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Comparison of the Diagnostic Values of Premenstrual Syndrome Screening Tool (PSST) and Daily Record of Severity of Problems (DRSP)

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ABSTRACT

BACKGROUND AND OBJECTIVE: Premenstrual syndrome (PMS) is the most common complication among women at the reproductive age, which may adversely interfere with daily activities. Due to the high prevalence of PMS in Iran, identification of rapid and effective diagnostic tools is paramount for the correct recognition of this syndrome. This study aimed to compare the predictive values of the Premenstrual Symptoms Screening Tool (PSST**)** and Daily Record of Severity of Problems (DRSP) in the diagnosis of PMS**.**

METHODS: This cross-sectional study was conducted on 230 female students above 18 years, who were selected using convenience sampling. PSST and DRSP questionnaires were completed on a daily basis during two menstrual cycles of the subjects**.**

FINDINGS : In this study, rate of the correct classification of PMS symptom severity (mild to severe) by PSST was estimated at 83.9%. Sensitivity and specificity of PSST were 66.3% and 85.6%, respectively. In addition, positive and negative predictive values of PSST were reported to be 96.2% and 33%, respectively. Also, there was a moderate, significant correlation between PSST and DRSP ($r=0.38$, $p<0.001$)**.**

CONCLUSION: According to the results of this study, PSST could be a proper screening tool to identify normal women in clinical situations and diagnose mild PMS accurately. However, it is not an appropriate measure to predict the severity of PMS. In this regard, use of prospective tools could result in a definitive diagnosis of PMS

KEY WORDS: Premenstrual Syndrome, Screening Tools, Diagnostic Value.

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Introduction

Premenstrual syndrome (PMS) is the most common complication among women at the reproductive age. PMS has a wide range of symptoms, including physical, mental and behavioral disorders, which are mainly associated with the menstrual cycle of women. These symptoms may appear after ovulation and diminish within a few days after the onset of menstruation (1). Among the most frequent

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physical symptoms of PMS are bloating, fatigue, mastalgia and headaches. The most common psychological and behavioral symptoms include mood instability, irritability, depression, overeating, forgetfulness and concentration difficulty (2). Approximately 80% of women experience mild PMS (3), while moderate and severe forms of PMS are detected in 25-50% (4). In Iran, the rate of PMS has been estimated at 52.9% among women within the age range of 18-45 years (5). According to one meta-analysis, Iran has been reported to have the highest prevalence of PMS compared to other countries (6). Early diagnosis and treatment of PMS is of paramount importance since this condition could influence different aspects of daily life, as well as the quality of life, in women (9). For instance, PMS could degrade the social involvement, promote suicidal tendencies and reduce the quality of life (7, 8). According to the literature, various diagnostic tools have been designated for PMS; such example is the Daily Record of Severity of Problems (DRSP), which was first introduced by Endicott et al. in 1996 (10). This prospective questionnaire should be completed by patients on a daily basis for at least two months. During this time, the patients receive no treatments for their PMS symptoms (11).

According to the guidelines of Diagnostic and Statistical Manual of Mental Disorders (DSM), DRSP offers the most efficient diagnostic criteria for PMS (12). Nevertheless, many patients may leave the treatment due to the time-consuming procedures in this method (13). Another diagnostic measure used for PMS is the Premenstrual Symptoms Screening Tool (PSST). This method has been proposed as a simple screening tool for PMS. The diagnostic classification of DSM-IV includes a grading scale for the assessment of the severity and impact of different symptoms on the daily life of patients (13, 14). The PSST criteria has been widely used in countries such as the U.S., Germany and Japan (13, 15, 17). This tool is commonly used in Iran for the diagnosis of PMS (18, 19). Due to the high prevalence of PMS in Iran, application of rapid and effective tools for the accurate diagnosis of this condition is essential (6). Using such methods could also reduce the severity and impact of PMS on the daily function and social activities of women and increase their quality of life (20). To date, no studies have been conducted and approved by DSM on the evaluation of the sensitivity and specificity of PSST and comparison of the diagnostic value of this test with other PMS screening tools. This study aimed to compare the diagnostic value of PSST and DRSP in PMS patients.

