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ORIGINAL ARTICLE

Observational Study

Dimensional (premenstrual symptoms screening tool) *vs* categorical (mini diagnostic interview, module U) for assessment of premenstrual disorders

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Abstract

BACKGROUND

Premenstrual syndrome (PMS) is the constellation of physical and psychological symptoms before menstruation. Premenstrual dysphoric disorder (PMDD) is a severe form of PMS with more depressive and anxiety symptoms. The Mini international neuropsychiatric interview, module U (MINI-U), assesses the diagnostic criteria for probable PMDD. The Premenstrual Symptoms screening tool (PSST) measures the severity of these symptoms.

AIM

To compare the PSST ordinal scores with the corresponding dichotomous MINI-U answers.

METHODS

Arab women (n = 194) residing in Doha, Qatar, received the MINI-U and PSST. Receiver Operating Characteristics (ROC) analyses provided the cut-off scores on the PSST using MINI-U as a gold standard.

RESULTS

All PSST ratings were higher in participants with positive responses on MINI-U. In addition, ROC analyses showed that all areas under the curves were significant

with the cutoff scores on PSST.

CONCLUSION
This study confirms that the severity measures from PSST can recognize patients with moderate/severe PMS and PMDD who would benefit from immediate treatment.

Key Words: Premenstrual symptoms screening tool; Premenstrual dysphoric disorder; Arabs; Categorical *vs* dimensional classification

Core Tip: This manuscript assesses the relationship between responses on the dichotomous the Mini international neuropsychiatric interview, module U (MINI-U) answers and the scores on the Premenstrual Symptoms screening tool (PSST). Our findings give reassurance that the MINI-U provides an adequate assessment for the probable diagnosis of Premenstrual dysphoric disorder (PMDD) and that the severity measures of the PSST can recognize patients with moderate/severe premenstrual syndrome and PMDD who would benefit from immediate treatment.

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INTRODUCTION

Premenstrual syndrome (PMS) is characterized by a collection of mild to severe physical, affective, and behavioral symptoms experienced by many reproductive age women. The symptoms occur cyclically before or during the luteal phase of the menstrual cycle. During this period, the symptoms might cause impairment to the daily lives of women, disrupting both work and personal activities[1]. Premenstrual dysphoric disorder (PMDD) is a more severe form of PMS with a greater emphasis on depressive and anxiety symptoms[2]. PMS and PMDD usually resolve within a few days of menstruation. The etiology of PMS and PMDD is not clearly understood, but the onset of symptoms is associated with hypersensitivity to changes in the ovarian hormonal level during the menstrual cycle, dysregulated immune function[2], neurotransmitter dysregulation, stress, diet and lifestyle[3-5]. Treatment intervention is mostly tailored to the patient's symptoms profile because the cause of PMS and PMDD is unknown. Conventional nonpharmacological treatments are lifestyle interventions such as improved diet, increased exercise, sleep hygiene, and Cognitive Behavioral Therapy (CBT) for stress management. Pharmacological interventions include analgesic treatment, combined oral contraceptives[6], and selective serotonin reuptake inhibitors[7].

Overall, 75%-85% of women have experienced PMS symptoms[1,8], whereas PMDD affects 5%-8% of reproductive age women worldwide[9]. According to the International Classification of Diseases (ICD-10)[10], only one distressing symptom at the time of menstruation is required for PMS diagnosis. It does not consider the severity of the symptoms, and no clear definition exists when PMS becomes clinically significant. Contrarily, diagnosis of PMDD mandates the impairment of functioning by the symptoms [11]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)[12], the criteria for the diagnosis of PMDD are: (1) At least five symptoms must be present in the final week before the onset of menses and resolve within a few days of the onset of menses, and these symptoms must occur in the majority of the menstrual cycles; (2) At least one symptom must be marked affective lability, marked irritability or anger or marked depressed mood or anxiety; (3) One or more of the following symptoms must be present: decreased interest in usual activities, difficulty in concentration, increased fatigue, change in appetite, marked change in sleep, feeling overwhelmed or physical symptoms; and (4) These symptoms should affect productivity at work or school, relationships, responsibilities, or social activities. These symptoms should not be attributable/resultant to symptoms from: (1) Another psychiatric disorder; or (2) Physiological effects of a substance. Finally, these symptoms should be confirmed by prospective daily ratings for at least two symptomatic cycles.

