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Original Article

Comorbid psychiatric diagnosis in suicide attempters using self-immolation and self-poisoning: A case-control and multisite study

Seyed Kazem Malakouti[1], Mojgan Taban[2], Marzieh Nojomi[3], Mehrdad Eftekhar Ardebili[4], Hamideh Mohammadi Farsani[5], Zahra Ghiasi[6*], Habibolah Khazaie[7], Mehran Zarghami[8], M. Karimi[9], Kamran Aghakhani[10]

1- Associate Professor of Psychiatry, Mental Health Research Center, Tehran Institute of Psychiatry, School of Behavioral Sciences and Mental Health, Iran University of Medical Sciences, Tehran, Iran
2- Mental Health Research Center, Tehran Institute of Psychiatry, School of Behavioral Sciences and Mental Health, Iran University of Medical Sciences, Tehran, Iran
3- Professor of Community Medicine, Preventive Medicine and Public Health Reseach Center. Iran University of Medical Sciences, Tehran, Iran
4- Associate Professor of Psychiatry, Mental Health Research Center, Tehran Institute of Psychiatry, School of Behavioral Sciences and Mental Health, Iran University of Medical Sciences, Tehran, Iran
5- Psychiatrist, Resource Center of Suicidology, CRES, Paris, France
*6- (**Corresponding author**), Assistant Professor of Psychiatry, Zahedan University of Medical Sciences, Zahedan, Iran*
Email: linooshghiasi@gmail.com
7. Associate Professor of Psychiatry, Sleep Disorders Research Center, Kermanshah University of Medical Sciences (KUMS), Kermanshah, Iran
8. Psychiatrist, Faculty Member, Professor of Psychiatry, Psychiatry and Behavioral Sciences Research Center, Zare Hospital, Sari, Iran
9. Psychiatrist, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran
10. Forensic Medicine Specialist, Professor, Department of Legal Medicine & Toxicology, Iran University of Medical Sciences, Tehran, Iran

Abstract

Background and Objectives: *The prevalence of mental disorders among suicide attempters has not been investigated in Eastern Mediterranean Region, almost led to the lack of reliable information and census about its prevalence and characteristics. This study was performed to evaluate the diagnosis of mental disorders among victims of suicide attempts using self-poisoning and self-immolation through conducting a structured clinical interview for axis I disorders.*
Materials and Methods*: This study was performed as a case-control, multi-site study, recruiting 142 study samples and 172 subjects as the control group. The study subjects were collected from different provinces of the country comprising 88 subjects with drug overdose and 54 ones with self-immolation. Structured Clinical Interview (SCID) was used to assess the axis I diagnosis. The Chi-square test, t-testand logistic regression were used for data analysis through SPSS v. 23.*
Results*: About 85% of the suicide attempters suffered at least from one psychiatric axis I disorder ($p<0.001$). Major Depressive Disorder (MDD) had a significantly higher prevalence among attempters (45.1%, OR=7.4; CI:3-18) ($p<0.001$). Suicidal ideation during the past year (OR=6, CI:2.8-13); high educational level (OR=0.2, CI:0.1-0.4); and suicide reattempt (OR=11, CI:2-60) had a significant effect on suicide attempt. Comparing with the self-poisoning group, the self-immolation group were significantly more female gender, married, and housewife with low education and less alcohol abuse ($p<0.005$).*
Conclusion: *This article provided some clinical and demographic risk factors for suicide attempters by self-immolation and self-poisoning. Using fatal means of setting fire does not imply the severity of psychopathology in the self-immolation suicide attempt group. Access to oil should be considered for using the method of self-immolation.*

Keywords
Suicide attempt,
Self-immolation,
Self-poisoning,
Mental disorders,
Diagnosis,
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Introduction

Suicide is one of the serious challenges in the field of mental and public health [1]. WHO estimates that three suicides happen per minute. According to the WHO report, the burden of suicide in 1998 was 1.8 which is expected to increase to 2.4 by 2020. It is estimated that suicide will lead to loss of 1.53 million lives by 2020 [2].

