
Investigating Anxiety and Depression in Medical Students with Premenstrual Syndrome

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Abstract: *Background:* Premenstrual syndrome (PMS) is a common disorder in women that decreases their emotional, behavioral, and physical functioning. It also affects their family relationships and social and educational activities. Recognizing the factors associated with PMS can be helpful in planning to alleviate the complication. The aim of this study was to investigate the anxiety and depression in medical students with premenstrual syndrome. *Method:* In this cross-sectional study, 300 students at Ilam University of Medical Sciences took part during three menstrual cycles from August to December in 2016. The participants were selected through convenient sampling. For data gathering, PSST screening questionnaires, Beck Depression Inventory, and Spielberger Anxiety Scale were utilized. Data analyses were done using T-test, Chi-square, and ANOVA in SPSS 19 ($P < 0.05$). *Results:* Totally, 137 participants (44.7%) had premenstrual syndrome. This syndrome is more common in the age range 20-25 (61.9%) in unmarried girls (72.4%). Mean menstrual cycle length and bleeding duration were not significantly different between the two groups. The mean score of depression in students with and without PMS was 7.72 ± 5.93 and 5.86 ± 4.88 respectively. In addition, the mean score of anxiety in students with and without PMS was 44.47 ± 7.21 and 42.32 ± 5.74 respectively. Therefore, the two groups were significantly different in terms of depression ($p = 0.003$) and anxiety ($p = 0.004$). *Conclusion:* The symptoms of anxiety and depression are more common among young and unmarried students with premenstrual syndrome.

Keywords: Premenstrual Syndrome, Anxiety, Depression

1. Introduction

Menstruation is a physiological phenomenon with several biological psychological factors, which leads to different reactions in women. Late in the luteal phase, most women experience a degree of mental and physical incompatibilities, commonly known as premenstrual syndrome (PMS). This syndrome is a regular recurrence of various physical, emotional, behavioral and cognitive symptoms in the luteal phase, which usually decreases shortly after the onset of menstruation [1-3].

This disorder is one of the most common diseases in women of fertility age. Although, accurate information on the

prevalence of this disease in Iran is not available, studies in the United States have demonstrated that about 40 to 60 percent of women in 12 - 50 years age range in this country are affected by this disorder [4]. In addition, the frequency of PMS with moderate to severe symptoms varies in 14.1 - 82% range [5].

This disorder can interfere with people's daily activities. Approximately 5 to 8% of women suffer from severe premenstrual syndrome. The main cause of this disorder is still unknown; however, the changes in estrogen, progesterone and androgen levels can be the probable causes. Other factors such as lifestyle changes, hormonal changes, diet, obesity, hypothalamic dysfunction, and environmental factors have been studied in some studies [6, 7]. This

syndrome affects the quality of life in different ways. Not only has it affected individuals but also the family and society. In addition, through altering women's behavior, it leads to marital incompatibility and disruption in child rearing [8]. Psychological symptoms of this syndrome include a range of absenteeism, isolation, and decreased performance, lack of concentration, social exclusion, increased incidence, criminal behavior, alcohol use, and suicidal ideation. The rate of depressive symptoms in severe premenstrual symptoms- and asymptomatic women is 51% and 13.5% respectively [9].

The prevalence of depression in women with moderate premenstrual syndrome is 11.3% and in women with severe premenstrual syndrome this rate is 24.6% [10]. In another study, a significant relationship was reported between premenstrual syndrome symptoms and anxiety, depression, and changes in women's social relationships [11].

Women with premenstrual syndrome have higher levels of stress than healthy women. Studies have shown that this syndrome is more prevalent and severe in educated women, which is probably caused by stresses. It is also one of the factors that make women more prone to depression than men, especially during the premenstrual period, prenatal period, and during the menstrual period [12].

Regardless of the severity of symptoms, skin disorders, irritability, fatigue, mood swings, pain, decreased academic performance, low back pain, breast tenderness, and weight gain are the common symptoms [13]. Moreover, mental perception of health and self-reporting stress are factors associated with premenstrual syndrome distress.

