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Evaluating the Psychiatric Comorbidity in Patients with Substance Use Disorder After a Suicide Attempt in Shahid Beheshti Hospital, Taft, Iran

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Abstract

Background: Psychiatric comorbidity and substance use disorders were major risk factors for suicide. In Iran, although suicide rates are rising, there is limited research in this regard, therefore, this study aims to investigate the relationship between psychiatric comorbidity and substance use disorder in these patients through a retrospective review of medical records.

Methods: This retrospective study analyzed 413 medical records of patients with substance use disorder who had attempted suicide and were hospitalized at Shahid Beheshti Hospital, Taft, Iran from 2014 to 2023. Diagnosis of poisoning was done under the supervision of a clinical toxicology and poisoning fellowship. Psychiatric diagnoses were established based on DSM-5 criteria through clinical interviews. Chi-Square test and logistic regression analysis were used for analysis.

Results: Among the patients, Major Depressive Disorder (MDD) was the most common comorbidity (53%). Methadone was the most frequent substance use disorder (20.1%). Significant associations were found between MDD and factors such as age, education, employment status, and methadone and benzodiazepine use. Logistic regression analysis indicated strong positive associations between opioid, cannabis, and methamphetamine use and the likelihood of having bipolar disorder [Odds Ratios (OR): 8.96, 13.59, and 8.22, respectively; $p<0.01$]. Methamphetamine use was also significantly associated with increased odds of personality disorders (OR=3.002; 95%CI: 1.195–7.545; p=0.019).

Conclusion: MDD was the most prevalent psychiatric disorder among patients with substance use disorder after a suicide attempt, with higher prevalence observed in younger, less educated, and unemployed individuals. Methamphetamine use was significantly associated with increased odds of developing personality disorders. Additionally, opioid, cannabis, and methamphetamine use were linked to a higher likelihood of developing bipolar disorder.

Keywords: Major depressive disorder, Psychiatric, Substance related disorders, Suicide

Introduction

Suicide is a major global public health concern (1-4) and ranks as the tenth leading cause of death across all age groups worldwide (2). The suicide mortality rate varies significantly across different regions, influenced by a range of factors, including age, sex, and socio-demographic index (3). The suicide mortality rate in the Islamic Republic of Iran is reported to be 5.3 *per* 100,000, with a male-to-female ratio of 2:1 (1). Furthermore, studies indicate that suicide mortality can vary among different cities within a country (5).

In addressing the management strategies aimed at reducing the suicide rate, it is crucial to emphasize identifying and understanding suicide risk factors within diverse populations. Numerous variables contribute to suicidal behaviors, underscoring the need for comprehensive and targeted approaches (6). According to the evidence, a significant factor contributing to the rise in the suicide rate is drug use disorder (7,8), which accounts for approximately half of suicides among individuals with substance use disorders.

Mental health problems represent the most prevalent and extensively studied risk factor linked to suicidal ideation, suicide attempts, and completed suicide. Approximately 90% of individuals who die by suicide meet the diagnostic criteria for one or more psychiatric disorders (9). Faraji *et al* in Iran reported that the majority of individuals involved in self-immolation suffer from psychiatric disorders, such as major depression and anxiety disorder. These factors, along with stressful life events, are the most important contributors to suicide. Moreover, individuals who die by suicide often have co-occurring alcohol and substance use disorders, as well as psychiatric conditions such as major depression, bipolar disorder, and anxiety disorders. In contrast, some individuals with substance use disorder may turn to drugs or alcohol as coping mechanisms in response to stress or depression (7).

Given the increasing suicide rate despite the implementation of prevention programs in Iran, and the recognition that psychiatric comorbidity and drug use disorder are significant contributors to suicide, the objective of this study is to investigate the relationship between psychiatric comorbidity and drug use disorder among patients with suicide attempts through a retrospective review of medical records.

Materials and Methods

Study design

This retrospective study was conducted on the medical records of patients with substance use disorder who committed suicide and hospitalized at Shahid Beheshti hospital, Taft, Iran from 2014 to 2023.

