The Association Between Neuroticism and Premenstrual Syndrome Symptoms.

Soodeh Nosratabadi
  Kerman University of Medical Sciences

Atefeh Ahmadi
  Kerman University of Medical Sciences

Masumeh Ghazanfarpour
  Kerman University of Medical Sciences

Abolfazl Hosseinnataj
  Mazandaran University of Medical Sciences

Fahimeh Khorasani (✉ Fahimeh_Khorasani@ymail.com)
  Kerman University of Medical Sciences

The Association between Neuroticism and Premenstrual Syndrome Symptoms

Soodeh Nosratabadi[1], Atefeh Ahmadi[2], Masumeh Ghazanfarpour[3], Abolfazl Hosseinnataj[4], Fahimeh Khorasani*[5]

1. Student Research Committee, Kerman University of Medical Sciences, Kerman, Iran.
2. Assistant Professor Kerman University of Medical Science, Nursing Research Center, Department of counselling in midwifery, Razi Faculty of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, Iran.
3. Nursing Research Center, Kerman University of Medical Sciences, Kerman, Iran.
4. Assistant Professor, Department of Biostatistics, Faculty of health, Mazandaran University of Medical Sciences, Sari, Iran.
5. *Correspondence: Ms Fahimeh Khorasani, Nursing Research Center, Kerman University of Medical Sciences, Kerman, Iran; Tel/fax: +989130400106; E-mail: f.khorasani@kmu.ac.ir

Abstract

Background and objectives: Premenstrual syndrome includes physical and mental symptoms occurring cyclically during the secretory phase. The present study aimed to specify the association between neuroticism and the severity of premenstrual syndrome symptoms.

Method: This cross-sectional study was conducted on 223 students of Kerman University of Medical Sciences in 2019 November 17. Chi-square and Fisher's exact tests were used to analyze the relationship between qualitative variables; stepwise logistic regression was employed to assess the factors affecting the syndrome symptoms, and Mann–Whitney U test was used to compare the scores of the Daily Record of Severity of Problems chart in two groups.

Findings: 223 female students completed the first stage information. The mean score of the questionnaire was 151.72±100.11. Moreover, 77.6% of the students had the syndrome. The severity of symptoms was mild, moderate, severe, and highly severe in 53.6, 42, 3.6, and 0.7%, respectively. There was a significant relationship between premenstrual syndrome and neuroticism scores. Students with PMS had higher scores in all of the subscales (neuroticism including anxiety, stress, despair,..) (P<0.001).

Conclusion: It seems that there is a relationship between neuroticism (anxiety, stress, despair) and the severity of PMS symptoms. Therefore, it is recommended

that therapists and counselors consider these factors to treat and mitigate the severity of PMS symptoms.

Introduction

Premenstrual syndrome (PMS) is the most common syndrome in all healthy women at their fertility ages and includes periodic and recurrent symptoms such as physical, emotional, and mental symptoms. These symptoms occur in the luteal phase and resolve with the start of bleeding (2-3 days after menstruation) and repeat for 2-3 menstrual periods. (1-2-3-4-5)

This syndrome is seen in all cultures and has varying effects on women's status, interpersonal relationships, relationship with children (such as conflict with children), and social interactions. This should be considered that the prevalence and severity of PMS are different in different cultures; moreover, there is no certain criterion for detecting this syndrome, and its cause is unknown. Most women experience PMS at least once in their lives, and it may include a wide range of clinical findings from mild, moderate to severe occurring in a relatively regular manner. (1,3,6,8-9-10)

The prevalence of this syndrome varies based on factors such as exercise, diet, culture, and underlying diseases. In general, it can be stated that approximately half of the women around the world suffer from this syndrome (2,11).

