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Literacy of Suicide Scale in the Iranian Military Youth; The Validity and Reliability of the Persian Version

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ABSTRACT

Aims Suicide is a leading cause of death globally, necessitating its assessment through valid tools. Among these tools, the Literacy of Suicide Scale (LOSS), developed by Calear *et al.*, has not yet been validated for Persian-speaking populations. Therefore, this study aimed to translate, evaluate, and validate the LOSS within a young military community.
Instrument & Methods This cross-sectional study employed a methodological approach. The sample consisted of young military personnel who visited counseling and psychology clinics and were selected via convenience sampling. Initially, the original version of the scale was translated into Persian using the Forward-Backward method. To evaluate content validity, ten experts assessed the scale, calculating the content validity ratio (CVR) and the content validity index (CVI). Face validity was also assessed with a sample of 20 subjects from the study population. Reliability was tested through a test-retest procedure with a two-week interval and measurement of Cronbach's alpha. Finally, the questionnaire was administered to 415 subjects to assess construct and convergent validity.
Findings The CVR, CVI, and face validity of all questions on the LOSS were at acceptable levels. The Cronbach's alpha for the subscales ranged from 0.71 to 0.76, and for the total scale, it was 0.75. Additionally, all components of the LOSS showed a significant relationship with the total score of the questionnaire (r>0.2).
Conclusion The Persian version of the LOSS demonstrates acceptable validity and reliability for use among young military personnel.

Keywords Psychometrics; Surveys and Questionnaire; Suicide; Literacy

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Introduction

Suicide is a significant public health issue [1] and ranks among the leading causes of death globally [2]. It is also one of the top ten causes of death and lost years of life in many parts of the world [3]. The term "suicide" refers to death caused by self-inflicted injury with the intent to die [4].

The World Health Organization has identified suicide as a public health priority, stating that suicide prevention is essential in all countries. Key underlying factors of suicide include predisposing physical diseases, mental disorders, demographic factors, economic factors, environmental factors, issues related to refuge and immigration, emotional-communication problems, incarceration, and family issues [5, 6].

Every year, approximately 700,000 individuals die from suicide worldwide. Suicide can occur at any point throughout the life cycle and stands as the fourth leading cause of death among individuals aged 15-29 years globally [7]. Common methods of suicide include the use of firearms, hanging, suffocation, drowning, carbon monoxide poisoning, jumping, and drug overdose. The incidence of suicide has been rising gradually worldwide, particularly in European countries. For example, in the Netherlands, the number of suicides increases annually by between 3% and 6% [8].

Suicide rates are also increasing in Iran. A meta-analysis concluded that in recent decades, Iran has seen the largest increase in suicide rates among Islamic and Eastern Mediterranean countries [9]. The provinces of Ilam, Lorestan, Hamadan, Kurdistan, and Kermanshah have the highest rates of completed suicides, while the provinces of Isfahan, Yazd, Semnan, and Qom have the highest rates of attempted suicide and the lowest rates of completed suicide [10]. Furthermore, findings from Zarani and Ahmadi's study indicate that contrary to global statistics, suicide attempts are more prevalent among Iranian men [11].

Suicidal behavior is categorized into four main types: suicidal thoughts, planning, attempts, and completed suicide. Suicidal ideation involves harboring thoughts and plans for suicide without necessarily acting on them. In the planning stage, an individual makes preparations by securing the means or location for suicide [12].

Suicide can also occur among soldiers. In a survey, the suicide rate for military personnel was reported as twelve per 100,000 people, compared to nine per 100,000 among civilians [13]. The United States Department of Veterans Affairs has reported that 17 veterans die by suicide every day. Consistent with this, studies have estimated that suicide is more common among military personnel than civilians [14, 15].

