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Risk Factors of Suicide in Zanjan- Iran Population

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Abstract

Background: Few studies have examined the risk factors among Iranians attempting suicide.
Objectives: The present study aimed to explore the risk factors of suicide among patients admitted to hospitals due to suicide attempts.
Patients and Methods: Suicidal participants (N = 200, 104 males and 96 females, aged 18 to 40) were recruited via judgmental sampling method, and non-suicidal participants (n = 300, 166 males and 134 females, aged from 18 to 40) were selected via a convincing sampling method. The participants completed a battery of questionnaires on family strength, religious identification, substance use, hopelessness, depression, sexual, emotional, and physical abuse, impulsive aggression, neuroticism, suicidal ideation, family discord, stressful life events, and anxiety. Data were analyzed by independent *t*-test, chi-square and hierarchical logistic regression.
Results: The current use of cigarettes/hookah, lifetime non-prescribed medication use, suicidal ideation (suicidal thoughts/tendencies), and depression significantly predicted suicide attempts. In addition, lower levels of religious belief were significantly associated with a higher likelihood of attempting suicide.
Conclusions: Suicide prevention programs should explore the efficacy of treating individuals with substance abuse disorders, depression, and suicidal thoughts/tendencies for the reduction of suicide attempts. Furthermore, family, media, and school-based programs to internalize religious values would be valuable components of prevention programs for suicide in Iran.

Keywords: Risk Factors, Suicidal Ideation, Attempted Suicide, Substance-Related Disorders

1. Background

Suicide is a significant public health issue in Iran. According to estimates by the WHO, the suicide rate among the Iranian population is 5.3 per 100,000; 3.6 for females and 7 for males (1). A national research study regarding the burden of diseases in Iran showed that disability-adjusted life years (DALY) due to suicide and self-harm behaviors was 206.2 per 100,000 population (2). The considerable number of Iranian individuals and families that are impacted by suicidal behavior and its related negative effects (1) reflects the necessity to identify the risk factors and precursors of attempting suicide.

Some longitudinal and cross-sectional studies examined the distal or predisposing risk factors of suicide. Studies consistently showed that having a history of suicide attempts in the first or second degree of relatives significantly increases the risk of suicide in individuals (3). Also, studies demonstrated that the transmission of suicidal behaviors among families is mediated by the transmission of personality traits such as impulsive aggression and neuroticism (4). Studies indicated that parental psychopathology, including depression, substance abuse, and anxiety disorders, extenuate the risk of suicidal behaviors throughout an individual's lifetime (5). Exposure to sexual, physical, and emotional abuse during childhood is another well-established risk factor of suicidal behavior (6, 7).

Predisposing factors might play their role in suicidal behavior via personality traits and cognitive style (8). Impulsive aggression (9) and neuroticism (10) have been shown as important risk factors of suicide. Hopelessness is a crucial, cognitive vulnerability that significantly predicts the risk of suicide, and there is initial evidence on determining the role of hopelessness in the association of post-traumatic stress disorder (PTSD) and suicide attempts (11).

Psychiatric disorders, negative life events, and suicidal ideation are identified as precipitating risk factors of suicide. Having psychopathology is the key predictor of suici-

dal behaviors (9). Evidence suggests that 87.3% of individuals who die by suicide meet the criteria for a psychiatric disorder (12). Arsenault-Lapierre et al. (12) found that affective disorders, substance use disorders, schizophrenia, and other psychotic disorders were most frequent among suicide cases. The associations of negative life events (13) and perceived levels of stress (14) with suicidal ideation and behavior are well demonstrated. Finally, longitudinal studies have demonstrated that severe and pervasive suicidal thoughts exacerbate the risk of suicide attempts (8).

To our knowledge, in Iran, the majority of studies focused on the risk and protective factors of suicidal ideation, not attempting suicide (7, 14). Anisi et al. (14) explored the risk factors of suicidal ideation among Iranian soldiers. They found that higher levels of work-related stress, depression, and anxiety, being single, a history of smoking and substance use, family problems, history of attempted suicide, and a family history of suicide attempts were significantly associated with higher levels of suicidal ideation. In another study, Ziaei et al. (7) also reported that current smoking and substance use, being the victim of sexual abuse, and higher levels of anxiety were significantly associated with suicidal ideation among high school students. However, these studies explored the psychological risk factors of suicide thoughts in a sample of the non-clinical population (e.g., students and military individuals), and therefore, it is not plausible to generalize the findings of non-suicidal samples to patients who attempt suicide.