Main outcomes

The primary outcomes of this study were the identification of psychiatric comorbidities [such as Major Depressive Disorder (MDD)], personality disorder, adjustment disorder, and bipolar disorder) and the types of substance use disorders (opioid, cannabis, methamphetamine, alcohol, and benzodiazepine use) among patients who attempted suicide. Psychiatric comorbidities were examined in relation to feature, including demographic factors, and other relevant variables.

Inclusion and exclusion criteria

Patients admitted to the poison service of a specialized hospital for drug poisoning due to suicide attempts (specifically opioid poisoning) were included in the study. Patients with incomplete medical records were excluded from the study. Additionally, individuals with no history of suicide and those admitted for drug use disorder withdrawal were also excluded.

Assessment for psychiatric examination and poisoning, and substance use disorder

The psychiatric examination was performed by a psychiatrist after the patient's physical condition was stable and in full consciousness. The type of psychiatric illness, including *MDD, personality disorder, adjustment disorder, and bipolar disorder* was diagnosed based on a clinical interview and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnostic criteria.

The diagnosis of poisoning was made based on clinical signs of poisoning, response to naloxone, and the patient's or family's history under the supervision of a clinical toxicology and poisoning fellowship. The diagnosis of substance use disorder was determined

based on the patient's history and the withdrawal symptoms that appeared during hospitalization after recovery.

Data collection

Information, including age, gender, marital status, educational status, employment status, type of drugs used, psychiatric comorbidity, and others, was extracted from medical records.

Statistical analysis

The data were entered into SPSS, version 23, for analysis. Pearson Chi-Square test and Fisher exact test were employed for data analysis. A significance level of $p<0.05$ was considered statistically significant.

Ethical approval

This study was approved by Shahid Sadoughi University of Medical Sciences (number: IR.SSU.MEDICINE.REC.1400.236).

Results

This study was conducted on 413 patients with a mean age of 29.05±17.5 years. Among the participants, 219 (53%) were diagnosed with MDD, 170 (41.2%) with personality disorder, 85 (20.6%) with adjustment disorder, and 25 (6.1%) with bipolar disorder. It is noticed that some patients could have multiple diagnoses.

Table 1 presents the distribution of participants based on various variables, including gender, marital status, education, occupation, and housing situation. The frequency of patients with drug use disorder is presented in table 2. As shown in table 2, methadone (20.1%) had the highest frequency of use among the listed drugs. The relationship between MDD and various variables, including age, gender, education, job, drug use, marital status, and housing situation, is presented in table 3.

A significant relationship was observed between MDD and various variables, including age, job, education, as well as the use of methadone and benzodiazepines (Table 3) ($p<0.5$). However, no significant relationship was observed between MDD and marital status, gender, as well as the use of alcohol and other drugs ($p>0.05$). While the majority of individuals with MDD (53.9%) resided in rented

Table 1. The frequency of patients in terms of demographic variables

Variables	N (%)
Gender	
Men	235(56.9)
Women	178(43.1)
Total	413(100)
Marital status	
Single	177(42.9)
Married	169(40.9)
Divorced	64(15.5)
Widowed	3(0.7)
Total	413(100)
Education	
Illiterate	23(5.6)
Primary education	114(27.6)
Diploma	188(45.5)
Associate degree	32(7.7)
Master degree	54(13.1)
Ph.D	2(0.5)
Total	413(100)
Job (employment status)	
Employed	110(26.6)
Students	45(10.9)
Housewife	110(26.6)
Soldier	9(2.2)
Unemployed	115(27.8)
Unemployed with income	10(2.4)
Disabled	6(1.2)
Retired	5(1.2)
Other	3(0.7)
Total	413(100)
Housing situation	
Rental house	237(57.4)
Personal	151(36.6)
Homeless	25(6.1)
Total	413(100)

Table 2. The frequency of drug use disorder in patients

Substance use disorder	Consumption N (%)
Methadone	83(20.1)
Heroin	40(9.7)
Opium	38(9.2)
Tramadol	33(8)
Cannabis	65(15.7)
Benzodiazepine	76(18.4)
Methamphetamine	40(9.7)
Alcohol	128(31)