According to the research done in different countries, the prevalence of PMS has been reported with different rates. For instance, the prevalence of this syndrome in the USA among women at their fertility ages was 20-40%, and the prevalence of premenstrual dysphoric disorder (PMDD, recurrent physical and mental symptoms in the luteal phase which is a severe form of PMS. Although PMS and PMDD are categorized separately, they belong to the same clinical classification with a common basic feature) was reported to be 3-8%. Moreover, the prevalence of this syndrome has been reported to be 20-50% in most western studies. Although no comprehensive study has been conducted on this syndrome in Iran, sporadic studies have reported a prevalence of 50-80% among students of Shiraz University of Medical Sciences (5,11,13-14). All age groups can be affected by PMS, yet the most common ages are reported to be 25 to 45 (2).

From social and cultural viewpoints and according to so researchers, PMS represents the negative attitudes and beliefs regarding the unpleasant experience of

bleeding in menstruation. In fact, premenstrual experiences are quite varying and women do not experience similar changes; moreover, an individual's experience might vary in different months (6).

So far, 200 symptoms have been identified for PMS, and as mentioned before, they include physical, emotional, and mental symptoms. Most studies state that the highest prevalence (91.7%) is attributed to physical symptoms and these symptoms are dominant (2, 13).

Physical symptoms include headache, back pain, breast tenderness and pain, abdominal discomfort (abdominal bloating, abdominal pain,…), nausea, weight gain, and changes in defecation habits. Mental and emotional symptoms include social withdrawal, suicide, irritability, appetite changes, tension, extreme fatigue, anger, excitement, aggression, changes in sleeping pattern, … (4,1-10,3).

Depression: One of the major problems and symptoms of people with PMS is depression. Depression is a common mental disorder affecting work performance, interpersonal relationships, and so on. The prevalence of depression in women is twice that in men. These patients are at risk of psychiatric disorders, and therefore, determining efficient preventive treatment for them is essential (15, 6-16).

Neuroticism: Neuroticism is a stable personality trait associated with anxiety, stress, frustration, emotional instability and insecurity, a tendency to evasion, … (11). The aforementioned symptoms of neuroticism will be briefly explained (based on previous research):

-Anxiety: Anxiety is a feeling of uneasiness and fear. This feeling mostly occurs when people cannot predict or control the outcome. The results of this study indicate that women with higher AS levels experience more PMS symptoms compared with those with lower AS levels (17-18).

-Stress: According to the DSM-5, stress is a specific or non-specific response of the body to any kind of pressure imposed on it and it involves a part of each individual's life. Research shows that external stress is an effective factor in causing PMS. In fact, stress leads to an increase in cortisol levels, and since cortisol and progesterone fight over common cell receptors, cortisol causes disorders in progesterone activity and leads to an increase in estrogen activity which in turn chronically leads to the initiation or aggravation of PMS symptoms (4,13,19-20-21).

Frustration: Frustration is an emotional state that is a subcategory of the basic emotion of sadness. Frustration leads to depression, despair, loss of motivation, and suicidal thoughts (22).

As mentioned previously, PMS is unknown, yet numerous hypotheses have been proposed about it, such as an increase in estrogen, a decrease in progesterone, over-secretion of prolactin, idiopathic hypoglycemia, vitamin A, B1, and B6 deficiency, an increase in aldosterone, prostaglandins disorders, diet, obesity, and lifestyle (1, 9).

Consequently, the present study was conducted aiming to determine the association between neuroticism and PMS symptoms among the students of Kerman University of Medical Sciences in 2019 November 17.

Method

This cross-sectional study aimed to assess the correlation between three variables related to neuroticism and PMS. The study population consisted of all female students of different levels living in dormitories of Kerman University of Medical Sciences in the second semester of 2020 September 22-2021 July 20. The correlation coefficient between PMS and neuroticism was r=0.18. With a confidence level of 99% and test power of 91%, the sample size was estimated to be 239 using the software. After the approval of the ethics committee and permission from the Razi School of Nursing and Obstetrics, the students were randomly selected from the dormitory rooms. Inclusion criteria: Female students of Kerman University of Medical Sciences, Razi School of Nursing and Obstetrics in the defined period (3 months, from April 9 to July 11). Independent variables included age (years), education (associate/bachelor/master/doctorate), first menstruation age (years), length of each menstruation period (less than 3 days, between 3 and 8 days, more than 8 days), the interval between two menstrual periods (less than 24 days, between 24-35 days, more than 35 days), regular menstruation (yes/no), physical illness (yes/no), mental illness (yes/no), smoking (yes/no), medication use, incident (no/ marriage/ death of a relative), exercise (never/ sometimes/ regularly). The response variable was the condition of PMS (having/not having). The Daily Record of Severity of Problems chart, in which 11 symptoms were analyzed, was used to record the daily information about PMS symptoms. Choices included no symptom, minor changes, mild changes, moderate changes, severe changes, and highly severe changes; these answers were coded from o to 5 and the severity was measured. The score of each symptom was