As far as we know, only one study explored the risk factors of attempted suicide among Iranian patients (15). Akbari et al. (15) indicated that recent stressful events, a low level of general health, lack of social support, and low levels of religious belief were significant predictors of a suicide attempt. However, they did not investigate the role of psychological variables in predicting a suicide attempt.

2. Objectives

Considering the scarcity of information regarding the risk and protective factors of attempted suicide in Iranian patients, the present study aimed to explore the risk factors of suicide among patients who were hospitalized following a suicide attempt in Zanjan, Iran.

3. Patients and Methods

3.1. Participants

The study participants were 200 patients (104 males and 96 females, aged 18 to 40) who attempted suicide and were referred to the emergency centers of three hospitals in Zanjan, Iran, from September 2015 to June 2016. They were selected via a judgmental sampling method. The non-suicidal participants were 300 patients (166 males and 134 females, aged 18 to 40) who were referred to the emergency centers of the above-mentioned hospitals in the same timeframe for reasons other than a suicide attempt. They were selected via a convenience sampling method. The exclusion criterion for the non-suicidal participants was having a history of attempting suicide.

3.2. Instruments

3.2.1. Sociodemographic Characteristics

They included sex, marital status, age, and education and were measured via a questionnaire.

3.2.2. Family Strength, Religious Identification

We used the prevention planning survey (PPS) (16) to assess these variables. The PPS consists of items and scales that measure several personality and social risk factors. The family strength subscale consists of 10 items. Higher scores indicate lower levels of family unity. In the current study, the internal consistency of the family strength subscale was 0.90. The religious identification subscale comprised three items. Participants were asked to answer questions using a four-point Likert scale ranging from (1) “strongly agree” to (4) “strongly disagree”. Higher scores indicated lower levels of religious belief. In the current study, the internal consistency of the religious identification subscale was 0.87.

3.2.3. Substance Use

Lifetime and current substance use were measured via a questionnaire based on the American Drug and Alcohol Survey. This scale assesses the substance use throughout the lifetime, annual use, and usage in the past 30-day time frame. The content validity, test-retest, and internal consistency of the Persian version of the scale have been established (17).

3.2.4. Hopelessness

We utilized the Beck Hopelessness Scale (BHS) (18). The BHS is a 20-item (“true = 1”, “false = 0”) self-reporting instrument that assesses hopelessness and pessimism about the future. In the Iranian sample, BHS showed good concurrent and discriminant validity, as well as internal consistency (19). In the current sample, the internal consistency of the BHS was 0.81.

3.2.5. Depression

In order to assess depression, the Zung Self-Rating Depression Scale (SDS) (20) was used. The SDS is a 20-item instrument with a four-point Likert-type scale (1 = "a little of the time" to 4 = "most of the time") designed to measure depressive symptomatology. The Persian version of the SDS showed high test-retest reliability, acceptable internal consistency, and satisfactory factor structure (21). In the current sample, the internal consistency of the SDS was 0.90.

3.2.6. History of Sexual, Emotional, and Physical Abuse

It was assessed by the Child Abuse Self-Report Scale (CASRC). The CASRC is a 38-item tool with a four-point Likert-type scale (0 = "never" to 3 = "always") that measures family and parental abusive behaviors toward the individual during childhood. The scale demonstrated satisfactory construct and concurrent validity and test-retest reliability among the Iranian population (22). The internal consistency of the CASRC in the current sample was 0.88.

3.2.7. Impulsive Aggression

It was assessed by a hostility subscale (six items) of the Symptom Checklist-90-Revision (SCL-90-R). Responses to each item were on a five-point Likert scale ranging from (0) "not at all" to (4) "extremely". The Persian version of SCL-90-R showed good internal consistency, test-retest reliability, and construct validity (23). The internal consistency of the hostility subscale was 0.89 in the current sample.