Mental perception of health and stress are the factors associated with distress caused by premenstrual syndrome. Even if the symptoms of this syndrome are not intensified, moderate levels can affect interpersonal relationships, social interactions, job activities, and productivity throughout the fertility age. In young women in particular, premenstrual symptoms can lead to academic performance disorders, including poor grades and absenteeism [14, 15]. Due to the fact that limited studies have been conducted on the psychological symptoms of premenstrual syndrome and that studies in this area have barely focused on students, the present study is an attempt to investigate the anxiety and depression among medical students with premenstrual syndrome. The aim of this study was to investigate the anxiety and depression in medical students with premenstrual syndrome.

2. Methods and Material

2.1. Design & Samples

This cross-sectional study was conducted on female students at Ilam University of Medical Sciences during three menstrual cycles from August to December 2016. The study population consisted of 1400 female students. The sample size was determined using the following formula, considering the 45% pms ratio (14), 95% confidence interval, and 0.06%

error coefficient equal to 264. To increase study power and given attritions, 300 people finally entered the study.

$$n = \frac{z_{1-\alpha/2}^2 \times p(1-p)}{d^2}$$

Sampling was done using convenient sampling method. Inclusion criteria were desire to participate in the study, regular menstrual cycles during the last six months (21 to 35 days interval and bleeding duration of 3-7 days), and no known physical or mental illness. Exclusion criterion was a clear expression of unwillingness to participate in the study. After obtaining informed and written consent from the participants and assuring them about the confidentiality of their information, a demographics questionnaire (age, height, weight, marital status, employment status) was administered. Then, the participants completed study tools including Premenstrual Symptoms Screening Tool (PSST), Beck Depression Inventory, and Spielberger Anxiety Inventory.

2.2. Study Tools

2.2.1. Premenstrual Symptoms Screening Tool (PSST)

This instrument is a premenstrual symptoms screening tool designed by Macdougall and Brown to identify women who suffer from severe PMS. The first section of the scale is a checklist consisting of 14 items about the experience of the premenstrual symptoms. Section two checks if these symptoms interfere with five work efficiency or productivity domains, relationships with family, relationships with coworkers, social life activities and/or home responsibilities. The second section consists of five items. The items of two sections are rated based on a Likert's four-point scale (1=not at all, 4=severe). To confirm moderate to severe PMS: at least one of 1, 2, 3, and 4 should be moderate to severe. Moreover, at least four of 1 to 14 should be moderate to severe and one of A, B, C, D, E should be moderate to severe [15]. Siahbazi et al. examined the reliability of the tool by obtaining Cronbach's alpha index equal to 0.90 in the symptoms section, 0.90 in the impact of symptoms on life section, and 0.93 in the total score. Moreover, to evaluate the validity, content validity index and content validity ratio were used, the values of which were 0.7 and 0.8 respectively [16]. Cronbach's alpha was equal to 0.9 for the symptoms section and 0.8 for its impact on life.

2.2.2. Beck Depression Inventory

To assess the level of depression, Beck Depression Inventory was employed. It was originally developed by Aaron T. Beck in the 1960s to determine if the respondent is depressed or not and what is the severity in adolescents and adults. The tool has 21 questions, each of which with four options (0-3). The respondent needs to choose one of the alternatives that better represent their feelings over the past week. Fifteen items in the tool are focused on psychological symptoms and the rest of items are about physical symptoms. The depression score is calculated by adding the scores obtained from all expressions and the range is between 0 and 63. To interpret the result, a score between 0 and 9 is no a sign of depression, a score between 10 and 16 is a sign

of mild depression, a score between 17 and 29 is a sign of moderate depression, and scores above 30 indicate severe depression [17]. Hamidi *et al.* determined the reliability of this questionnaire using Cronbach's alpha and halving equal to 0.93 and 0.64 respectively. As to convergent validity, the correlation of this instrument with GHQ-28 instrument and its four structures was supported. The correlation between Beck questionnaire and the total score of GHQ-28 instrument was 0.80 [18]. In addition, Cronbach's alpha coefficient was equal to 0.92 and one-week retest coefficient was equal to 0.96.