calculated from a week before the period to 4 days after it and then divided by 11. The mean score was calculated in percentage and the severity of each symptom was obtained. For values less than 30%, the severity was considered mild. Moderate severity was attributed to 30%, or values greater than 30% and less than 50%. For values between 50 and 60%, the severity was considered severe and highly severe if it was more than 60%.

The Daily Record of Severity of Problems chart is a universal standard and considered a valid guideline for determining the severity of PMS and its validity has been confirmed in previous studies in Iran. The reliability of the Daily Record of Severity of Problems chart was confirmed by Mohebbi Dehnavi et al (2016); moreover, its validity is evaluated using Cronbach's alpha (internal consistency) with a reliability coefficient of 0.77.

The data were reported using descriptive and analytical statistics measures. In terms of descriptive statistics, frequency, percentage, mean, and standard deviation were reported. In terms of analytical statistics, Chi-square and Fisher's exact tests were used to analyze the relationship between qualitative variables, stepwise logistic regression was employed to assess the factors affecting the syndrome symptoms (having/not having), and Mann–Whitney U test was used to compare the scores of the Daily Record of Severity of Problems chart in two groups. The normality of the response variable was measured using the Kolmogorov–Smirnov test. SPSS 20 was used to analyze the data.

Findings

223 female students completed the first stage. The mean age of participants was 21.56 ± 1.94. Most students (78.9%). The descriptive information of the variables was reported. Approximately 89.3% of the students had 3-to-8-day menstrual periods, and 80.7% had a 24-35-day interval between their two menstrual periods. 64.1% had irregular menstruation, 2.7% had physical illnesses, 1.8% had mental illnesses, 4% smoked cigarettes, and 9.9% were using medication. Moreover, 2.7% had used contraceptive pills and 36.3% different types of vitamins. Additional information is presented in table 1.

The mean age at menarche was 13.33±1.51. Almost 95.4% had experienced menstruation before 15. In this study, 10 and 23 were the earliest and latest ages of the first menstruation. Approximately 77.6% reported having PMS symptoms a week before menstruation.

Table 1- demographic and behavioral information based on the PMS condition and the relationship between them

Variable		Number (Percentage)	PMS Yes	No	P-value
Education	associate	19 (8.5)	17	2	0.452
	bachelor	176 (78.9)	134	42	
	master	18 (8.1)	13	5	
	doctorate	10 (4.5)	9	1	
The length of each menstruation period	less than 3 days	17 (7.6)	4	13	0.001
	between 3 and 8 days	199 (89.3)	163	36	
	more than 8 days	7 (3.1)	6	1	
the interval between two menstrual periods	less than 24 days	26 (11.7)	19	7	0.035
	between 24 and 35 days	180 (80.7)	145	35	
	more than 35 days	17 (7.6)	9	8	
regular menstruation	no	80 (35.9)	57	23	0.090
	yes	143 (64.1)	116	27	
physical illness	no	217 (97.3)	167	50	0.342
	yes	6 (2.7)	6	0	
mental illness	no	219 (98.2)	169	50	0.577
	yes	4 (1.8)	4	0	
smoking	no	214 (96)	170	44	0.005
	yes	9 (4)	3	6	
medication use	no	201 (90.1)	156	45	0.971
	yes	22 (9.9)	17	5	
incident	no	184 (82.5)	145	39	0.547
	marriage	20 (9)	15	5	
	death of a relative	19 (8.5)	13	6	
exercise	never	60 (26.9)	41	19	0.100
	sometimes	139 (62.3)	114	25	

	regularly	24 (10.8)	18	6	

Table 1 presents the variables based on the presence of PMS symptoms and the number of students. The relationship between each variable and PMS was assessed using the chi-square and in the case of insufficient sample size using Fisher's exact test. According to the table, there was a significant relationship between the length of each menstruation period, the interval between two menstrual periods, and smoking and PMS symptoms.