Furthermore, suicide literacy is crucial both in the general population and particularly among military personnel. Suicide literacy refers to the understanding of the causes, risk factors, signs, symptoms, and treatments of suicide. This knowledge is vital as it can help reduce the prevalence of suicide by encouraging individuals to seek professional help. In contrast, incorrect or incomplete knowledge may cause hesitance in seeking the necessary support for suicide prevention [16]. Generally, suicide literacy is insufficient [17], leading to the stigmatization of suicide as a taboo topic and the neglect of its warning signs [18].

Studies have shown that the quality of nursing care for patients who have attempted suicide can be influenced by various factors, including the nurses' knowledge about suicide, their ability to assess suicide risk, and their professional experiences, attitudes, and beliefs about suicide as a taboo subject [19]. Additional research also confirms that suicide literacy effectively improves attitudes, reduces stigmatization, and decreases judgment toward affected individuals [20-23].

As a result, it is crucial to identify groups with limited literacy in this field to promote mental health programs. By enhancing public and professional awareness about suicide, we can better manage and prevent it. One tool that can be used to evaluate the level of suicide literacy is a questionnaire. The Literacy of Suicide Scale (LOSS) by Calear *et al.* is a suitable tool for this purpose [16]. This scale is valuable and practical due to its reference scale and the absence of a similar questionnaire in Iran. The LOSS contains 27 items; twelve items are taken from the Revised Facts on Suicide Quiz (RFOS) developed by Hubbard and McIntosh, with additional items included to more accurately assess the four domains of suicide literacy identified by Calear *et al.* [16]. These domains are: a) signs and symptoms of suicide, b) causes or nature of suicidal thoughts and behaviors, c) risk factors, and d) treatment and prevention of suicide. The psychometric properties of this questionnaire have been validated in various studies and have been effective in clinical studies and interventions [24]. By understanding the level of suicide literacy among individuals and exploring how this type of literacy impacts other psychological variables, we can gain a deeper understanding of this area and aid specialists and psychotherapists in suicide-related interventions. Additionally, this study is important as there is no existing tool in Persian to measure suicide literacy and evaluate it alongside other related variables.

Moreover, given that military personnel, especially soldiers, are prone to suicidal thoughts due to factors such as the pressures of the military environment, challenges with commanders, difficulty adapting to changes, and personality issues, it is necessary to investigate and measure the level of suicide literacy within this population. Therefore, the aim of the present study was to translate and assess the validity

and reliability of the LOSS by Calear *et al.* in the military community.

Materials and Methods

This cross-sectional study employed a methodological approach. The study population consisted of military personnel serving in the guard corps of Tehran and Arak during April and May 2021. The sample was selected via convenience sampling and included 10 experts for the content validity assessment stage, 20 soldiers for the qualitative assessment of face validity, intraclass correlation coefficient (ICC), difficulty coefficient, and a test-retest assessment within a 2-week period, and 415 soldiers to assess the concurrent validity. Inclusion criteria were the absence of psychological disorders or any history of suicide and self-mutilation. Exclusion criteria included refusal to participate in the study and incomplete questionnaire responses.

Translation process

Initially, the English version of the questionnaire was translated into Farsi by experts in the English language. Subsequently, in the backward-forward stage, the Farsi translation was independently re-translated into English by two bilingual individuals. This version was then compared with the original, and the final version was prepared by the research team. The final Persian version of the questionnaire was approved after being reviewed by an expert in Persian language and literature.

Validation

Face validity

To evaluate face validity, the questionnaires were completed by 20 soldiers, and their validity was assessed using the Impact Score formula. The accepted standard for the item impact score was 1.5.

Content validity

Content validity was evaluated using the content validity ratio (CVR) according to Lawshe's table. With ten experts, a CVR above 0.62 was considered acceptable [25]. The content validity index (CVI) according to Waltz & Bausell was also used to measure content validity. According to this index, items scoring below 0.7 are rejected, those between 0.7 and 0.79 need revision, and those above 0.79 are acceptable [26].

To this end, questionnaires were initially sent to ten experts in health education, nursing, nutrition, and psychology to assess the necessity and importance of the questions. For questions with a CVI and CVR estimated to be less than 0.62 and 0.70 respectively, these questions were presented to the ten experts again in a second stage; six experts responded, and the CVI and CVR were recalculated.