Table 3. The relation between MDD with variables

Variables	No MDD N (%)	MDD N (%)	p-value
Age			
<30 years	134(69.1)	118(53.9)	0.002
>30 years	60(30.9)	101(46.1)	
Job			
Employed	57(29.4)	53(24.2)	0.001
Students	23(11.9)	22(10)	
Housewife	40(20.6)	70(32)	
Soldier	7(3.6)	2(0.9)	
Unemployed	55(28.4)	60(27.4)	
Unemployed with income	3(1.5)	7(3.2)	
Disabled	6(3.1)	0(0)	
Retired	0(0)	5(2.3)	
Other	3(1.5)	0(0)	
Education			
Illiterate	14(7.2)	9(4.1)	0.024
Primary education	67(34.5)	47(21.5)	
Diploma	79(40.7)	109(49.7)	
Associate degree	11(5.7)	21(9.6)	
Master degree	22(11.3)	32(14.6)	
Ph.D	1(0.5)	1(0.5)	
Methadone use disorder			
No	147(75.8)	183(83.6)	0.032
Yes	47(24.2)	36(16.4)	
Benzodiazepine use disorder			
No	168(86.6)	169(77.2)	0.016
Yes	26(13.4)	50(22.8)	

Only significant variables between the two groups are shown in this table, due to a large number of variables.

houses, no significant relationship was observed between housing situation and MDD ($p>0.05$).

The relation between personality disorder and variables, including age, gender, education, housing situation and drug use disorder is shown in table 4.

A significant relationship was observed between personality disorder and variables such as age, gender, education, housing situation, marital status, as well as the use of opium, methamphetamine, and benzodiazepine ($p<0.05$).

The relationship between adjustment disorder and various variables, including age, gender, education, occupation, substance use, marital status, and housing situation, is displayed in table 5.

A significant relationship was observed between adjustment disorder and various variables, including age, gender, education, marital status, job, as well as the use of alcohol, heroin, and methamphetamine ($p<0.05$). However, no significant relationship was found between housing situation and adjustment disorder ($p>0.05$).

The relationship between bipolar disorder and variables, including age, gender, education, housing situation, and drug use disorder, is illustrated in table 6. The relationship between bipolar disorder and various variables revealed a significant association between bipolar disorder and gender, job, as well as the use of heroin, opium, alcohol, benzodiazepine, and methamphetamine ($p<0.05$). However, no significant relationship was observed between bipolar disorder and age, education, marital status, housing situation, and other drugs ($p>0.05$), except as mentioned above.

Regression analysis of factors associated with psychiatric comorbidity was evaluated and the most findings were as follows.

Regression analysis of factors associated with personality disorders

Table 4. Relation between personality disorder and demographic variables

Variables	No personality disorder N (%)	Personality disorder N (%)	p-value
Age			
<30 years	136(56)	116(68.2)	0.014
>30 years	107(44)	54(31.8)	
Gender			
Men	124(51)	111(65.3)	0.005
Women	119(49)	59(34.7)	
Education			
Illiterate	11(4.5)	12(7.1)	
Primary education	46(18.9)	68(40)	
Diploma	128(52.7)	60(35.3)	<0.001
Associate degree	18(7.4)	14(8.2)	
Master degree	38(15.6)	16(9.4)	
Ph.D	2(0.8)	0(0)	
Housing situation			
Rental house	146(60.1)	91(53.5)	0.001
Personal	91(37.4)	60(35.3)	
Homeless	6(2.5)	19(11.2)	
Marital status			
Single	89(36.6)	88(51.7)	
Married	107(44)	62(36.5)	0.01
Divorced	44(18.1)	20(11.8)	
Widowed	3(1.2)	0(0)	
Opium use disorder			
No	213(87.7)	162(95.3)	0.009
Yes	30(12.3)	8(4.7)	
Benzodiazepine use disorder			
No	181(74.5)	156(91.8)	0.001
Yes	62(25.5)	14(8.2)	
Methamphetamine use disorder			
No	233(95.9)	140(82.4)	0.001
Yes	10(4.1)	30(17.6)	

Only significant variables between the two groups are shown in this table, due to a large number of variables.