Methods

This cross-sectional study was conducted on 230 female students (age: ≥18 years), who were residents in the campus of Tabriz University of Medical Sciences, Iran. The subjects were selected by availability sampling. In this study, the results obtained by Tadayyoni et al., who applied PSST in the diagnosis of PMS, were used to determine the sample size; according to their findings, the prevalence of PMS was reported to be 66.1% (18). In our study, the minimum required sample size was estimated at 270 with the confidence interval of 95%, and considering a dropout rate of 10%, the total sample size was calculated at 230 eventually.

Inclusion and Exclusion Criteria: The inclusion criteria of this study were as follows: 1) age ≥18 years; 2) regular menstrual cycles (21-35 day) and 3) available contact information for the follow-up period. The exclusion criteria were as follows: 1) disease history (e.g., epilepsy, digestive, cardiovascular, renal and endocrine disorders) as reported by the patient; 2) use of medications (e.g., antidepressants, anticonvulsants or herbal medicines), hormones and vitamins within the past three months; 3) consumption of alcohol; 4) smoking habits; 5) occurrence of traumatic events within the past six months (e.g., parental separation, death of family members).

Study Design: The objectives of the study were presented to the subjects, and they were granted terms of confidentiality. In addition, informed consent was obtained from all the subjects who met the inclusion criteria. In total, 245 women, who were eligible and willing to participate in the study, received the

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questionnaires. According to the guidelines of DSM, PSST was completed retrospectively and based on the individual reminder of the subjects on the premenstrual symptoms during their previous cycle. After the necessary explanations, the subjects were provided with DRSP questionnaires and completed them during their menstrual cycle. At the end of the second cycle, 15 subjects were excluded from the study due to failure or incompetence in completing the questionnaires.

Research Tools: The main research tools used in this study were demographic questionnaires, DRSP and PSST. Demographic characteristics of the subjects included age, marital status, educational status and duration of menstrual period.

Daily Record of Severity of Problems (DRSP): This questionnaire was first introduced by Endicott et al. in 1996. According to the criteria of DSM-V, premenstrual symptoms are classified into five main categories in DRSP:

1)Anxiety (nervous tension, emotional fluctuations, concentration difficulty, irritability and unreasonable fear)

2)Depression (depression, despair, forgetfulness, crying, confusion, mood swings, sleep disorders, isolation and loss of interest in daily activities)

3)Emotional symptoms (headaches, sweating, hot flashes, overeating, palpitations, fatigue, lethargy, energy loss and inability to perform daily tasks)

4)Retention symptoms (weight gain, swelling of the extremities, sensitivity, mastalgia, backache, abdominal pain, muscle and joint pain, muscle cramps and bloating)

5)Physical symptoms (acne, nose inflammation, frequent urinations and constipation) (10, 12, 21)

The DRSP is scored on a four-point scale; lack of symptoms is scored zero, and the presence of notable symptoms (without causing significant problems) is scored one. The symptoms that affect daily activities (without leading to absenteeism in the workplace) and syndromes disrupting daily activities are scored two and three, respectively. In this study, PMS was diagnosed in women presented with at least five symptoms within seven days before the onset of menstruation, and during the first four days of the menstrual cycle (no symptoms on the other days of the two menstrual cycles) (20). The mean of symptom severity was calculated by summing up the rate of symptom severity during seven days before the menstruation, as well as the first four days of the menstrual cycles, and dividing the obtained figure by the number of the days when the symptoms appeared (20). In DRSP, scores between 0-33 indicate mild symptoms, while scores between 33-66 and above 66 represent moderate and severe symptoms, respectively (22). Ingeneral, DRSP is considered as a standard diagnostic tool for PMS, and the validity of this test has been measured by a number of previous studies (11).

