1): 207 – 214 (In Persian).
 49. Asayesh H, Jahahgir F, Qorbani M, et al. Substance Abuse and Correlation between of Route of Administration and Age Factors in Substance Abuser. *Journal of Research Development in Nursing & Midwifery*. 2012; 9(2): 82 – 89.
 50. Substance Abuse and Mental Health Services Administration. Center for Behavioral Health Statistics and Quality. The NSDUH Report: Illicit Drug Use among Older Adults. 2011. Available from: URL: <http://oas.samhsa.gov>.