2.2.3. Spielberger Anxiety Inventory

The Spielberger Anxiety Questionnaire was used to assess anxiety. The tool was first developed in 1970 with 21 questions (almost never, sometimes, often and almost always). It can be used individually or in groups and as a self-test. As to the anxiety scale, respondents are asked to express their feelings at the present moment, that is, at the exact time of the test, and to rate it on a scale of 1 to 4. As to the anxiety trait, respondents are asked to identify their general and common emotions and rate them on a scale of 1 to 4. Each test term is given a score of 1 to 4 based on the answer given by the subject. It should be noted that some items have inverse scoring [19]. Abdoli *et al.* measured the validity and reliability of this tool and reported that Cronbach's alpha for internal consistency was equal to 0.886 for trait anxiety and 0.846 for state anxiety in the Persian version of STAI-Y. The reliability was checked using test-retest method and it was obtained equal to 0.765 for trait anxiety and 0.62 for state anxiety. For the items 1 to 20 (state anxiety), the reliability coefficients was equal to 0.889 and 0.854 for items 21 to 40 (trait anxiety). The convergent validity between STAI-Y and BAI for trait anxiety and state anxiety was 0.612 and 0.643 respectively [20]. Here, the reliability based on Cronbach's alpha was 0.94 and based on

test-retest coefficient it was between 0.76 and 0.87.

After collecting the questionnaires, data analysis was performed using t-test, Chi-square, and ANOVA in SPSS 19 ($p < 0.05$).

2.3. Ethical Considerations

The present article is extracted from a M.Sc. dissertation in clinical psychology approved by the Research Center of Islamic Azad University, Ilam Branch (ethics code: 63920701952006).

3. Results

The results show that out of 300 participants in this study, 134 (44.7%) had PMS and 166 (55.3%) had no PMS symptoms. Most of the participants in the two groups were unmarried and in age range 20-25 years. No significant difference was found between the two groups as to the marital status and age ($p = 0.08$ and $p = 0.23$) (Table 1). The mean length of menstrual cycle in the groups without and with the symptoms was 28.92 ± 6.06 and 28.42 ± 3.40 days respectively. The mean duration of bleeding was 6.37 ± 1.36 days in the symptomatic group and 6.44 ± 1.56 days in the asymptomatic group. No significant difference was found between the two groups in the mean length of the menstrual cycle and mean duration of bleeding (Table 1). Out of 134 patients with premenstrual syndrome, 62 (46.26%) had mild symptoms, 45 (33.6%) had moderate symptoms, and 37 (27.6%) had severe symptoms. The mean score of depression in students with PMS symptoms was 7.72 ± 5.93 and in the group with symptoms PMS, it was 5.86 ± 4.88 . Therefore, the mean score of depression in two groups was significantly different ($p = 0.003$) (Table 2). The average score of anxiety in students with and without PMS symptoms (44.47 ± 7.21 & 42.32 ± 5.74) was statistically different ($p = 0.004$) (Table 3).

Table 1. Frequency distribution of respondents in both groups with and without PMS symptoms by age, marital status, mean menstrual cycle length, and duration of bleeding.

Variable		Without PMS	With PMS	P-value
Age (Year)	Less than 20	40 (24.1)	30 (22.4)	P=0.08
	20-25	101 (60.8)	83 (61.9)	
	More than 25	25 (15.1)	21 (15.7)	
marital status	Unmarried	118 (71.1)	97 (72.4)	P=0.23
	Married	48 (28.9)	37 (27.6)	
mean menstrual cycle length (Day)	28.92 ± 6.06		28.42 ± 3.40	$p = 0.47$
mean duration of bleeding (Day)	6.37 ± 1.36		6.44 ± 1.56	$P = 0.21$

Table 2. Comparison of depression in students with and without PMS symptoms in Ilam University of Medical Sciences.

Depression score	With PMS	Without PMS	P-value
Normal (0-9)	8 (61.2)	12 (77.71)	0.003
Mild (10-16)	3 (23.90)	2 (12.86)	
Moderate (17-29)	1 (12.68)	(5.42)	
Severe (30-63)	(2.23)	(0)	
Mean±SD	5.93 ± 7.72	$5.86 \pm 4.88z$	

Table 3. Comparison of the average score of anxiety in students with and without PMS symptoms in Ilam University of Medical Sciences.

