Predicting suicidal thoughts using depression, anxiety and premenstrual syndrome patterns in female students of Ilam universities

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Abstract

Introduction: Suicide is one of the major mental health problems. One of the most important ways to prevent suicide is to identify people with suicidal thoughts and also to identify the factors that can affect suicidal thoughts. The aim of this study was to predict suicidal thoughts in female students of Ilam universities.
Materials and Methods: In this cross-sectional study, 331 female students of Ilam universities in May to August 2020 participated by cluster sampling using an online questionnaire. Suicidal thought was measured using Beck Suicide Scale Thoughts, Premenstrual Syndrome (PMS) was measured using 19 indicators of Premenstrual Symptoms Screening Tool (PSST) and depression and anxiety using DASS42 questionnaire. Data were analyzed using chi-square test. Linear and logistic regression models were used to predict suicidal thoughts.
Results: Suicidal thoughts had a significant relationship with depression, anxiety, and premenstrual symptoms ($P<0.01$). The results of univariate logistic showed that the prevalence of suicidal thoughts in people with extremely severe and severe depression was 33 and 13 times higher than those without depression and in people with extremely severe and severe anxiety was 9 and 4 times higher than in people without anxiety ($P<0.001$). Suicidal thoughts were 3 times more common in people with severe PMS symptoms than in those with mild symptoms ($P=0.002$).
Conclusion: The results showed that anxiety, depression, and PMS have a direct and significant relationship with suicidal thoughts in female students of Ilam Universities. Therefore, by providing mental health services and screening for mental disorders and premenstrual symptoms, an effective step can be taken to prevent suicide among students.

Keywords: Suicidal thoughts, Depression, Anxiety, Symptoms of PMS

Introduction

Suicide is one of the mental health problems and it is the third most common cause of death between the ages of 15- 44 (1). One million people lose their lives as a result of suicide every year (2). Suicide rates have risen over the past 50 years and it is projected to reach 1.53 million by 2020. The issue of suicide is receiving a lot of attention in developed countries but it has been neglected in developing countries (3).

In a study entitled "Prevalence of suicidal thoughts and related risk factors in Iranian students: a systematic review and meta-analysis" has examined the prevalence of suicidal thoughts and its effective factors in Iranian students (4). Suicide is the second

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leading cause of death in people aged 15 to 24 in Ilam Province (5). Jan Ghorbani in a study entitled "Prevalence of suicidal thoughts and related factors in students of Isfahan University of Medical Sciences in the year 93-94" has investigated the lifetime prevalence, one year, and momentary suicidal thoughts in these students (6). Overholser in a research investigated the relationship between suicidal thoughts and poor psychosocial performance, upcoming depressive disorders, drop out of school, high-risk sexual behaviors, aggressive behaviors, and drug abuse disorders (7).

Subica and coworkers in 2016 examined the structure of depressive-anxiety symptoms and their association with neuroticism, extraversion, and suicide/self-harm behavior in adults with severe mental illness (8). Several studies have examined the relationship between PMS and increased risk of suicide (9, 10). Some studies have confirmed an increased risk of suicide during PMS period (11, 12) and others have denied any significant relationship (13, 14). Therefore, the relationship between PMS and increased risk of suicide remains challenging.

In all countries, the majority of suicides are committed by women, about 50% of whom are less than 30 years old. The annual rate of suicide commitment for this age group is one in every 100 people. (15). Suicide rates are rising among Iranian women compared to men. Iran is the third country in the world where the number of female suicides is increasing (16). Major depression has the highest risk of suicide. Concomitant disorders such as anxiety, restlessness, and rapid mood swings increase the risk of suicide (17).

Since one of the most important ways to prevent suicide is to identify people who have suicidal thoughts, it is important to identify these people and the factors that can affect suicidal thoughts. Therefore, the aim of this study was to investigate the relationship between PMS, depression and anxiety patterns with suicidal thoughts in female students of Ilam universities.

Materials and Methods

The present study is a cross-sectional study conducted among female students of Ilam universities.