The Mini International Neuropsychiatric Interview (MINI) is a structured interview consisting of several modules developed to establish a diagnostic instrument that is easy to administer, inexpensive, highly sensitive, and specific to diagnose DSM-IV-TR psychiatric disorders[13,14]. Module U (MINI-U) is the corresponding module that categorically measures the presence or absence of symptoms to fulfill

diagnostic criteria for PMDD[15]. Prospective daily ratings have to be completed for at least two symptomatic cycles to confirm the diagnosis. Thus, they are the only way to measure severity and monitor symptoms over time[16]. However, completing daily ratings proved to be difficult in practice [17,18].

The Premenstrual Symptoms screening tool (PSST) is an instrument that includes all premenstrual symptoms and a measure of impairment as per DSM-IV-TR criteria. It also translates categorical DSM-IV-TR criteria into a dimensional rating scale to assess severity[16]. Thus, it is a useful diagnostic tool to capture moderate/severe PMS and PMDD diagnoses in symptomatic women who would benefit from treatment[19]. The Arabic version of PSST was already validated, where it showed good consistency and reliability (Cronbach's alpha = 0.92). The discriminant validity showed adequate specificity (95.6%) but low sensitivity (26.7%), indicating that PSST is a good screening tool to confirm the cases with true PMDD where treatment is possibly indicated. The positive and negative values (PPV and NPV) for PMDD were 85.2% and 58.3%, respectively. The construct validity was assessed using exploratory factor analysis, and the results showed that the original 19 items (14 questions on the symptoms and five on the interference with daily activities) of the PSST were grouped into five factors accounting for 66.73 % of the variance[20].

The MINI-U for diagnosis of PMDD relies mainly on the presence or absence of symptoms, including the impact on functioning. At the same time, PSST uses a dimensional scale to measure the severity of symptoms which ultimately is very important to determine the effects of symptoms on daily activities. Unfortunately, no studies compared the diagnostic categorical scales with dimensional measures of severity of PMDD symptoms. Such comparisons would enhance the accuracy of the psychometric measures of the combined approaches when diagnosing and monitoring patients with moderate/severe PMS and PMDD. Furthermore, the availability of valid cut-off scores from PSST tested through answers from MINI-U (DSM criteria) would give more confidence to diagnose PMDD based on the severity measures of PSST. This reassurance would facilitate the initiation of treatment for this group of patients instead of waiting two months, especially that the daily recording of symptoms has proven to be very difficult in practice[17,18]. Thus, the aims of this study were: (1) To compare the responses between the dichotomous MINI-U answers and the scores on the PSST items; and (2) To establish the cut-off scores on the dimensional PSST items by using the categorical MINI-U as a gold standard.

MATERIALS AND METHODS

This cross-sectional study is part of a project to validate the Arabic version of the PSST[20]. This article reports a secondary analysis of the relationship between answers on the Arabic MINI-U with the corresponding items in the Arabic PSST (see Table 1).

Study setting and subjects

The study took place in Doha, Qatar, a country experiencing rapid development and economic growth. As a result, the Qatari population includes many expatriate residents from different nationalities and ethnicities. However, the most stable populations are the Qatari and Arabs, representing respectively 15% and 13% of the population[21]. Arab women were recruited at two Primary Healthcare Centers between October 2013 and March 2014.

Participants were eligible to join the study if they were Arab females between 18 and 45 years old and with a regular menstrual cycle of 24 to 32 d. The following exclusion criteria were adopted to control other confounding conditions: women taking oral contraceptive pills, hormonal therapy, psychotropic medication, and suspected of being pregnant or in menopause. In addition, women with endometriosis, acute thyroid or pituitary disorders, or any other acute medical problem were ineligible to participate. Lastly, women with a history of drug and alcohol abuse or an active psychiatric disorder (other than PMDD), diagnosed in the previous six months, were excluded.