Variable	Groups	Mean±SD	T	P-value
Anxiety	With PMS	44.47 ± 7.21	-2.869	0.004
	Without PMS	42.32 ± 5.74		

4. Discussion

The anxiety and depression in medical students with Premenstrual Syndrome were examined. The prevalence of premenstrual syndrome (PMS) among female students at Ilam University of Medical Sciences was consistent with the prevalence of premenstrual syndrome in medical students in Zahedan [21], nursing and midwifery students in Hamadan [9], and nursing students in Taiwan [1]. However, the prevalence was reported higher by other studies like a study by Pakistan University of Medical Sciences [22] and studies on nursing students in Iraq [23] and medical students in Ethiopia [24]. Differences in the prevalence of PMS in different studies can be due to ethnic, racial, cultural, lifestyle, and even dietary differences of the subjects [25] as well as sample size and sampling methods.

Although, premenstrual syndrome PMS was more common in unmarried students in the age group of 20-25 years, no statistically significant difference was found between the two groups with and without PMS Symptoms in terms of age and marital status. Consistent with the present study, other studies have reported the highest PMS prevalence in the age group of 20-24 years and unmarried individuals [9]. Other studies have shown a significant relationship between marital status and age with PMS symptoms [26, 27].

In addition, the mean length of menstrual cycle and mean duration of bleeding in the two groups with and without symptoms of PMS were not significantly different. In other studies, there was no significant relationship between the length of the menstrual cycle and the duration of bleeding [28] and the symptoms of premenstrual syndrome PMS. While some other studies have shown that people with bleeding lasting more than eight days and a cycle longer than 35 days are more likely to have premenstrual syndrome.

The participants in the present study were in the age group 18 - 30 years who had regular menstrual cycles. This can be considered the reason for the discrepancy between the results and the results of some studies. Because in these studies, people of reproductive age (15 to 45 years) constituted the study population and according to references, the highest rate of menstrual disorders, due to hormonal changes, belongs to both ends of this age range.

The mean of the anxiety score in students with PMS symptoms was higher than the group without PMS symptoms. However, in a study on Brazilian students, there was no statistically significant relationship between the prevalence and severity of premenstrual syndrome and anxiety levels [26]. This discrepancy may be due to differences in culture, race, sample size, and tools used in the studies. Other studies in line with the present study have shown a statistically significant relationship between PMS and anxiety [25, 27-29]. The level of anxiety associated with PMS also varies in different studies. Anxiety levels were reported moderate in students at Arak University of Medical Sciences [30] and severe in students at Kurdistan University of Medical Sciences [31].

The prevalence and mean score of depression in people with PMS were higher than those in asymptomatic people. Findings from other studies have also shown a statistically significant relationship between depression and PMS [5, 25, 26, 28, 29]. In the present study, mild depression was more common in students with PMS symptoms. In addition, mild form of depression was more common in students at Shahid Beheshti University of Medical Sciences [32]. A study in Egypt showed that severe and moderate depression levels were more common than mild depression [25].

Differences in anxiety and depression scores in different studies may be due to the semester and academic year of the students studied. The results obtained from previous studies indicated that the prevalence and severity of PMS is higher in first and second semester students of different majors and also in final semester students who are mostly taking clinical courses [9]. Additionally, the prevalence and severity of anxiety and depression are significantly higher in students with night shifts and interns in various medical sciences [32]. Of course, the differences and variety of tools used to measure anxiety and depression in different studies can be another reason for these differences in the results.

As to strengths, the study used standard tools to evaluate depression and anxiety. Moreover, while limited samples have been examined by the majority of studies, in this study, data were collected from all female students at the university. The limitation of the present study was the refusal of some students to answer the questions.

The limitation of this study was the lack of cooperation and interest of some participants in answering the questions. It is suggested that in future studies, the effect of psychotherapy on reducing anxiety and depression in students with PMS symptoms should be considered.

5. Conclusion

Depression and anxiety are common among young and unmarried students with symptoms of PMS. This part of society as the future mothers has a decisive role in formation of motivations and personality of the future generation. It is important to pay attention to their physical and mental health. Therefore, identifying and dealing with the symptoms and treatment of premenstrual syndrome must be covered by macro health policies.

Conflict of Interest

The authors declare that they have no competing interests.

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