Due to the outbreak of Covid-19, data was collected using online questioner via Porsline website (porsline.ir). Link of online questioners was sent to virtual networks of students in Ilam universities. By multi-stage cluster sampling, many university teachers were chosen randomly in Ilam university. University teachers put the link of questioners in students' groups. In the reporting section of Porsline website, the Excel file of the data was created and the duplicate answers and people who did not complete all four questionnaires were removed, and then the data was transferred to SPSS to define the numerical code for the answers. The sample size was estimated by multi-stage cluster sampling. After completion of the required questionnaires, the relevant data was extracted. Participants in this study were female students of Ilam universities who had completed the online questionnaires. The main outcome of our study was suicide thoughts. Demographic variables were: age, height, weight, length of sleep (based on hours in day), university name, marital status and degree of education (Ba, Ms., PH. D). Our three predictor variables were the results of three questionnaires related to depression, anxiety and PMS symptoms.

Suicidal thoughts were measured using Beck Suicide Scale Thoughts, PMS was measured using 19 indicators of Premenstrual Symptoms Screening Tool (PSST) and depression and anxiety were investigated using DASS42 questionnaire. The reliability of these questionnaires was evaluated using Cronbach Alpha. Our statistical population

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included all female students of Ilam universities and multi-stage cluster sampling method was used to choose samples. Sample size was calculated with considering 95% confidence interval, prevalence (P = 44%, d = 0.05, N = 10000 total student population (nonsense).

Statistical Analysis

In this article, the presence or absence of suicidal thoughts (yes, no) was considered as a dependent variable and the results of the three questionnaires were considered as independent variables. Chi-square (χ^2) test was used to find associations between the independent variables and suicidal thoughts. Univariate and multivariate logistic regression models, were used to predict the suicidal thoughts with independent variables. In univariate and multivariate logistic regression models, independent variables such as depression, anxiety and PMS were entered to models as ordinal and multinomial variables. Statistical analyzes were performed with SPSS Ver 25. A P<0.05 was considered as the significance level of the tests.

Results

In the sample of 331 people, the highest age group was between 20 and 25 years (57%). Most of the participants were from Ilam University of Medical Sciences and Ilam University. Most participants were single (71%) and had undergraduate degree (73%). The complete details of the participants are given in Table 1. The results showed that the prevalence of suicidal thoughts among female students of Ilam universities was 21.4%. The risk of suicidal thoughts was higher in single people than married students. Suicide rates were higher, at Payame Noor Universities and private universities. Suicidal thoughts were higher in those, who slept more than 7 hours a day, they were less than 160 cm tall and they were weighing 55 to 60 kg.

The reliability of questionnaires was evaluated using Cronbach's alpha, results confirmed the reliability of all four questionnaires (Table 2). Using $\chi 2$ test, we measured the relationship between the variables of depression, anxiety and premenstrual symptoms with the outcome of suicidal thoughts (Table 3). The table showed that suicidal thoughts was significantly associated with depression ($p = 0.000$, $\chi^2 = 57$), anxiety ($p = 0.000$, $\chi^2 = 33$) and premenstrual symptoms ($p = 0.006$, $\chi^2 = 10$). It has also been shown that the higher the symptoms of depression, anxiety, and premenstrual syndrome, the higher the suicide rate, and this relationship was almost linear. We defined the dependent variable of suicidal thoughts as dichotomous variable (yes, no) and examined its relationship with the variables of premenstrual syndrome, anxiety, and depression using logistic regression. The results showed that the logistic model between suicidal thoughts and severity of depression was:

$$\ln\left(\frac{p}{1-p}\right) = -3.57 + 0.841\ severity\ of\ deprssion$$

It shows that when we move from a lower class of depression to a higher class, the average risk of suicidal thoughts increased 2.3 times.