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Among the risk factors of suicide, non-fatal suicide is an important indicator since it is a predictor of subsequent fatal suicide and significant source of morbidity or death [2, 3]. More than 85% of cases with suicide had at least one mental disorder [2, 4]. Although ample of evidences show that there is a significant association between mental disorders, particularly depressive disorder, and suicide behaviors, but the relationshiop between mental disorders and the suicide attempt behavior is not explicit.

Previous studies carried out in United Kingdom have reported much lower rates of psychiatric and personality disorder among individuals with suicide attempt than suicide. Using a structured clinical interview base on ICD-10 psychiatric disorders were diagnosed in 92.0%. The most common diagnosis was affective disorder (72.0%). Personality disorder was identified in 45.9% of patients [5]. Some evidences show that the risk of mental disorders to attempt suicide is lower in developing countries [5-7].

This association was addressed by Knock [8] in comparing the developed and developing countries. The result showed that mental disorders predict the suicidal thought similarly between developed and developing countries (odds=2.9-8.9, considering the comorbidity of different mental disorders reduces the odds to 1.5-5.6). Depressive disorder is more predictive among developed countries, however impulsive disorders, substance use disorders and PTSD are more predictive among developing societies. Progression of suicidal thought toward plan and attempt is predicted by impulsive and anxiety disorders.

In a systematic review, psychiatric (Axis I) disorders were identified in 83.9% of adults and 81.2% of adolescents with suicide attempt. Depression, anxiety, alcohol misuse, attention deficit hyperactivity disorder (ADHD), and conduct disorder in younger patients were the most frequent diagnoses. Personality disorders were found in 27.5% of adult patients. Psychiatric disorders were somehow more common in patients in Western (89.6%) than non-Western countries (70.6%) [5].

Clinical and community research suggests links between suicide attempts and any psychiatric diagnosis. Among them mood disorders, anxiety disorders, impulse control,alcohol/substance use, and personality disorders convey the highest risks for suicide attempt [9-12].

There was a high prevalence of psychiatric disorders (89%; OR 24.27), personality disorders (52%; OR 3.43), comorbidity of psychiatric and personality disorders (51.6%; OR 3.01; 95% CI 1.14-7.92), and a high overall prevalence of any axis-I and/or axis-II (personality) morbidity (93%; OR 19.12) in the study samples compared to the controls [13].

Although suicide behavior has been thoroughly studied in developed countries, it has been neglected in some developing societies, particularly in Eastern Mediterranean Region, leading to the lack of reliable information and census about its prevalence and characteristics.

In Iran, as one of the member states of this region, the fifth cause of death is suicide [14] and the rates of suicide thought, plan and attempt have been reported around 13, 6, 3.3 percent, respectively [15].

The most prevalent methods of suicide in Iran are hanging, poisoning, and self-immolation [16], whereas in some western provinces of Iran, self-immolation is the most frequent mean of suiciding [17]. Self-immolation is the most prevalent means in the Middle East. In Iran, self- immolation is the selected method in 25 to 40 % of suicides [18]. Among 842 cases of self-immolation reported in 11 studies between 1991 and 2001, 84% belonged to the Iranian samples, presented in 3 studies carried out in Iran [19].

Demographic and some clinical features of suicide behaviors in Iran [8] are in correspondence with the findings introduced in western countries. However, studies on comorbidity of axis I and two mental disorders have been rarely carried out in Iran. The results of studies using clinical interview according to DSM criteria showed that the range of axis I mental disorders with suicide attempt is 31-89.4 percent [1, 20-22].

In this regard, this study was performed to determine the frequency of mental disorders among victims of suicide attempts using drug overdose and self-immolation, compared to the control group.

Materials and Methods

Design and Setting

This is a case-control study. The suicide attempters by self-immolation were enrolled from three cities of Iran: Sari (north of Iran, Psychiatry and Burn Center of Zare Hospital), Kermanshah (west of Iran, Farabi Hospital), and Tehran (capital city, Shahid Motahari Burn Hospital and Loghman Hospital). The cases with drug overdose attempt were enrolled only from Loghman general hospital as a well-known center to serve the suicide attempters in Tehran. This study was performed from March 2011 to March 2013.