Logistic regression was used for simultaneous analysis of the effect of all variables on PMS symptoms. Table 2 presents the variables affecting PMS symptoms based on logistic regression. According to this test, the length of each menstruation period was the only variable with a significant relationship with PMS. Students with 3-8 and more than 8 days length of menstruation period had respectively a 12 and 15-fold risk of suffering from PMS compared with those with length of menstruation period of less than 3 days.

Table 2- Variables affecting PMS symptoms based on logistic regression

Variable		Regression coefficient (beta)	Standard deviation (SD)	Odds ratio (OR)	P-value
The length of each menstruation period	less than 3 days	Reference	-	-	-
	between 3 and 8 days	2.49	0.61	12.06	0.001
	more than 8 days	2.73	1.23	15.33	0.026

138 students completed the Daily Record of Severity of Problems chart. The mean score of the questionnaire was 151.72 ±100.11. Table 3 presents the scores and standard deviation for each symptom and question in the Daily Record of Severity of Problems chart. The fifth (anger or irritability…), tenth (lethargy, fatigue…), and second (anxiety, nervous pressure…) questions had the highest means,

respectively. Table 3 also presents the mean score of participants with and without PMS. In students with the syndrome, the tenth (lethargy, fatigue…), fifth (anger or irritability…), and second (anxiety, nervous pressure…) questions had the highest means, respectively. However, in students without the syndrome, the fifth (anger or irritability…), tenth (lethargy, fatigue…), and first (frustration and hopelessness…) questions had the highest means, respectively. As seen, the mean of the total score and all of the symptoms were higher in students with the syndrome compared to those without it. Statistically, these scores were compared using the Mann–Whitney U test, and the results indicated that the difference was significant in all symptoms and total scores.

Table 3- The mean and standard deviation of the total score and questions of the Daily Record of Severity of Problems chart based on the status of the syndrome

Symptom	SD+Mean	With the syndrome SD+Mean	Without the syndrome SD+Mean	P-value
Total	151.72±100.11	192.39±85.02	55.51±58.98	0.001
Frustration and disappointment	15.12±10.31	18.80±9.11	6.39±7.34	0.001
anxiety, nervous pressure	17.24±11.86	21.92±10.42	6.20±6.56	0.001
difficulty in concentrating	9.86±9.51	12.88±9.27	2.71±5.42	0.001
problems in daily interactions	12.83±10.22	16.43±9.52	4.32±5.87	0.001
anger or irritability	19.41±11.96	23.31±10.88	10.20±9.04	0.001
breast tenderness	13.92±12.27	18.72±11.05	2.56±5.85	0.001
sleep disorder	10.62±10.03	13.69±9.88	3.34±5.76	0.001
increased appetite	10.21±9.95	13.09±9.95	3.39±5.77	0.001

sensitivity to rejection	10.82±10.55	13.96±10.35	3.39±6.64	0.001
lethargy, fatigue	19.13±12.08	23.78±10.34	8.12±8.17	0.001
less participation	12.57±9.20	15.81±8.19	4.90±6.57	0.001

Table 4 presents the analysis of the effect of the total score and the score of each question on PMS symptoms using logistic regression. In this case, PMS and scores were analyzed as the response and independent variables, respectively.