Reliability

To assess reliability, the questionnaires were initially administered to 20 soldiers. After two weeks, the same participants were asked to fill out the questionnaires again. Subsequently, the intra-class correlation coefficient was calculated to evaluate the consistency of the responses over time.

Concurrent validity

Concurrent validity was assessed by examining the relationship between the scores of the LOSS and the Stigma of Suicide Scale (SOSS), which measures convergent validity. The difficulty coefficient was also utilized in this study.

Data analysis

Statistical analysis was performed using SPSS 23 by Spearman's rank correlation, and also we measured item difficulty and analyzed the scale reliability using Cronbach's alpha coefficient.

Literacy of Suicide Scale

The LOSS was developed by Calear *et al.* to measure the level of suicide literacy. This scale contains 27 items, 12 of which are taken from the Revised Facts on Suicide Quiz (RFOS) developed by Hubbard and McIntosh, with additional items added to more accurately assess the four domains of suicide literacy identified by Calear *et al.* [16]. These domains include: a) causes or nature of suicidal thoughts and behaviors (questions 1 to 10), b) risk factors (questions 11 to 17), c) signs and symptoms of suicide (questions 18 to 23), and d) treatment and prevention of suicide (questions 24 to 27). In this questionnaire, correct answers are scored as 1, while incorrect answers and responses of "I don't know" receive a score of 0. The sum of the correct answers and the total score indicates an individual's literacy level. Higher scores reflect a higher level of suicide literacy. This scale is useful for identifying the strengths and weaknesses of individuals' awareness in the realm of suicide [16].

Stigma of Suicide Scale

This questionnaire, created by Batterham *et al.*, is designed to evaluate the stigmatizing attitudes of the general public toward individuals who commit suicide. It comes in two versions: a long version with 58 questions and a short version with 16 questions. Each question is rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), where higher scores indicate greater levels of stigmatization towards those who are suicidal [27]. The SOSS includes three subscales: Stigma, Isolation/Depression, and Glorification/Normalization. The first subscale, Stigma, has shown a Cronbach's alpha of 0.70 for narrative validity. The convergence validity of the total scale score was 0.66 according to Batterham *et al.*, and the construct validity for the depression subscale was reported as 0.46 [27]. In a study by Chan *et al.* [28], Cronbach's alpha for the subscales of stigma, isolation/depression, and glorification/normalization were estimated to be 0.95, 0.90, and 0.88, respectively. Ozturk *et al.* reported an internal correlation of 0.93 for the Turkish version of this scale [29]. In the present study, this questionnaire was used to assess convergent validity.

Findings

Demographic information

First stage

In the initial stage, 30 soldiers were studied. All participants were single, from the city of Arak, served in the Islamic Revolutionary Guard Corps (IRGC), and had no history of self-harm, drug use, or psychiatric referrals. The mean age of the participants was 21.75±2.97 years, and the mean duration of military service was 20.55±3.72 months.

Second stage

To test concurrent validity, a questionnaire was administered to 415 soldiers. All participants were single, from the city of Arak, and served in the IRGC. The mean age of the participants was 21.40 ± 2.41 years. Among the participants, 72 had a low economic status (up to 118.5 dollars), 181 had a moderate economic status (118.5 to 237 dollars), and 162 had a high economic status (more than 237 dollars). The mean duration of military service was 20.55 months with a standard deviation of 3.72.

Translation process and content validity

In the suicide literacy questionnaire, questions 1 ("Asking someone directly, 'Do you feel like committing suicide?' will probably lead to that person's suicide"), 8 ("Media coverage of suicide will definitely encourage others to commit suicide"), 22 ("Suicide rarely happens without warning"), and 23 ("The highest risk of suicide in depressed people is when they start to recover") were modified based on expert feedback. The removal of these questions was due to their CVR and CVI.