During the recruitment period, a total of 430 women were approached in primary healthcare centers to join the study. After an initial screening, 280 women were eligible for the study and agreed to learn more about the research project. However, only 194 women agreed to participate and were consented to join the study. Following consent, a further 15 participants were excluded from the study: 4 participants were pregnant, 4 elected to withdraw from the study, 4 participants spoke Arabic but were not originally from an Arab country, and 3 participants were excluded due to another possible psychiatric diagnosis as per the MINI screen. Therefore, the sample consisted of 179 female participants who completed all study procedures. This sample size was sufficient to detect the projected sensitivity or specificity of 85 percent and an estimated prevalence of severe PMS/PMDD of 20 percent, within a margin of error of 10 percent and a 95 percent confidence interval. This sample size was sufficient to detect the projected sensitivity or specificity of 85 percent and an estimated prevalence of severe PMS/PMDD of 20 percent, within a margin of error of 10 percent and a 95 percent confidence interval.

Research design

This study is cross-sectional with no interventions, and all participants provided written consent before

Table 1 Corresponding items between premenstrual symptoms screening tool and the Mini-premenstrual dysphoric disorder

Symptom	PSST	MINI-U
Anger/irritability	1	U3 - D
Anxiety/tension	2	U3 - B
Tearful/sensitive to rejection	3	U3 - C
Depressed mood /hopelessness	4	U3 - A
Decreased interest in work activities	5	U3 - E
Decreased interest in home activities	6	U3 - E
Decreased interest in social activities	7	U3 - E
Difficulty concentrating	8	U3 - F
Fatigue/lack of energy	9	U3 - G
Overeating/food cravings	10	U3 - H
Insomnia	11	U3 - I
Hypersomnia	12	U3 - I
Feeling overwhelmed or out of control	13	U3 - J
Physical symptoms	14	U3 - K
Symptoms interfered with:		
Work efficiency/productivity	A	U2
Relationship with co-workers	B	U2
Relationship with family	C	U2
Your social life activities	D	U2
Home responsibilities	E	U2
Most menstrual periods of last year are preceded by significant mood changes for almost one week	-	U1

PSST: Premenstrual Symptoms screening tool; MINI-U: The Mini International Neuropsychiatric Interview, Module U.

enrollment. The Institutional Review Boards of Hamad Medical Corporation and Weill Cornell Medicine in Doha, Qatar, approved this study. A licensed physician or nurse interviewed participants to confirm their eligibility. The psychiatrists then administered the Arabic Mini International Neuropsychiatric Interview Plus version 6 (MINI-Plus 6) to screen for any psychiatric disorders, including PMDD (MINI-U) as per DSM-IV-TR criteria[15]. An independent second rater, blinded to the results of the MINI, collected sociodemographic information, past medical and psychiatric history, smoking and exercise patterns, and administered the PSST. The independent raters were medical students or nurses who were formally trained to administer and rate the PSST. A good inter-rater agreement was established before the collection of data. A pilot sample (20 women) was assessed independently by more than two raters, and the interclass coefficient was 0.89.

Procedures

Recruitment for this study commenced shortly after the introduction of DSM-5. However, no diagnostic instruments were available at the time to diagnose PMDD according to DSM-5 criteria; hence we used the MINI-U that followed DSM-IV-TR criteria. DSM-5 adopted the same criteria for the diagnosis of PMDD as DSM-IV-TR except for minor modifications. The only major shift is the recognition of PMDD as a distinct diagnostic entity in DSM-5[12], whereas it was classified as a Mood Disorder Not Otherwise Specified in DSM-IV-TR[22].

Module U in the MINI is a screening and diagnostic tool for PMDD. It is composed of 13 dichotomous questions (U1, U2, and U3-A to U3-K) (Table 1) with the possibility of answering "yes" or "no." The first two questions respectively assess mood changes before menstruation and if the subject experienced any difficulty at work or in usual activities and relationships during these periods. The last set of questions determines the presence of affective, behavioral, and physical symptoms using lettered questions U3-A to U3-K, as indicated in Table 1. A diagnosis of probable PMDD is reached if the first two questions U1 and U2, are answered positively together with at least one affective symptom from U3-A to U3-D and also four of the questions U3-A to U3-K were answered[14,22].