3.2.8. Neuroticism

It was assessed by the emotionality or neuroticism subscale of the Eysenck Personality Questionnaire (EPQ) (24). The neuroticism subscale consists of 23 yes/no questions. Kaviani et al. showed that the Persian version of the EPQ has excellent test-retest reliability, internal consistency, and concurrent validity (25).

3.2.9. Suicidal Ideation

It was measured by four items of the depression subscale of the General Health Questionnaire-28 item (GHQ-28) (26). The internal consistency of these items was 0.96 in the current sample.

3.2.10. Family Discord

It was assessed using three questions: "Have your parents disputed with each other during your childhood and adolescence?", "Have your parents insulted each other during your childhood and adolescence?", and "Have your parents beaten each other during your childhood and adolescence?" The internal consistency of the three questions was 0.83.

3.2.11. Stressful Life Events

They were assessed using the Social Readjustment Rating Scale (SRRS) (27). The SRRS consists of 43 life events that are identified as stressful based on clinical experiences. The participants were asked to determine which of the stressful events they had experienced during the past year. The psychometric properties of SRRS were well established across various cultures (28).

3.2.12. Anxiety

It was assessed through the anxiety subscale of Depression, Anxiety, Stress scale-21 item (DASS-21) (29). Participants answer items using a 0 (did not apply to me at all) to 3 (apply to me very much) scale. The psychometric properties of DASS-21 were demonstrated among the Iranian population (30). In the current sample, the internal consistency of the anxiety subscale was 0.88.

3.3. Procedure

In order to gather data from non-suicidal participants, the researchers recruited two psychologists as assessors and trained them concerning the purpose and processes of this study. The assessors selected non-suicidal participants among patients who were referred to the emergency centers of the hospitals for reasons other than attempting suicide. The assessors explained the purpose and procedure of the study to the participants. Those in a healthy physical and mental state and agreed to take part in the study were asked to complete the questions.

For the suicidal participants, the second author (K.Z.) recruited patients who were referred to emergency centers of the hospitals after an attempted suicide. The author (K.Z.) was informed by the head nurse of the emergency center that a suicidal patient was admitted. After stabilizing the patient, the author approached him/her and explained the purpose and procedure of the research. Those who agreed to participate in the study were asked to answer the questionnaire. Completing the battery of questionnaires took 35 to 45 minutes.

The study was carried out following the recommendations of the Ethical Guideline for Research on Human Individuals of the Ethical Review Board of Zanjan University of Medical Sciences (ZUMS.REC.1394/43), with written informed consent from all individuals following the Declaration of Helsinki. Data were analyzed by independent *t*-test, chi-square and hierarchical logistic regression.

4. Results

The mean age of suicidal participants was 25.96 (SD = 7.28, range 18 to 40). The mean age of non-suicidal partic-

ipants was 28.92 (SD = 6.67, range 18 to 40). Among non-suicidal participants, 139 (46.3%) were single, and 161 (53.7%) were married. Besides, 117 (58.5%) suicidal participants were single, and 83 (41.5%) were married. Other demographic information is presented in Table 1. Also, suicidal participants reported significantly higher rates of lifetime use of cigarettes/hookah, alcohol, illicit drug, and non-prescribed medications than non-suicidal participants (Table 2).

Based on literature related to the predisposing, precipitating, and familial risk factors of attempting suicide (8, 9), we divided the independent variables into three categories for hierarchical logistic regression analysis: (1) familial risk factors (including a history of family discord, low level of family support, and history of sexual, physical, and emotional abuse); (2) individual predisposing risk factors (including impulsive aggression, neuroticism, hopelessness, and low levels of religious belief); and (3) individual precipitating risk factors (including depression, anxiety, suicidal ideation, stressful life events during the last year, lifetime cigarette/hookah use, current cigarette/hookah use, lifetime alcohol use, current alcohol use, lifetime illicit drug use, current illicit drug use, lifetime non-prescribed medication use, and current non-prescribed medications use).

Familial risk factors were entered in step 1 of the hierarchical logistic regression analysis. As shown in Table 3, familial risk factors accounted for 21% of the variance of suicide attempt ($\chi^2 = 119.70$, df = 2, $P < 0.0001$). Low levels of family strength [adjusted odds ratio (aOR) = 1.08] and history of sexual, physical, and emotional abuse (aOR = 1.10) were statistically significant factors, leading to suicide attempts in step 1. The model correctly classified 72% of the cases. A history of family discord did not predict suicide attempts and was excluded from the analysis.