The face validity study results indicated that the CVR for questions 1, 2, 5, 12, 13, 17, 19, and 21 was 1; for questions 3, 4, 7, 9, 10, 11, 14, 15, 16, 18, 20, and 24 it was 0.8; for questions 6, 22, 23, 25, and 27 it was 0.6; and for questions 8 and 26 it was 0.4. The CVI for questions 2, 3, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19 was also 0.8; for questions 1, 4, 5, 7, 8, 20, 21, and 22 it was 0.7; for questions 6, 23, 24, and 25 it was 0.6; for question 26 it was 0.5; and for question 27 it was 0.4.

Based on the results obtained, the face validity of each question was reported as favorable (ranging from 1.39 to 3.78).

In the first stage, questionnaires were sent to 30 people, of whom 10 experts responded and their CVI and CVR were calculated. Based on the cutoff point of 0.62 for CVR and 0.70 for CVI, some questions scored below these thresholds. After recalculations, in the suicide literacy questionnaire, seven questions (6, 8, 22, 23, 25, 26, and 27) fell below the CVR cutoff point and six questions (6, 23, 24, 25, 26, and 27) fell below the CVI cutoff point. The rest of the questions were considered favorable.

In the second stage, these questions were once again sent to six experts. The results indicated that in the suicide literacy questionnaire, all the questions were retained, but nine questions were edited, modified, and considered to be fluently phrased (Table 1).

Table 1. The CVR, CVI and the face validity values of the Literacy of Suicide Scale (LOSS)

Items	CVR	CVI	Face Validity
1-Asking the person directly, "Do you feel like killing yourself?" will probably lead to them committing suicide	1	0.7	1.75
2- People who commit suicide do it just to play with other people's feelings and get their attention	1	0.8	3.78
3- Very few people think about suicide	0.8	0.8	1.98
4- Anyone who commits suicide would have been diagnosed with depression by a psychiatrist	0.8	0.7	2.35
5- A person who tends to commit suicide will always remain this way and will continue to have suicidal thoughts	1	0.7	2.46
6- Talking about suicide always increases the probability of committing suicide	0.6	0.6	3.08
7- Motives and reasons for suicide attempts are easily identified	0.8	0.7	1.95
8- Media coverage of suicide definitely encourages others to commit suicide	0.4	0.7	2.37
9- Most people who commit suicide do not succeed in killing themselves	0.8	0.8	2.36
10- A person who commits suicide has a mental illness	0.8	0.8	1.70
11- Most people who commit suicide are mentally unstable	0.8	0.8	2.46
12- People with relationship problems or financial problems are more likely to commit suicide	1	0.8	3.15
13- A person who has committed suicide in the past is more likely to commit suicide again than someone who has never committed suicide	1	0.8	2.85
14- Men are more likely to commit suicide than women	0.8	0.8	1.86
15- People who are anxious or agitated are more likely to commit suicide	0.8	0.8	2.25
16- There is a strong connection between alcoholism (alcohol consumption) and suicide	0.8	0.8	1.65
17- Most people who commit suicide are less than 30 years old	1	0.8	2.10
18- All people who commit suicide do not plan on doing it beforehand	0.8	0.8	2.74
19- People who talk about suicide are less likely to commit suicide	1	0.8	3.45
20- People who have a tendency to commit suicide can quickly change their mind	0.8	0.7	2.15
21- Most people who commit suicide do not have a plan for the future	1	0.7	1.95
22- Suicide rarely happens without warning	0.6	0.7	1.80
23- There is a higher chance of depressed people commiting suicide in the beginning stage of their recovery	0.6	0.6	2.18
24- When people decide to commit suicide, nothing can stop them from this decision	0.8	0.6	2.34
25- Only professionals can help those who intend to commit suicide	0.6	0.6	1.39
26- People who think about suicide should not talk about it with others	0.4	0.5	2.18
27- Visiting a psychiatrist or psychologist can help prevent suicide	0.6	0.4	3.40

CVR: content validity ratio; CVI: content validity index.