The equation between suicidal thoughts and severity of anxiety was:

$$\ln\left(\frac{p}{1-p}\right) = -2 + 0.51\ severity\ of\ anxiety$$

This shows that when we move from a lower level of anxiety to a higher level, the average risk of suicidal thoughts increased 1.67 times. The equation between suicidal thoughts and the severity of PMS symptoms is:

$$\ln\left(\frac{p}{1-p}\right) = -1.65 + 0.5\ severity\ of\ PMS$$

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Table 1. Demographic characteristics of female students in the sample of Ilam universities.

Variables		N	Percentage	Cumulative percentage
Age	<20	30	9.1%	9.1%
	20-25	190	57%	66%
	25-30	47	14%	80%
	>30	64	19%	100%
Weight(kg)	<50	32	9%	9%
	50-55	74	22%	32%
	55-60	49	14%	46%
	60-65	60	18%	64%
	65-70	55	16%	81%
	>70	61	18%	100%
Height(cm)	<160	82	24%	24%
	160-165	115	34%	59%
	165-170	89	26%	86%
	>170	45	13%	100%
The average numbers of sleep on day	<5	11	3%	3%
	5-7	86	25%	29%
	7-9	181	54%	83%
	>9	53	16%	100%
University	Ilam university of medical sciences	85	25%	
	Ilam university	86	25%	
	Payame Noor University of Ilam	51	15%	
	Azad university	76	22%	
	other	33	9%	
Degree	Graduate	244	73%	
	Master	34	10%	
	Phd	53	16%	
Married	No	236	71%	
	Yes	90	27%	
	Other	5	1%	

The start numbers in different ranges should not be the same of the end number of previous ranges.

Table 2. Reliability of Beck Suicide Scale Thoughts, depression, anxiety, Premenstrual Symptoms Screening Tool questionnaires.

Beck suicide scale thoughts		Depression		Anxiety		Premenstrual symptoms screening tool	
Cronbach's alpha	Number of questions	Cronbach's alpha	Number of questions	Cronbach's alpha	Number of questions	Cronbach's alpha	Number of questions
.965	19	0.911	14	0.816	14	0.914	19

It is shown that when we move from a lower class of PMS symptoms to a higher class, the average risk of suicidal thoughts increases 1.65 times. The independent variables were considered as categorical variable, univariate (Model 1) and multivariate logistics (Model 2) were implemented (Table 4). (nonsense, two verbs in one sentence). The results of univariate logistic regression showed that the risk of suicidal thoughts in people with extremely severe and severe depression was 33 and 13 times higher than those without depression, respectively. The risk of suicidal thoughts in people with extremely severe and

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severe anxiety was 9 and 4 times higher than in people without anxiety. Suicidal thoughts were three times more common in people with severe PMS symptoms than in those with mild symptoms. The results of multivariate logistic regression showed that depression was the most important variable for predicting suicidal thoughts.

Table 3. Relationship between depression, anxiety and premenstrual syndrome with suicidal thoughts among female students of Ilam universities.

Variable		Suicidal thoughts				χ^2	df	P value
		Yes		No				
		Number	%	Number	%			
Depression	Normal	6	4%	115	95%			
	Mild	8	13%	51	86%			
	Moderate	23	30%	53	69%	57	4	<0.001***
	Severe	17	40%	25	59%			
	Extremely severe	14	63%	8	36%			
Anxiety	Normal	15	10%	122	89%			
	Mild	7	20%	27	79%			
	Moderate	14	18%	61	81%	33	4	<0.001***
	Severe	18	34%	34	65%			
	Extremely severe	17	53%	15	46%			
Premenstrual syndrome	Mild	14	12.1%	102	87%			
	Moderate	19	23%	61	76%	10	2	0.006**
	Severe	38	28%	95	71%			

Note: ** P<0.01, *** P<0.001.

Table 4. Univariate and multivariate logistic regression results for depression, anxiety and premenstrual symptoms by subscales.