The individual predisposing risk factors were added in step 2. The model explained that the total variance of suicide attempts significantly increased to 41% ($\chi^2 = 143.18$, df = 4, $P < 0.0001$). Impulsive aggression (aOR = 1.05), neuroticism (aOR = 1.25), and low level of religious beliefs (aOR = 0.70) were significant risk factors of suicide attempt. The model correctly identified 82% of the cases.

The individual precipitating risk factors were added in step 3. Compared to step 2, the total variance of suicide attempts significantly increased to 64% ($\chi^2 = 252.92$, df = 11, $P < 0.0001$). Suicidal ideation (aOR = 1.79), depression (aOR = 1.12), current use of cigarette/hookah (aOR = 8.14), and lifetime non-prescribed medications use (aOR = 2.48) were significant proximal risk factors of suicide attempt. The model correctly identified 93% of the cases.

5. Discussion

Our findings showed that individuals who scored higher on depression and suicidal ideation, currently used either cigarettes or hookah, and had a history of non-prescribed medication use, were more likely to attempt suicide. In addition, lower levels of religious belief were significantly connected to suicide attempts.

Our findings showed people who currently used cigarettes/hookah were eight times more likely to attempt suicide than non-smokers. This finding is consistent with studies reporting a significant association between smoking and suicide attempts (31). These findings are also in line with neurobiological and genetic hypotheses about the crucial modifying role of tobacco and nicotine on central neurotransmitter systems (31). Smoking is associated with reduced monoamine oxidase A (MAO-A) and B activities leading to increased MAO-dependent neurotransmitter availability. Genetic variations of MAO-A are associated with impulse control (31). Also, the evidence demonstrated that low expression of the MAO-A gene variant was correlated with differences in limbic circuitry that is responsible for dysfunctional approaches of cognitive control and emotion regulation (32). This finding might imply that prevention and intervention programs for smoking have indirect effects on decreasing impulsive behaviors and suicide attempts.

The present findings also indicated that individuals who had a lifetime history of non-prescribed medication use were 2.5 times more likely to attempt suicide than non-users. The results are in line with Khantzian's self-medication theory, which declares people use a particular substance to decrease negative emotions or achieve emotional stability (33). This result might imply that suicidal patients significantly use more dysfunctional emotion regulation strategies. Therefore, preventive programs and interventions for suicide should concentrate on educating emotion regulation and problem-solving strategies.

The current findings of the association of depression with suicide attempts are consistent with the previous literature, which reported that a major depressive disorder is a significant predictor of suicide attempts (14). In addition, the results indicated that suicidal ideation significantly anticipated suicide attempts. This finding is also consistent with previous studies reporting the association between suicidal ideation and suicide attempt (13). The findings reflect the importance of the early diagnosis of depression and assessment of suicidal ideation among patients with depressive disorder in both clinical practice and prevention programs.

Finally, our results showed that lower levels of religious beliefs significantly predicted suicide attempts. That

Table 1. Sociodemographic Characteristics and Mean and Standard Deviation of Predictor Variables of Suicidal Participants (n = 200) and Non-suicidal Participants (n = 300) [a]

Variables	Suicidal Participants, No. (%)	Non-suicidal Participants, No. (%)
Marital status		
Single	117 (58.5)*	139 (46.3)*
Married	83 (41.5)*	161 (53.7)*
Education level		
High school	91 (45.5)*	73 (24.3)*
Diploma	65 (32.5)*	121 (40.3)*
Bachelor	42 (21)*	90 (30)*
Master of science or higher	2 (1)*	16 (5.3)*
Family history of suicide		
Yes	29 (14.5)*	3 (1)*
No	171 (85.5)*	297 (99)*

[a] *, P < 0.05.