Reliability

The Cronbach's alpha for the components of the suicide literacy questionnaire was higher than 0.70, indicating good reliability. Additionally, the Kuder-Richardson and ICC values were also at a favorable level. According to experts, the difficulty level of the questions was deemed appropriate (Table 2).

Convergent validity

In Table 3, the relationships between the components of the LOSS and the SOSS are explored.

As detailed in Table 3, the total score of suicide literacy shows a direct and significant relationship with the normalization components, causes or nature of suicidal thoughts and behaviors, risk factors, signs and symptoms of suicide, and treatment and prevention of suicide. It also exhibits an indirect and significant relationship with the components of depression, stigma, and the total stigma score.

All components of suicide literacy—causes or nature of suicidal thoughts and behaviors, risk factors, signs and symptoms of suicide, and treatment and prevention of suicide—demonstrate a direct and significant relationship with the total score of this questionnaire at both stages. Specifically, in the first stage, the components with the highest correlation with the total score were risk factors (r=0.702; p=0.01), causes or nature of suicidal thoughts and behaviors (r=0.666; p=0.01), signs and symptoms of suicide (r=0.490; p=0.01), and treatment and prevention of suicide (r=0.358; p=0.01), respectively. In the second stage, the components with the highest correlation were causes or nature of suicidal thoughts and behaviors (r=0.768; p=0.01), risk factors (r=0.721; p=0.01), signs and symptoms of suicide (r=0.556; p=0.01), and treatment and prevention of suicide (r=0.432; p=0.01), respectively.

Table 2. Measurement of the reliability of the Persian version of the Literacy of Suicide Scale (LOSS) (n=20)

Dimensions of the LOSS	Number of items	Kuder–Richardson	Cronbach's alpha	ICC	Difficulty coefficient
Causes or nature of suicidal thoughts and behaviors	10	0.71	0.71	0.76	0.77
Risk factors	7	0.72	0.73	0.69	0.86
Signs and symptoms of suicide	6	0.72	0.74	0.74	0.80
Treatment and prevention of suicide	4	0.74	0.76	0.78	0.85
Total questions	27	0.73	0.75	0.72	0.82

Table 3. Correlation of the components of Literacy of Suicide Scale (LOSS) and Stigma of Suicide Scale (SOSS) (n=415)

Variables	Components	9	8	7	6	5	4	3	2	1
Suicide stigma	1- Normalization/Glorification	0.30	0.17	0.23	0.24	0.32	0.12	-0.14	0.28	1
	2- Depression/Isolation	-0.20	-0.12	-0.19	-0.19	-0.14	0.60	0.36	1	
	3- Stigma	-0.40	-0.28	-0.31	-0.32	-0.40	0.89	1		
	4- Total score of stigma	-0.29	-0.21	-0.23	-0.25	-0.26	1			
Suicide literacy	5- Causes or nature of suicidal thoughts and behaviors	0.89	0.65	-0.51	0.71	1				
	6- Risk factors	0.91	0.74	0.72	1					
	7- Signs and symptoms of suicide	0.80	0.62	1						
	8- Treatment and prevention of suicide	0.77	1							
	9- Total score of suicide literacy	1								

Significant at p<0.05.

Discussion

The purpose of the present study was to psychometrically evaluate the LOSS within military forces. The statistical sample included two specialists and experts during the translation stage, 16 experts in the content validity evaluation stage, 20 soldiers for the qualitative evaluation of face validity, and 415 soldiers to assess convergent validity. The results indicated that based on the CVR, CVI, and face validity, all questions of the suicide literacy questionnaire were at the optimal level and all 27 questions were maintained and found to be culturally compatible. The CVI of our study was 0.7 and above, while the CVI of the Malay version of the LOSS (M-LOSS (I-CVI)) and the Turkish version was 0.83 (and above) and 0.8 (and above), respectively [30, 31].