Sample and Eligibility Criteria

To detect a difference of about 0.12 between the groups for mental disorders, with 0.05 type one error and 80% power, about 300 subjects were studied. One hundred and forty-two study samples were selected using a convenience sampling method as cases and 160 subjects as the control group (80 subjects for each group of cases). The study subjects of cases and controls were enrolled as consecutive series aged ≥ 15 years admitted to the Emergency Departments (EDs). The control subjects were patients who were referred to the same hospitals with any somatic diseases. Exclusion criteria was non-consenting and those who critical physical condition did not let them to sign the required informed consent form. Patients recruited in the study after signing full informed consent form.

Suicide attempters were defined as individuals admitted to EDs because of deliberate self-injury with intention to die. For self-immolated cases, they were identified and interviewed in wards after stabilization of physical

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Table 1: Demographic features of the study sample (n=314).

		Self-immolated			Self-poisoned			Across Self-immolated and self-poisoned
		Case n=54	Control (n=92)	χ^2(P)	Case	Control	χ^2(P)	χ^2(P)
	Male	13 (24.1%)	30 (32.6%)	1.19 (NS)	44 (50%)	41 (51.2%)	0.026(NS)	9.36(0.003)
Gender	Female	41 (75.9%)	62 (67.4%)		44 (50%)	39 (48.8%)		
	Single	17 (31.5%)	34 (37%)	0.45 (NS)	50 (56.8%)	51 (63.7%)	2.057(NS)	8.62(0.01)
	Married	31 (57.4%)	49 (53.3%)		32 (36.4%)	27 (33.8%)		
Marital Status	Other				6 (6.8%)	2 (2.5%)		
	unemployed	15 (27.8)	5 (5.4)		12 (13.6)	8 (10)	3(NS)	37.78 (P<0.001)
	Employed	6 (11.1)	34 (37)	3 (0.000)	58 (65.9)	58 (72.5)		
Job Status	House wife	30 (55.6)	27 (29.3)		10 (11.4)	5 (6.3)		
	Student	3 (5.6)	26 (28.3)		8 (9.1)	9 (11.3)		
	< 12 yrs. schooling	35 (64.8%)	20 (21.7%)	32.74	28 (31.8%)	19 (23.8%)		14.77
	12 yrs. schooling	12 (22.2%)	20 (21.7%)	(P<0.001)	39 (44.3%)	35 (43.8%)		
Educational Level	> 12 yrs. schooling	7 (13%)	52 (56.5%)		21 (23.9%)	26 (32.5%)	2.095(NS)	(P<0.001)
Suicidal Ideation	Yes	29 (53.7%)	14 (15.2%)	24.25	46 (52.3%)	4 (5%)	44.79	0.027(NS)
During Past Year	No	25 (46.3%)	78 (84.8%)	(P<0.001)	42 (47.7%)	76 (95%)	(P<0.001)	
Domestic Violence	Yes	28 (51.9%)	26(28.3%)	8.12	53 (60.2%)	20(25%)	21.16	0.95 (NS)
	No	26 (48.1%)	66 (71.7%)	(0.004)	35 (39.8%)	60 (75%)	(P<0.001)	
History of Alcohol	Yes	4 (7.4%)	9 (9.8%)	0.237	39 (44.3%)	14 (17.5%)	13.95	21.59 (P<0.001)
Abuse	No	50 (92.6%)	83 (90.2%)	(NS)	49 (55.7%)	66 (82.5%)	(P<0.001)	
History of Drug	Yes	10 (18.5%)	6 (6.5%)	5.019	9 (10.2%)	10 (12.5%)	0.216	1.98 (NS)
Abuse	No	44 (81.5%)	86 (93.5%)	(P=0.03)	79 (89.8%)	70 (87.5%)	(NS)	

condition.

Demographic data were collected by trained emergency nursing staff from patients or their relatives. Current diagnoses of mental disorders for each case were assessed when they were close to discharge from hospital or after stabilization the physical condtion. The interviews were conducted by two trained psychiatric residents in their 4th grade.

Measures

Demographic and Medical Charateristics

Factors of age, gender, marital status, occupational status, educational level, the history of alcohol use, history of substance abuse, history of suicide attempts, history of suicide ideation in the preceding year of study, and any remarkable family problems such as domestic violence were measured.

Structured Clinical Interview for DSM-IV (SCID-CV)

The study on validity and reliability of the Persian translation of SCID-CV revealed 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%) [47].