Table 2. Prevalence of Lifetime and Current Substance Use Among Suicidal and Non-suicidal Participants [a]

Variables	Suicidal Participants, No. (%)	Non-suicidal Participants, No. (%)
Lifetime cigarette/hookah use	78 (39)*	50 (16.7)*
Current cigarette/hookah use	42 (21)*	34 (11.3)*
Lifetime alcohol use	57 (28.5)*	43 (14.3)*
Current alcohol use	22 (11)*	5 (1.7)*
Lifetime illicit drugs use	44 (22)*	14 (4.7)*
Current drugs use	22 (9.5)*	3(1)*
Lifetime non-prescribed medications use	150 (75)*	113 (37.7)*
Current non-prescribed medications use	55 (27.5)*	15 (5)*

[a] *, P < 0.05.

is, individuals who had lower levels of religious beliefs were more likely to engage in attempting suicide. These results are in line with previous studies indicating a significant association between religious affiliation and suicide attempts (34). One explanation of this result might be that religious beliefs help individuals to maintain hope and meaning in life, even in the face of stressful events (34). In terms of clinical practice, the findings suggest that it is important to assess religious beliefs when screening individuals for the risk of suicide.

The findings of the current research should be considered with its limitations in mind. First, the retrospective nature of the data hinders the inference of causal relationships between independent variables and suicide attempts. Thus, future longitudinal studies might further clarify the causal role of each risk and protective factor of suicide attempts among the Iranian population. Second, utilizing self-report instruments should also be considered another limitation.

5.1. Conclusion

In an overview, the findings from the current sample of suicidal Iranian patients are generally in line with the results of studies that investigated the psychological risk factors of suicide attempts in Europe and other Middle Eastern populations (35). This consistency across different cultures might imply that preventive programs and interventions for suicide developed for other cultures would apply to suicidal Iranians, albeit with some cultural adaptations. However, future research should concentrate on the cross-cultural clinical validity of those programs within the Iranian population.

Table 3. Logistic Multiple Regression Analysis with Enter Method of Factors Associated with Suicide Attempt

Variables	Step 1		Step 2		Step 3	
	aOR	95%CI	aOR	95%CI	aOR	95%CI
Familial risk factors						
Low level of family strength	1.08 [a]	1.04 - 1.12	1.02	0.97 - 1.06	1.08	1.00 - 1.17
History of sexual, physical, and emotional abuse	1.10 [a]	1.05 - 1.15	1.03	0.98 - 1.09	0.95	0.86 - 1.04
Individual predisposing risk factors						
Impulsive aggression			1.05	1.03 -1.11	1.03	0.94 - 1.14
Neuroticism			1.25 [a]	1.17 - 1.34	0.86	0.75 - 0.99
Low level of religious beliefs			0.70 [a]	0.61 - 0.80	0.71 [a]	0.57 - 0.90
Hopelessness			0.99	0.92 - 1.08	0.95	0.83 - 1.08
Individual precipitating risk factors						
Depression					1.12 [a]	1.05 - 1.19
Anxiety					0.91	0.81 - 1.02
Suicidal ideation					1.79 [a]	1.50 - 2.12
Stressful life events during last year					1.05	0.91 -1.20
Lifetime cigarette/hookah use					1.08	0.92 - 1.16
Current cigarette/hookah use					8.14 [a]	2.05 - 32.25
Lifetime alcohol use					0.96	0.25 - 3.70
Current alcohol use					0.89	0.69 - 1.02
Lifetime illicit drug use					0.50	0.10 - 2.52
Current illicit drug use					0.63	0.03 - 13.43
Lifetime non-prescribed medication use					2.48 [a]	1.12 - 4.85
Current non-prescribed medication use					0.63	0.18 - 2.18

[a] $P < 0.0001$.

Footnotes

Authors' Contribution: Farhad Taremian and Mazaher Rezaei designed the research and supervised the study procedure. Seyedeh Kiana Zamani collected the data of the study. Reza Moloodi and Soghrat Faghihzadeh analyzed the data and wrote the paper.

Conflict of Interests: The authors have no actual or potential conflicts of interest, including any financial, personal, or other relationships with other people or organizations within three years of beginning the work submitted that could inappropriately influence their work.

Ethical Approval: The study was carried out in accordance with the recommendations of Ethical guideline for research on human individuals of Ethical Review Board of Zanjan University of Medical Sciences (ZUMS.REC.1394/43).

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Informed Consent: The participants gave written informed consent in accordance with the Declaration of Helsinki.

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