Given that the population of our study was the military community, a unique demographic, the CVI results of this study justify and demonstrate the validity of the Persian version. Additionally, Kuder-Richardson and optimal components were calculated. Al-Dalake *et al.* [32] concluded in their study that the LOSS has a favorable Cronbach's alpha (Cronbach's alpha>0.70). The Kuder-Richardson score in the Turkish version was 0.61, which was lower than in our study [31]. In a study on the general population of Iran, the Cronbach's alpha was 0.85 and the ICC was 0.89, both higher than in the present study [33]. A study in India on medical students reported a Cronbach's alpha of 0.74, similar to our findings. Thus, the reliability index of our study was moderate and favorable compared to other studies [23].

The results of Spearman's internal correlation coefficient showed that all components of suicide literacy had a direct and significant relationship with the total score of this questionnaire, and the subscales of LOSS had a positive and strong correlation with each other. However, there was a weak negative correlation between the subscales of the SOSS and LOSS. The significance, strength, and direction of the correlation were reported in the

Arabic version [32]. The correlation of this questionnaire with the stigma questionnaire was reported as -0.50, indicating that the suicide literacy and suicide stigma questionnaires in Arab society have good validity and reliability. Similar to the present study, in the German population, LOSS was negatively associated with SOSS [34]. Gholamrezaei *et al.* found a significant relationship between suicide literacy and suicide stigma at the 0.05 level [21]. In line with these results, Claire *et al.* [24] concluded that this questionnaire has good validity and reliability and can be used for psychological education interventions. Consequently, LOSS demonstrated good convergent validity with the SOSS.

According to the obtained and previous results, it can be said that the increase in suicide literacy in people causes the attitude of people and the way they deal with suicide to change in a positive way, and this understanding and knowledge, both for them and for the people who commit suicide, can be fruitful. As a result, the availability of suitable tools for evaluating the level of suicide literacy can be very useful in assessing the level of awareness and literacy in individuals, provinces of the country, different cultures, military personnel, etc. Accreditation and localization of such a tool assist in understanding the prevalence, rate and severity of suicide in the country (and especially among the military) and in taking appropriate measures to prevent and reduce it. Compared with other researches, the obtained results have good validity and vision. As a result, according to the results of this research and other researches, it can be concluded that this questionnaire can be used in Iranian society.

Given the increasing statistics of suicide in Iran, the taboo nature of the subject in society, and the general public's lack of awareness about the causes and consequences of suicide, coupled with insufficient research in this area, this study proves to be valuable. By understanding the level of suicide literacy among the population and exploring how this type of literacy affects other psychological variables, we can gain a deeper and more comprehensive understanding in this field. This knowledge assists specialists and psychotherapists in developing interventions related to suicide prevention and management.

Among the limitations of this research are the lack of confidence in the study by individuals with a history of suicide, the fact that the research was conducted only on soldiers, the absence of samples from different ethnicities and cultures, and the incomplete filling out of a number of questionnaires by the soldiers (due to fatigue and lack of time). This resulted in some questionnaires being discarded and replaced with others. Additionally, because the items are binary-coded (correct or incorrect), factor structure analysis was not conducted on the LOSS. Nevertheless, this is the first time such research has been conducted within the military community in Iran. The convenience sampling method also limits the generalizability of the results.

We recommend enhancing the suicide literacy of soldiers through various classes and workshops, teaching them concepts related to suicide. Furthermore, following the completion of the psychometric evaluation, we recommend using the current questionnaire to assess the level of suicide literacy in the general population.

Conclusion

The Persian version of the LOSS within the soldier community demonstrates good and favorable validity and reliability, making it suitable for measuring the level of suicide literacy in this group.

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Ethical Permissions: Ethical considerations were duly observed in this study. Necessary permits for this study were obtained from the relevant research center. Participants were assured of the confidentiality of their recorded information. This study has been registered with the ethics code IR.BMSU.REC.1400.097 at Baqiyatallah University of Medical Sciences.

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