Statistical Analysis

The Chi-square test was utilized for comparison between the results of SCID-I, MCMI-II and qualitative demographic variants. The numeric variables were compared using t-test across two groups. Logistic regression analysis was used to assess the independent association of factors with suicide attempt. The significant level was considred as 0.05. The study was approved by the ethical committee of the Iran University of Medical Sciences with no: 12336.

Results

Due to feasibility of collecting the cases with self-immolation, just 54 cases of self-immolation and 88 subjects with drug self-poisoning were enrolled in the study. For the control groups, 92 cases for self-immolation, and 80 as control subjects for the self-poisoning group were enrolled in the study.

1. ***Demographic Features***

The mean age among the self-immolated cases was lower than the self-poisoned samples, 26±10 vs. 36±10. In the self-immolated group comparing with its control group, the study samples were younger with less education (p<0.001), and suicide ideation during the past year (p<0.001), history of drug abuse (p=0.03), and domestic violence (p=0.004) were more prevalent among them.

In the self-poinsoing group, comparing with its control group, domestic violence (p<0.001), alcohol abuse (p<0.001), suicide ideation during the past year (p<0.001) were more prevalent.

Comparing the two case groups, the self-immolation group were more female, married, housewife, less schooling with less alcohol abuse (p<0.01) (Table 1).

Psychiatric Disorders Diagnosis

The prevalence of psychiatric disorders among the case and control subjects is shown in Table 2. The result showed that 85.2% of the suicide attempters suffered at least from one psychiatric axis I disorder, indicating a significance difference in comparison with the control groups (Chi^2=54.62, p<0.001). Similarly, Major Depressive Disorder (MDD) had a significantly higher prevalence among attempters (45.1%) than the control subjects altogether (10.5%) (p<0.000).

Most of the psychpathology axis I disorders including PTSD, MDD, BMD were significantly lower in the self-immolation group (the data were not revealed).

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Table 2. Prevalence of psychiatric axis one disorders among study samples.

	Case versus control (n=172)				SI vs. SP (N=142)			
	Case	Control	Value	P.	SP	SI	Value	P.
	No (%)	No (%)			No (%)	No (%)		
Total Axis I	121 (85.2)	77 (44.8)	54.6	0.000				
BMD-1	9(6.3%)	1(0.6%)	8.36	0.004	7(8%)	2(3.7%)	1.01	0.26
BMD-2	10(7.0%)	4(2.3%)	4.06	0.04	8(9.1%)	2(3.7%)	1.48	0.19
Cyclothymia	4(2.8%)	2(1.2%)	1.13	NS	2(2.3%)	2(3.7%)	0.25	0.49
MDD	64(45.1%)	18(10.5%)	48.3	0.000	49(55.7%)	15(27.8%)	10.52	0.01
Dysthymia	9(5.2%)	3(2.1%)	2.06	0.126	0	3(5.6%)	4.99	0.05
Panic	2(1.4%)	1(0.6%)	0.56	0.428	2(2.3%)	0	1.24	0.38
OCD	15(10.6%)	17(9.9%)	0.04	0.494	12(13.6%)	3(5.6%)	2.31	0.10
PTSD	7(4.9%)	3(1.7%)	2.56	0.101	6(6.8%)	1(1.9%)	1.7	0.18
Phobia	8(5.6%)	1(0.6%)	7.13	0.008	7(8%)	1(1.9%)	2.34	0.12
GAD	35(24.6%)	8(4.7%)	26.3	0.000	35(39.8%)	0	28.5	0.000
Somatoform	11(7.7%)	2(1.2%)	8.49	.004	7(8%)	4(7.4%)	0.14	0.59
Alcohol Abuse and Dependency	14(9.9%)	9(5.2%)	2.45	0.11	11(12.5%)	3(5.6%)	1.81	0.14
Drug Abuse	14(9.9%)	6(3.5%)	5.29	0.02	5(5.7%)	9(16.7%)	4.54	0.34
Adjustment Dis.	28 (19.7%)	14 (8.1%)	9	0.00	24(27.3%)	4(7.4%)	8.34	0.003

SI: self emmolation, SP: Self-poisening

Table 3 illustrates the results of logistic regression analysis. History of suicide attempt was the most important risk factor among others followed by mood disorders (MDD & BMD). Eduaction was a protective factor for attempt. For self-poisoned, thought of suicide one year ago, and for self-immolation, history of suicide were the most important risk factors.