Table 4- The effect of the total score and the score of each question in the Daily Record of Severity of Problems chart on PMS symptoms based on logistic regression

Variable	Regression Coefficient (beta)	Standard deviation (SD)	Odds ratio (OR)	P-value
Total	0.022	0.004	1.02	0.001
Frustration and disappointment	0.171	0.03	1.19	0.001
anxiety, nervous pressure	0.185	0.033	1.20	0.001
difficulty in concentrating	0.211	0.045	1.23	0.001
problems in daily interactions	0.224	0.044	1.25	0.001
anger or irritability	0.122	0.023	1.13	0.001
breast tenderness	0.201	0.039	1.22	0.001
sleep disorder	0.172	0.037	1.19	0.001
increased appetite	0.159	0.036	1.17	0.001

sensitivity to rejection	0.163	0.035	1.18	0.001
lethargy, fatigue	0.160	0.027	1.17	0.001
less participation	0.193	0.036	1.21	0.001

As seen in the table above, there was a significant relationship between the total score of the Daily Record of Severity of Problems chart and PMS symptoms. One score increase in the total score led to a 2% increase in the incidence of PMS. Moreover, the relationship between each question and PMS was analyzed, and all questions had significant relationships with PMS. For one score increase in the first (frustration…), second (anxiety, nervous pressure…), third (difficulty in concentrating…), fourth (problems in daily interactions…), fifth (anger or irritability…), sixth (breast tenderness…), seventh (sleep disorder…), eighth (increased appetite…), ninth (sensitivity to rejection…), tenth (lethargy, fatigue…), and eleventh (less participation…) questions, there was a 19, 20, 23, 25, 13, 22, 19, 17, 18, 17, and 21% increase in the incidence of PMS.

Discussion

The results of the present study aimed to determine the relationship between neuroticism and the severity of Premenstrual Syndrome symptoms in university students indicated that the mean total score and score of all the symptoms were greater in students with the syndrome compared with those without it. In the present study, 77.6% of the students had the syndrome. In the participants, the severity of the symptoms was mild, moderate, severe, and highly severe in 53.6%, 42%, 3.6%, and 0.7% of the students respectively. In the study conducted by Nisar et al. in 2008, the prevalence of different severities of PMS was mild, moderate, and severe in 59.5%, 29.2%, and 11.2% of patients respectively. In the study conducted by Silva et al. (2008) in Turkey on women whose menarche occurred at the age of 11, the prevalence of mild, moderate, and severe syndrome was reported 80.8%, 12.4%, and 5.8% respectively. Statistics obtained from numerous sources and studies in different countries indicate obvious differences in the prevalence of different severities of PMS symptoms, which is in part due to cultural differences and negative attitudes toward menstruation and the resulting limitations on women's response to menstruation and related issues among different societies.

The present study was conducted on medical students, who have a less negative attitude toward menstruation due to their high levels of medical knowledge and consider menstruation as a physiological and natural phenomenon. Therefore, they accurately describe symptoms associated with menstruation, which can be the reason for the significant statistical differences between the present study and other studies on the prevalence of different severities of symptoms in people with the syndrome. With proper control of neuroticism (stress, anxiety, and frustration, etc.) in university students, the incidence and severity of PMS symptoms will decrease. Through decreasing brain beta-endorphins and increasing adrenal cortisol, stress causes mood symptoms in individuals, especially those with PMS. In the study conducted by Kathleen et al. (2006), there was a significant relationship between the stress score (one of the neuroticism symptoms) and the severity of PMS symptoms in such a way that higher levels of stress were associated with more severe symptoms in patients, which was in line with the results of the present study. Moreover, Shu Haicheng et al. (2013) considered stress as a factor in developing the syndrome and increasing the severity of its symptoms and reported a significant relationship between these two variables. However, in the study conducted by Lee et al. (2005) on undergraduate students in Hong Kong China, no statistically significant relationship was observed between stress and PMS. According to research, anxiety sensitivity (AS) may be an important mental factor in experiencing physical and mental symptoms during the menstrual period. The results of these studies prove that women with higher levels of AS experience more symptoms of menstruation compared with women with lower AS levels; Moreover, in the present study, a statistically significant relationship was observed between these two variables. In the study conducted by Lustic et al., the most prevalent symptoms of PMS were irritability, anxiety, anger, and depression; similarly, in the present study anger and depression were also prevalent symptoms. Furthermore, this study indicated that appetite changes were observed in 17% of those with PMS, which was statically significant.