Table 5. The relation between adjustment disorder and various variables

Variables	No Adjustment disorder N (%)	Adjustment disorder N (%)	p-value
Age			
<30 years	190(57.9)	62(72.9)	0.012
>30 years	138(42.1)	23(27.1)	
Gender			
Men	198(60.4)	48(43.5)	0.007
Women	130(39.6)	37(56.5)	
Education			
Illiterate	18(5.5)	5(5.9)	
Primary education	101(30.8)	13(15.3)	
Diploma	145(44.2)	43(50.6)	0.042
Associate degree	26(7.9)	6(7.1)	
Master degree	37(11.3)	17(20)	
Ph.D	1(0.3)	1(1.2)	

Contd. table 5.

Marital status			
Single	139(42.4)	38(44.6)	
Married	143(43.6)	28(30.6)	0.018
Divorced	45(13.7)	19(22.4)	
Death of wife	1(0.3)	2(2.4)	
Job			
Employed	89(27.1)	21(24.7)	
Students	33(10.1)	12(14.1)	
Housewife	86(26.2)	24(28.2)	
Soldier	3(0.9)	6(7.1)	0.004
Unemployed	98(29.9)	17(20)	
Unemployed with income	7(2.1)	3(3,5)	
Disabled	6(1.8)	0(0)	
Retired	5(1.5)	0(0)	
Other	1(0.3)	2(2.4)	
Alcohol use disorder			
No	237(72.3)	48(56.5)	0.008
Yes	91(27.7)	37(43.5)	
Methamphetamine use disorder			
No	289(88.1)	84(98.8)	0.001
Yes	39(11.9)	1(1.2)	
Heroin use disorder			
No	291(88.7)	82(95.6)	0.038
Yes	37(11.3)	3(3.5)	

Only significant variables between the two groups are shown in this table, due to a large number of variables.

Table 6. Relation between bipolar disorder with variables, including age, gender, education, housing situation and drug use disorder

Variables	No bipolar disorder frequency (%)	Bipolar disorder frequency (%)	p-value
Gender			
Men	212(54.6)	23(92)	0.001
Women	176(45.4)	2(8)	
Job			
Employed	103(26.5)	7(28)	
Students	44(11.3)	1(4)	
Housewife	110(28.4)	0(0)	
Soldier	9(2.3)	0(0)	0.001
Unemployed	100(25.8)	15(60)	
Unemployed with income	10(2.6)	0(0)	
Disabled	4(1)	2(8)	
Retired	5(1.3)	0(0)	
Other	3(0.8)	0(0)	
Heroin use disorder			
Yes	354(91.2)	19(76)	0.025
No	34(8.8)	6(24)	
Opium use disorder			
Yes	358(92.3)	17(68)	0.001
No	30(7.7)	8(32)	
Alcohol use disorder			
Yes	260(67)	25(100)	0.001
No	128(33)	0(0)	

Contd. table 6.

Benzodiazepine use disorder			
Yes	312(80.4)	25(100)	0.001
No	76(19.6)	0(0)	
Methamphetamine use disorder			
Yes	354(91.2)	19(76)	0.025
No	34(8.8)	6(24)	

Only significant variables between the two groups are shown in this table, due to a large number of variables.

Methamphetamine use disorder showed a statistically significant positive association with personality disorder, with an OR of 3.002 and a 95% Confidence Interval (CI) ranging from 1.195 to 7.545 (p=0.019). This suggests that methamphetamine use significantly increases the odds of developing a personality disorder.

Regression analysis of factors associated with bipolar disorder

Opioid use disorder: OR=8.958 (95%CI: 1.983 to 40.47; p=0.004): Individuals with opioid use disorder (including methadone, heroin, opium, and tramadol) are 8.96 times more likely to develop bipolar disorder compared to those without opioid use disorder. This association is statistically significant (p<0.05).

Cannabis use disorder: OR = 13.597 (95%CI: 2.528 to 73.13; p=0.002): Cannabis use disorder is 13.6 times more likely to be associated with bipolar disorder, with a strong statistically significant association (p<0.05).