Discussion

In this study SCID, a structured clinical interview, was applied to yield the most possible valid diagnosis of psychiatric disorders among suicide attempters to be able to be compared with the correspondence studies.

In the self-immolated group comparing with its control group, the study samples were younger with less schooling ($p<0.05$). And suicide ideation during the past year, history of drug abuse, and domestic violence were more prevalent among them ($p<0.05$).

In the self poinsoing group, comparing with its control group, the domestic violence, alcohol abuse, and suicide ideation during the past year were more prevalent ($p<0.05$).

Comparing the two case groups, females, marrieds, housewifes, and less schooling status were more prevalent in the self-immolation group than self-poisoning which is compatible with local studies [23, 24]. It can be contemplated that the young married women facing marital discord, particularly at early years of marriage, may stimulate their introverted anger. Mehrpour (2012) believes that factors such as high economic, social, cultural, and educational factors, higher income, mental health facilities, and social freedom for woman can be protective factors in suicide attempt by self-immolation.

Corresponding social and cultural factors were mentioned in Pakistan, as a neighbour country with the most similar cultural elements, as a risk of suicide in the same demographic population [25, 26].

Fire as a symbol of anger originated from unfaire situation is used to show a revenge against injustice in the family. Domestic abuse and harsh lifestyles of the rural village (kishlocks) culture were the main motivating

Table 3. Adjusted risk factors for suicide attempt (self-immolation and self-poisoning)

	Both suicide and control groups				Self-poisoned vs control		Self-immolation vs control	
	Crude OR	95% CI	Adjusted OR	(95% CI)	Adjusted OR	(95% CI)	Adjusted OR	(95% CI)
Education	0.37	0.2-0.6	.221	.11-0.44	.59	.17-2	0.1	0.04-0.29
Bipolar1	11.6	1.4-92.4	-	-	-	-	-	-
Bipolar2	3.2	0.98-10.4	6.530	1.22-34.74	13.2	1.33-131.1	-	-
MDD	7	3-12.6	7.410	3.02-18.18	9.8	2.46-38.9	4.9	1.08-22.4
GAD	6.7	3-15	6.941	2.14-24.47	7.5	1.67-33.8	-	-
Phobia	10.2	1.3-82.6	-	-	-	-	-	-
Somatoform disorders	7	1.5-32.7	-	-	-	-	-	-
Drug abuse	3	1.1-8	5.581	1.35-22.95	-	-	8.7	1.6-46.5
Adjustment disorder	2.8	1.4-5.5	9.482	3.37-26.68	31.5	6-164	-	-
Axis one	7	4-12.3			-	-	-	-
Thought of suicide one year ago	9.6	5.317.3	6.069	2.81-13.06	15.8	3.6-68.3	6.6	2.1-20.2
History of alcohol abuse	2.8	1.6-4.9	-	-	-	-	.057	.005-0.6
History of suicide attempt	0.4	0.3-0.4	11.088	2.01-60.88	-	-	24	17.2-335.5
Domestic violence	3.6	2.3-5.8	-	-	-	-	-	-
Family history of suicide attempt	0.4	0.4-0.5	-	-	-	-	-	-

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factors in self-immolation among the women interviewed among Uzbek women [27]. Being in socially, economically unfaire and unequity situation is the main reason for self-burning [28].

The number of attempts in the past history of the study subjects was the next strongest predictive factor. Around 25-40 percent of people with history of suicide attempt have repeated their attempts [29-31]. In our study the risk of reattempt was OR=11. In spite of general belief in our culture that if someone had serious intention to die, he/she would have died so far; the mental health and emergency departments' personnel have to consider the reattempt issue as a strong factor for complete suicide. Having history of suicide thought is another strong predictor factor for suicide attempt which requires to be evaluated in clinical and screening setting. As result shows, it may increase six times (OR) the risk of suicide attempt. Prevalence of drug poisoning in male and female cases was the same, while in other studies patients who seriously attempted suicide by drug overdose were likely to be more females with borderline personality disorder [32-34].