		B	OR	(95% CI for OR)		P value
				Lower	Upper	
Model 1	Normal depression	Ref.				
	Mild depression	1.101	3.007	0.992	9.111	0.052
	Moderate depression	2.118	8.318	3.199	21.627	<0.001***
	Severe depression	2.568	13.033	4.670	36.372	<0.001***
	Extremely severe depression	3.513	33.542	10.152	110.816	<0.001***
	Normal anxiety	Ref.				
	Mild anxiety	0.746	2.109	.784	5.671	0.139
	Moderate anxiety	0.624	1.867	.847	4.115	0.122
	Severe anxiety	1.460	4.306	1.967	9.427	<0.001***
	Extremely severe anxiety	2.221	9.218	3.834	22.163	<0.001***
	Mild PMS	Ref.				
	Moderate PMS	0.819	2.269	1.062	4.851	0.035*
	Severe PMS	1.070	2.914	1.486	5.715	0.002**
Model 2	Severity of depression	0.822	2.276	1.677	3.088	<0.001***
	Severity of anxiety	0.187	1.206	0.922	1.577	0.172
	Severity of PMS	0-.309	0.734	0.472	1.143	0.172

Note: * P<0.05, ** P<0.01, *** P<0.001, OR: odds ratio, CI: confidence interval.

Discussion

The results showed that the prevalence of suicidal thoughts among female students of Ilam universities was 21.4%. The risk of suicidal thoughts was higher in single students than married students. Three degrees were the same in terms of suicidal thoughts, in the age group of 20 to 25 years suicidal thoughts rates were higher, at Payame Noor

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universities and other nonprofit centers suicide rates were slightly higher, and similarly, in people who slept more than 7 hours a day, those less than 160 cm tall, weighing 55 to 60 kg, the percentage of suicidal thoughts was higher Rezaian in his study entitled " The Prevalence of Suicide Thoughts and Attempted Suicide Plus Their Risk Factors Among Iranian Students: A Systematic Review Study" stated that the prevalence of suicidal thoughts among students varies from 6.2 to 42.7% have been. In this research, 26 articles on suicidal thoughts in students were included in the systematic review process (4). The whole paragraph must be revised. Please separate the statements with relevant punctuations.

Jan Ghorbani (6) in a study entitled "Prevalence of suicidal thoughts and its related factors in students of Isfahan University of Medical Sciences in the academic year 94-93" stated that the prevalence of lifetime , one year and one moment suicidal thoughts were, 29 %, 15% and 6.2% respectively (6).The results showed that depression, anxiety, and PMS are the most important variables for predicting suicidal thoughts, respectively. In Pourhossein's study, the results of regression analysis showed that depression plays the largest role in predicting suicidal thoughts, followed by anxiety, mental health, resilience, and daily stress (18).

Overholser also stated that suicidal thoughts was associated with poor psychosocial functioning, future depressive disorders, drop out, high-risk sexual behaviors, aggressive behaviors, and substance abuse disorders (7). Subika in 2016 showed that the factor of general anxiety, depression, and bifactor-independent anxiety was associated with neuroticism, which was an adult personality disorder with a serious mental illness. General anxiety and depression were associated with recent suicide, but these factors have not been associated with previous suicidal behavior (8).

One of the limitations of our study was that some of students of Ilam University of Medical Sciences and the University of Ilam come from other provinces, while the majority of the students at Azad University and Payame Noor come from Ilam province and there may be a slight bias in the results, due to the genetic and environmental issues, which is negligible due to the small number of non-native students. Another limitation of our study was violation of randomization. Questioners were completed with online questioner that it has some advantages and disadvantages in comparison to classic questioners.

Conclusion

The results showed that the prevalence of suicidal thoughts among female students of Ilam universities was 21.4%. The risk of suicidal thoughts was higher in singles than married students. Suicide thought? rates were higher, at Payame Noor Universities and private universities. Suicidal thoughts were higher in those, who slept more than 7 hours a day, those less than 160 cm tall and weighing 55 to 60 kg. The results showed that suicidal thoughts in students were high and anxiety, depression, and PMS have a direct and significant relationship with suicidal thoughts in these students. Therefore, by providing mental health services and screening for mental disorders and premenstrual symptoms, an effective step can be taken to prevent suicide among students.

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