Methamphetamine use disorder: OR=8.222 (95%CI: 1.976 to 34.209; p=0.004): Methamphetamine use disorder is 8.22 times more likely to be associated with bipolar disorder, and the result is statistically significant (p<0.05).

Discussion

In the present study, the examination of psychiatric comorbidity in patients with substance use disorder after a suicide attempt revealed notable findings. MDD, personality disorder, adjustment disorder, and bipolar disorder were observed in 53, 41.2, 20.6, and 6.1% of individuals, respectively. These outcomes show that the most common psychiatric comorbidity in hospitalized drug use disorder patients with suicide attempts was MDD. This finding was consistent with studies by these studies (10-13). Aharonovich *et al*, in the USA assessed the effects of major depression in relation to substance use disorders in patients with suicide attempts and reported that all three types of depression increased the risk of suicide attempts in these patients (12). Therefore, it seems that early diagnosis of depression can help prevent suicidal behavior or other problems in patients with substance use disorder.

Relation between psychiatric comorbidity and gender

Additionally, the results of the present study revealed a significant relationship between personality disorders, bipolar disorder, and adjustment disorder with gender. In this regard, the frequency of personality disorders, bipolar disorder, and adjustment disorder was significantly higher in men than women. Also, although there was no significant relationship between gender and MDD in these patients, the frequency of individuals with MDD was higher among males (61.9%) than females (38.1%). The findings of this study align with the studies of Gradus in the USA (14), and Dom *et al* in Hungary (15). According to these findings, considering sociodemographic factors, male gender is identified as a risk factor for suicide. Alijanzadeh *et al* in Iran conducted a study in this regard and observed that the rate of depression was higher in women than in men (11). The distinction between the two studies was that the present study was conducted on patients with substance use disorder who attempted suicide, while Kashi *et al* conducted their study on patients with suicidal thoughts.

Relation between psychiatric comorbidity and age

The frequency of psychiatric disorders in individuals with substance use disorder in terms of age showed a significant relationship between personality disorders, depression, and adjustment disorder with the age of

individuals. The frequency of patients with all these disorders (bipolar disorder, depression, adjustment disorder, and personality) in individuals under 30 years old is higher than in those over 30 years old. This finding was consistent with the findings of other studies (7,16-18). Therefore, based on the results of the present study and other research, it seems that the prevalence of all psychiatric comorbidities in individuals with suicide attempts in the age range of under 30 years is greater than in those over 30 years.

Relation between psychiatric comorbidity and marital status

Determining the frequency of psychiatric comorbidity in individuals with substance use disorder based on marital status revealed that the frequency of personality disorders in single individuals is higher than in other groups, consistent with the findings of Yen *et al* in the USA (19). Additionally, no relationship was seen between marital status with MDD and bipolar disorder. In a study conducted by Eric and colleagues in Finland, they investigated the frequency of suicide attempts in patients with bipolar disorder and reported a higher frequency among married individuals than in other groups (20). The difference between the two studies was likely related to cultural differences (variations in societal norms, values, support systems, and stigma surrounding mental health and marital relationships, which can influence both the experience of illness and help-seeking behaviors) between the two countries. For example, in some cultures, marriage might provide a strong protective support system, reducing stress and improving mental health outcomes. In contrast, in other cultures, marital responsibilities or conflicts could contribute to increased psychological distress, leading to a higher frequency of suicide attempts. Moreover, in the present study, adjustment disorder was more common in single than married persons, aligning with the findings of Gradus *et al* in the USA (14). In a study in America, Roy *et al* investigated suicide in patients with substance use disorder, the majority of whom were suffering from depression, and observed that most of these individuals were those who had lost their loved ones and spouses (13). These findings differ from the results of the present study, suggesting that cultural differences may contribute to the variation in outcomes between the two studies. Therefore, based on these results, the frequency of comorbidity types in individuals with substance use disorder varies according to their marital status.

Relation between psychiatric comorbidity and occupations

In the present study, a significant relationship was observed between all psychiatric comorbidities, excluding personality disorders, and people's occupations. The highest frequency of these comorbidities was found among housewives and unemployed jobseekers. These findings were consistent with the studies by, Roy *et al* in the USA (13), and Yen *et al* in the USA (19).