Compared with the studies conducted by Gman on PMS in 1995, it was proved that food high in carbohydrates (such as soft drinks) that increase tryptophan significantly reduce depression, anger, and restlessness in 90 to 180 minutes after ingestion. In the present study, these changes in appetite also reduced the symptoms. One of the causes of the relationship between the severity of PMS symptoms and neuroticism in the present study might be the fact that the study was conducted on medical students that are fully familiar with the medical discourse;

therefore, they accurately reviewed their symptoms during these stages without overlooking any particular behavior. Moreover, the results of the present study are partly affected by the presence of specific issues in the students' lives that are full of various anxieties and stresses such as economic problems, specific conditions of students' residence, distance from family, incompatibility, and personal conflict with people living in their dormitories. Psychologists point out a number of personal factors in individuals regarding the power of managing and controlling neuroticism the most important of which are taking control of life, being active and working, being hopeful, and having the support of family members, relatives, and friends. In this regard, in the study conducted by Lee et al. (2002), the effectiveness of pathological factors in the incidence of PMS symptoms was considered as one of the reasons for the lack of relationship between stress (one of the neuroticism symptoms) and the syndrome. Furthermore, in the present study, there was no relationship between education levels and PMS, which was in line with the results of the study by Kiani et al. (2009).

The present study had some limitations and considering them can lead to a better understanding of PMS and neuroticism in university students. For instance, self-report was the basis for assessing neuroticism in samples; as a result, the responses may have been influenced by cultural and social factors in some cases. Although an attempt was made to control this limitation to some extent by further explaining the objectives of the study and establishing more communication, it was not possible to fully control this limitation.

Conclusion

People with lower levels of neuroticism have less severe PMS symptoms. Therefore, it is recommended to consider neuroticism (stress, anxiety, frustration, etc.) and its impact on different severities of the symptoms in people with PMS during counseling and treatment.

Acknowledgments

Declarations:

Ethics approval and consent to participate:

This project with Reg. No. 98000444 was approved by ethical committee of Kerman University of Medical Sciences. The Ethic approval Code is IR.KMU.REC.1398.498. People participating in this project have consciously filled out the consent form. All experimental protocols were approved by ethical committee and deputy of research of Kerman University of Medical Sciences. Informed consent was obtained from all participants. All methods were carried out in accordance with relevant guidelines and regulations.

Consent to publish:

Participants provided the consent to publish.

Availability of data and materials:

Data will be sent to people per their request by contact the corresponding author (Fahimeh Khorasani).

Competing interests:

There is no conflict of interest for any of the authors.

Authers contributions:

All authors have read and approved the final manuscript.

References:

1. Mousavi Parvaneh, Zaheri Hamideh, Tajar Shahnaz Afshari Pourandokht, "Study of the effect of Vitagnos on physical and mental symptoms of PMS: Randomized clinical trial" Journal of Nursing and Midwifery and Spring 2015, Volume 4, Number 1, 76-68

2. Armand Akram, Talaei Ali The Effectiveness of Cognitive-Behavioral Stress Management Training on Reducing Psychological Problems and Symptoms of Premenstrual Syndrome

3. Farrokh Islamloo Hamidreza, Nabi Lobhram, Oshnavi Sima, Akbari Elham, "Prevalence of premenstrual syndrome and its factors in female medical students of Urmia University of Medical Sciences" Urmia Medical Journal, December 2013, Volume 24, Issue No. 702-710

4. Eshaghi Marzieh, Fallah Ramadan, Emamgholi Khoshechin Taraneh, Heshi Jafar, "The effect of group counseling on stress management on the symptoms of PMS" Journal of Nursing and Midwifery, Tehran University of Medical Sciences (Hayat), Winter 2017, Volume 23, Number Fourth, 358-371

5. Akhbari M, Heydari N, Abootalebi M, Ghodrati F. Correlation between mental health and premenstrual syndrome in students of Shiraz university of medical sciences. Original article, 2017; 5(4): 176-179.