Premenstrual Symptoms Screening Tool (PSST): PSST is another questionnaire used for the diagnosis of PMS and was first introduced by Steinner et al. in 2003. This test consists of two main parts and 19 items; the first part evaluates the physical and psychological symptoms, and the second part (last five questions) assess the impact of symptoms on the daily life of patients. The items in PSST are scored with the 4-point Likert scale (Not at all, Mild, Moderate, Severe). To confirm the diagnosis of moderate or severe PMS, all the following three conditions need to be present in the PSST together: 1) At least one moderate or severe option among the items 1-4 (first part); 2) At least four moderate or severe options among the items 1-14 (first part); 3) At least one moderate or severe option among the items of the second part (12, 16). According to the study conducted by Yen et al., Cronbach's alpha of the first and second parts of PSST was 0.96 and 0.61, respectively (23). The translation and psychometric properties of the Persian version of PSST have been evaluated by Hariri et al. in a study performed on the students of Tehran university, Iran. According to their report, the content validity of the first and second parts of this test was 0.93 and 0.8%, respectively (14).

Data Analysis: In this study, data analysis was performed using SPSS V.17. Additionally, the classification and regression tree (CART) algorithm

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was used to compare the predictive values of PSST and DRSP in the diagnosis of PMS. This statistical method mainly focuses on the two aspects of classification and regression.

In the regression level, the criteria are defined based on the relationship between the independent and dependent variables. This measure is used when the predicted outcome is a number (e.g., length of hospital stay). On the other hand, classification is used when the predicted outcome is the class to which the data belong, and the subjects could be categorized into groups. The criteria for the inclusion of an individual in a category was associated with their obtained score based on the independent variables. In this study, we applied the CART method since there were more than two categories of dependent variables. Spearman's test was used in order to determine the correlation between the classifications of PSST and DRSP. Moreover, the sensitivity and specificity of the tests, as well as the positive and negative predictive values, were calculated in this study.

Results

In this study, the mean age of the normal subjects and subjects with mild PMS was 23.5±3.6 years, while it was 24.1±3.1 years in women with moderate and severe PMS (table 1). According to the results of DRSP, 193 subjects (83.9%) had mild PMS, while 32 (13.9%) and five cases (2.2%) had moderate and severe PMS, respectively. According to the results of PSST, 133 subjects (57.8%) had mild PMS or were normal, while 97 subjects (42.2%) had moderate or severe PMS. Among 133 women who were diagnosed with mild PMS by PSST, 128 cases had mild PMS, three cases had moderate PMS, and two cases had severe PMS according to the DRSP. In addition, among 97 women who were diagnosed with moderate and severe PMS by PSST, 65 cases had mild PMS, 29 cases had moderate PMS, and three cases had severe PMS according to the DRSP (table 2). According to the further results of our study, mild PMS was correctly diagnosed by PSST; however, moderate and severe PMS were not accurately predicted by this test. In total, the rate of the correct classification of PMS symptom severity (mild to severe) by PSST was estimated at 83.9% (fig 1). Sensitivity and specificity of PSST were determined as 66.3% (59.4-72.6%) and 85.6% (72-94.1%), respectively. According to the results of PSST, about 66% of the participants were correctly diagnosed with PMS, whereas 14% of the normal subjects were wrongly diagnosed with PMS. The positive and negative predictive values of this test were estimated at 96.2% (91.5-98.4%) and 33% (42.8-24.4%), respectively. Moreover, the positive and negative likelihood ratios were calculated to be 4.9 (2.1-11.1) and 0.3 (0.3-0.4), respectively. The results of the correlation coefficients were indicative of a moderate, significant correlation between PSST and DRSP ($r=0.38$, $p<0.001$).

Table1. Demographic Characteristics of the Studied Subjects(N=230)

Premenstrual syndrome (PMS)		Mild/No PMS(N=133) N(%)	Moderate/Severe PMS(N=97) N(%)
Marital Status	Single	88(66.2)	65(67)
	Married	45(33.8)	32(33)
Education Level	BS	69(51.9)	52(53.6)
	MD	46(34.6)	32(33)
	Ph.D.	18	13(13.4)
Age (year)*		23.5±3.6	24.1±3.1
Days of Menstrual Period*		6.3±1.2	6.4±1

*Mean±SD

Table 2. Classifications of DRSP and PSST in the Diagnosis of Premenstrual Syndrome