In addition, the frequency of all psychiatric comorbidities among patients with substance use disorder based on the residence status of these patients showed that among all the disorders, only personality disorder has a significant relationship with the residence status. However, the majority of individuals with MDD (53.9%), adjustment disorder (62.4%), bipolar disorder (76%), and personality disorder (53.5%) reside in rented houses. These findings indicate a higher prevalence of these disorders among individuals at lower economic and income levels. While few studies have explored this field, the majority of existing research has focused on people's jobs and income.

In a study, Gradus *et al* in the USA assessed the relationship between adjustment disorder and suicide, noting that the majority of these individuals have low income (14). These findings were consistent with the results of the present study.

Relation between psychiatric comorbidity and substance use disorder

The results of the present study revealed that among individuals suffering from depression, personality disorder, and adjustment disorder, the most frequent substance use disorder was related to alcohol.

In this study, methadone users showed lower levels of depression, likely due to its mood-stabilizing effects, the support of Methadone Maintenance Therapy (MMT), and reduced stress from illicit opioid use. This highlights methadone's dual role in treating opioid dependence and alleviating depressive

symptoms, suggesting the need for combined pharmacological and psychosocial interventions. Regarding personality disorders, individuals with these disorders tend to engage in impulsive, high-risk behaviors, making them more likely to use stimulants like methamphetamine rather than depressants such as benzodiazepines or opium. This is supported by finding of higher methamphetamine use in patients with personality disorders in the present study. Additionally, methamphetamine use significantly increases the likelihood of developing a personality disorder, while opioid, cannabis, and methamphetamine use raises the chances of developing bipolar disorder.

Zhang *et al*, in China found that borderline and antisocial personality disorders were risk factors of methamphetamine use disorder (adjusted OR=2.891, p=0.007 and adjusted OR= 1.680, p=0.042) (21). Preuss *et al*, in Germany revealed that substance use disorders are highly prevalent in bipolar disorder (22). This finding was also consistent with the present study. In another study, Balo *et al*, in Turkey investigated the relationship between suicide and adjustment disorder, focusing on the type of drugs used. They observed that none of the study subjects used any type of drug except cigarettes (17). In contrast, the present study found the highest frequency of drug use was methadone. Therefore, these results suggested that the types of drugs used vary among patients with different psychiatric disorders.

In addition, table 4 indicates that patients with personality disorders had lower rates of benzodiazepine and opium use disorder compared to those without personality disorders. While this finding may seem unexpected, several factors could explain this trend. Alcohol, heroin, and methamphetamine use show inverse relationships with adjustment disorders (according to data of table 5), possibly because substance use masks stress-related symptoms or serves as an alternative coping mechanism. This complicates diagnosis and suggests that clinicians should carefully assess for underlying stressors in substance-using populations. Treatment should simultaneously address substance use and stress-related symptoms to ensure comprehensive care.

Suggestion for future study

Future studies should focus on prospective and longitudinal research to establish causality between substance use disorders and psychiatric comorbidities in suicide attempters, providing a clearer understanding of how these factors contribute to suicide risk over time. Additionally, comparing findings across different cultural and regional contexts, both within Iran and internationally, could inform more tailored and effective prevention strategies.

Limitations of the study

This study has several key limitations: it relies on past medical records, which may be incomplete or inconsistent, possibly affecting diagnostic accuracy. The single-hospital setting limits the generalizability of the results.

Conclusion

The present study shows the high prevalence of psychiatric comorbidities among patients with substance use disorder following suicide attempts. MDD was the most common psychiatric diagnosis, particularly among younger, less educated, and unemployed individuals. Methadone was the most frequently used substance. Furthermore, opioid, cannabis, and methamphetamine use were strongly linked to an increased risk of bipolar disorder, while methamphetamine use significantly elevated the odds of personality disorders. These findings emphasize the need for comprehensive psychiatric assessment and targeted interventions for individuals with substance use disorder to reduce suicide risk.

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Conflict of Interest

There is no conflict of interest.

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