6. Dadi Givshad R, Nourani Saadoldin SH, Esmaily H. The relationship of perceived severity of premenstrual syndrome with knowledge, attitude and recorded severity of syndrome by a daily calendar among university students in Iran. Journal of midwifery & reproductive health, 2016; 4(1): 522-529.

7. Sadeghi Roya, Ali Zareipour Morad, Akbari Hossein Khan Beigi Mohammad, "Mental health status and related factors in women referring to health centers" Journal of Health and Care 13th and Winter 2011, No. 4

8. cheng SH, Shih CH, Yang Ye, Chen K, Chang Y, Yang Yi. Factor associated with premenstrual syndrome asurvey of new female university students. Kaohsiung journal of medical science, 2013; 29, 100-105.

9. Shariati KH, Ghazavi H, Saedi M, Ghahremani S, Shariati A, Aryan H, et al. Psychotherapy for depression and anxiety in premenstrual syndrome (PMS): A systematic review and Meta-Analysis. Int J Pediatr 2019;7 (3):9169-79.

10. Kumari S, Sachdeva A. Patterns and predictors of premenstrual syndromes among females working in a Psychiatry Hospital. Research Article, 2016, 7page.

11. Del mar Fernandez M, Regueira-mendez C, Takkouche B. Psychological factors and premenstrual syndrome: A Spanish case-control study. Research Article, 2019; 14(3).

12. Hashemi Yasman Talepasand Siavash, Alavi Kaveh, "Psychometric properties of screening tools for premenstrual thirst in female students of Semnan University" Journal of the School of Nursing and Midwifery, Tehran University of Medical Sciences (Hayat), 2014, Volume 20 Number 2: 82-96

13. Mirzaei Farzaneh, Teshat Doost Hamid Taher, Mehrdad Police Station, Nematollahzadeh Mahani Kazem, Jabal Ameli Sheidar Mehrollahi Tahereh, The Impact of Cognitive-Behavioral Stress Management on Anxiety and Physical Symptoms in Women with Premenstrual Thirst ", Knowledge and Research in Applied Psychology, Year 12 and Winter 2011, Number 4 and (46)

14. Firoozi R, Kafi M, Salehi I, Shimohammadi M. The relationship between severity of Premenstrual syndrome and Psychiatric syndrome. Original Article , Iran J Psychiatry 2012; 7: 36-40.

15. Muharam R, Wiwie setiawan M, Ikhsan M, Eudite rizkinya H, Sumapraja K. Depression and its link to other symptom in menopausal transition. Original Article, 2017; 10-1016.

16. Nelson C, Bickford D, Delucchi K, Jess G, Fiedorowicz M, William H, et al. Risk of Psychosis in recurrent of Psychotic nonpsychotic major Depressive Disorder: A systematic review and Meta – Analysis. AJP in Advance, 2018 ; 10-1176

17. Rezaei Abbas Ali and "Test Anxiety and Coping Strategies", SLD Article, 2005

18. Nillin Y, Rohan K, Mahon J, Pineles S, Zvolensky M. The role of anxiety sensitivity in the experience of menstrual related symptoms reported via daily dairy. Psychiatry Res, 2013 Dec 15; 210 (2) : 564 – 569

19. Rezakhani Simin Dokht and Pasha Sharifi Hassan and the hero Ali Shafiabadi Abdullah, Stress sources of students of thought and behavior in the fall of 2008, third grade and number.

20.of Forouzandeh Nasrin and Aslani Yousef and Mehr Alian Hossein Ali and Driss Fatemeh, "The relationship between academic stress and quality Life of Students Journal of Shahrekord University of Medical Sciences, August and September 2016, Volume 18, Number 3, 1-7 .

21. Allsworth J, Clarke J, Peipert J, Hebert M, Coopre CRNP A, Bordman L. The influence of stress on the menstrual cycle among newly incarcerated woman. Women Health Issues, 2007; 17(4): 202–209

22. Nejati Vahid, Ismailian Tasvin, Amati Omido "Psychometric Properties and Factor Structure of Child and Adolescent Despair Scale" Thought and Behavior , Year 1393, Ninth Volume and No. 34.