PSST‡	DRSP* Mild PMS N(%)	Moderate PMS N(%)	Severe PMS N(%)	Total N(%)
Mild/No PMS	128(55.7)	3(1.3)	2(0.9)	133(57.8)
Moderate/Severe PMS	65(28.3)	29(12.6)	3(1.3)	97(42.2)
Total	193(83.9)	32(13.9)	5(2.2)	230(100)

* Daily Record of Severity of Problems,

‡ Premenstrual Symptoms Screening Tool

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DRSP Diagnostic Classification

Classification	N(%)
Mild	193(83.9)
Moderate	32(13.9)
Severe	5(2.2)
Total	230(100)

PSST Diagnostic Classification
(Adj. p-value<0.001, Chi-square=29/9, df=1)

Mild/No PMS		Moderate/Severe PMS	
Mild/No PMS based on the Classification of DRSP Predicted by PSST		**Moderate/Severe PMS based on the Classification of DRSP Predicted by PSST**	
Classification	N(%)	Classification	N(%)
Mild	128(96.2)	Mild	65(67)
Moderate	3(2.3)	Moderate	29(29.9)
Severe	2(1.5)	Severe	3(3.1)
Total	133(57.8)	Total	97(42.2)

Figure 1. CART Classification for the Evaluation of Accurate PMS Diagnosis by PSST Compared to DRSP

Discussion

According to the results of this study, mild PMS was accurately diagnosed by PSST, whereas moderate and severe PMS could not be correctly diagnosed by this tool. A moderate correlation was observed between PSST and DRSP, and the sensitivity of PSST in the diagnosis of PMS was relatively low; however, the specificity of this test was comparatively high, resulting in an accurate diagnosis in the normal subjects. The current study was the first to compare the diagnostic values of PSST and DRSP, and the findings were consistent with the results obtained by Hashemi et al. According to their study, there was a moderate coefficient of agreement between PSST and the standard psychiatric diagnosis of PMS. Furthermore, the sensitivity of PSST was not high in the diagnosis of PMS in the study by Hashemi et al., and about 45% of the cases could not be accurately identified (19). In another study by Ainscough et al., the prospective pattern of increasing severity during the luteal phase of menstruation, which was measured by retrospective tools, was not reported (24). In addition, the prospective and retrospective tools used in their study differed from our questionnaires; however, the retrospective tools did not have a high sensitivity in the diagnosis of PMS in both studies. In another study, Nogueira et al. compared the diagnostic values of Premenstrual Assessment Form (PAF) and DSRP. According to their findings, despite the high sensitivity of PAF in the diagnosis of PMS, the low specificity led to the inaccurate diagnosis of PMS, and the criteria were not considered to be efficient in predicting PMS (25). This was in line with the results obtained by the current study. Although PSST is a rapid diagnostic tool for PMS, it may not result in an accurate diagnosis of this condition. In fact, by affecting the rate of the reported PMS symptoms, PSST may result in an incorrect diagnosis (14). There is a notable tendency to use retrospective tools in the screening for PMS; this is mainly because of the simplicity and rapidity of these tools (13, 26). However, recording the daily symptoms may not be possible by using retrospective questionnaires; therefore, retrospective tools could not be considered efficient in the diagnosis of PMS severity (21). Furthermore, since there is no need to recall the intensity and duration of symptoms, retrospective questionnaire, such as DRSP, could be effective in the accurate diagnosis of PMS (11). On the other hand, PSST could not distinguish between the patients presented with mild PMS and normal individuals (14). The results of this study indicated that PSST could be used as a proper diagnostic and screening tool to identify normal women in clinical situations, as well as to diagnose mild PMS accurately. However, this method could not be applied to determine the severity of PMS. The definitive diagnosis of PMS could be achieved by using prospective tools, and PSST could not be the efficient criteria in the diagnosis of moderate and severe PMS.

Limitations and Recommendations: In the present study, there were no differential diagnoses of the mental conditions caused by PMS, such as personality disorders and depression. Furthermore, the findings of

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the current study could not be applied to the general population of women due to the limited sample size and use of availability sampling. In conclusion, it is recommended that randomized studies be conducted on larger sample sizes, and differential diagnoses of other disorders be obtained for the better recognition of the retrospective diagnostic tools used for PMS.

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