The current study found almost a high rate of psychiatric disorders in patients who made suicide attempts. Eighty-five percent of cases have been suffering from mental disorders (OR=6-9). The results show that it is similar to the statistics presented from North America and Europe which revealed at the time of attempt or in one year before study, 80-92 percent of subjects had at least one psychiatric disorder [2, 11, 35-38]. However, the results are not concordant with the results of some studies performed in developing countries, shown that psychiatric morbidity, is about 42-65 percent of the individuals with suicide attempt who had psychiatric disorders [7, 32, 34, 39-41]. However, a recent study in India revealed that the first suicide attempters had psychiatric axis I diagnosis (89%) and personality disorders (52%) [42].

Although some evidences show that the risk of mental disorders of suicide attempters is lower in developing countries, cross-national studies revealed that using similar methods and instruments, the mental disorders were equally predictive for suicide attempt in both groups of countries with the major difference that mood disorders are the strongest factors for developed societies whereas the three disorders of impulsive control, substance abuse, and PTSD were the most predictive factors among developing countries [8]. Aggressive behavior can significantly fascilitate the suicide behaviors [43]. However, in our study just history of drug abuse had significant relationship with suicide attempt (OR=6.7). In our study the odds ratio of mood disorders and anxiety disorder were 6.5 to 7.4 which were a significant predictive factor for suicide attempt. The odds ratios of depressive disorders vary from 3 to 33 among diverse societies [8, 12].

Notwithstanding our expectation, the study samples who had chosen set fire for suicide, which is considered a severe fatal mean of suicide, revealed less sever psychopathology in terms of frequency of axis I comparing with the self-poisoning group. This can be interpreted in this way that having access to petrol/oil in addition to a cultural-bond method may cause some individuals to select such a method.

Impulsive control disorder was one of the powerful predictive factor among developing (OR=3.6) than developed societies (OR=2) [8]. Impulsive behaviors could increase the risk of transferring suicide ideation to unplanned attempt (OR=1.9-2.2) [8, 12, 44]. In our study we did not measure the impulsivity and the severity of aggression. But considering PTSD as having important elements and features of impulstivity and agrressive behavior, our study results did not reveal a significant relationship after adjusting the yielded data.

Domestic violence was observed in 52 % and 60% of self-immolation and self-poisoning cases which were significantly different from the control groups, however, it did not reveal any significant relationship with suicide attempt after being adjusted with other variables. The study conducted by Espinoza-Gomez et al. (2010) showed the risk of suicide in people exposed to domestic violence was 5 times [45]. However, it is possible that tolerance for domestic violence is influenced by socio-cultural factors and length of immigration and acculturation. There is a significant relationship between impulsive behaviors and domestic violence which is indicative of the fact that low verbal ability and executive functioning can be one of the neurocognitive features of the victims [46] .

Limitations

Exhaustion due to excessive number of questions and critical medical conditions of some cases were two major causes of missing some samples. Some other cases refused to cooperate or denied their purpose of attempt due to social stigma which condemns suicidal behavior. Avoidance of mentioning the suicidal purposes in the medical documents, due to conceivable loosing of insurance coverage, in some cases made some difficulties to find our cases.

Severe pain and consumption of analgesic or opioid medications in the self-immolated patients led to their reduced attention and cooperation during interviews, which may have caused a bias to the cases of milder burning injuries. And some multi-session interviews were interrupted because of the deterioration of medical condition and ICU admission. The next one is that the findings are based on a sample recruited from one regional hospital, raising the question of whether the results can be generalized. The last limitation was the recall biases from the control groups, which is the common limitation in case control studies.

Conclusion

A positive history for suicide attempt, mood and anxiety disorders, having suicide thought in the past year, drug abuse, and low education were the important risk factors in this study in Iran. This model provides a

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suitable interactive model for attempting suicide, as presented by Yoshimasu (2008), in which the mental disorders and social-economical problems had a more important role and influence on attempting suicide. These findings can provide a reasonable evidence for the prevention programs in our society and correspondence countries with similar socio-cultural background in Eastern Mediterranean countries.

Conflict of Interest: The authors have declared no conflict of interest for this study

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