Table 2 Sociodemographic characteristics

Variables	
Mean age (SD), yr	32.12 (8.26)
Country born, *n* (%)	
Qatar	111 (62.0)
Other	68 (38.0)
Marital status, *n* (%)	
Married	112 (62.6)
Never married	55 (30.7)
Divorced/widowed	12 (6.7)
Education level, *n* (%)	
Elementary or intermediate school	11 (6.2)
Secondary or high school	53 (29.9)
Vocational/associate degree	55 (31.1)
University degree or postgraduate degree	58 (32.7)
Employment status, *n* (%)	
Employed	118 (66.6)
Housewife	25 (14.1)
Jobseeker	11 (6.2)
Student	15 (8.5)
Retired	2 (1.1)
Other	6 (3.4)
Lifestyle, *n* (%)	
Current cigarettes smoker	5 (2.8)
Current shisha smoker	9 (5.1)
Regular exercise	55 (30.7)

SD: Standard deviation.

Table 3 Clinical features of subjects

Medical Characteristics, *n* (%)	
PMS, according to PSST	63 (35.2)
PMDD according to PSST	25 (13.9)
PMDD according to MINI	84 (46.7)
Previous diagnoses	
Psychiatric diagnosis	6 (3.3)
Depression	9 (5.0)
Chronic lung disease	25 (13.9)
Hypertension	7 (3.9)
Cardiac disease	5 (2.8)
Arthritis	20 (11.1)
Osteoporosis	9 (5.0)

Kidney disease	4 (2.2)
Diabetes	10 (5.6)
Hypercholesterolemia	20 (11.1)
Cancer	2 (1.1)
Allergies	52 (28.9)

PMS: Premenstrual syndrome; PSST: Premenstrual Symptoms screening tool; PMDD: Premenstrual dysphoric disorder.

The PSST is composed of two sections representing the two domains as per DSM-IV-TR criteria for PMDD. The first section includes a list of 14 questions related to premenstrual symptoms, followed by the second section of 5 questions that measure the severity of interference of the symptoms on a woman's ability to function (Table 1). Responses are reported on a severity scale of "not at all," "mild," "moderate," or "severe," corresponding to a score of 1 to 4 in our study. The following criteria must be present for the diagnosis of PMDD: (1) At least one of the responses to questions 1-4 is severe; (2) In addition at least four of 1-14 questions are moderate to severe; and (3) At least one of A, B, C, D, E is severe. Also, the following criteria must be present for a diagnosis of moderate to severe PMS: (1) At least one of the responses to questions 1-4 is moderate to severe; (2) In addition at least four of 1-14 questions are moderate to severe; and (3) At least one of A, B, C, D, E is moderate to severe[16]. The original author[16] and McMaster University approved the translation of the PSST. The PSST was translated to Arabic using the repeated forward-backward procedure. All concerns were resolved by modifying the Arabic version of PSST until the original author approved the English back-translated version. Please refer to the study by Mahfoud *et al* for further details on the translation and validation procedures for the Arabic versions[20].

Statistical analysis

All analyses were performed using IBM Statistical Package for Social Sciences (SPSS) for Mac version 24 [23]. The level of significance was set at 5%. Sociodemographic characteristics and clinical features were reported as means and standard deviations (SD) for continuous measures such as age and as frequency and percentage for categorical measures such as education level. To compare the scores on the PSST items by MINI-U responses (Yes *vs* No), we reported the median and interquartile range (IQR), and we used the Wilcoxon-Mann-Whitney test to determine if the PSST severity measures are valid to differentiate between those who answered Yes *vs* No on MINI-U. Bonferroni correction (an option in SPSS) was used to correct for the multiple comparisons. The comparisons were followed by receiver operating characteristics (ROC) analyses using the MINI-U answers as the gold standard to determine the cut-off scores on the PSST, in addition to their sensitivity and specificity measures. Finally, we used the highest Youden indices (J) to determine the best cut-off scores on each item in PSST and the corresponding sensitivity and specificity[24].

RESULTS

Sociodemographic and clinical characteristics

A total of 179 female participants completed all study procedures. The study sample had a mean age of 32.12 years (SD = 8.26). The majority of participants were born in Qatar (62.0%), married (62.6%), and employed (66.6%). Approximately 33% of participants had a university degree, and 31% practiced regular exercise. According to the PSST, 14% of participants had a PMDD diagnosis, and 35% had PMS. However, according to MINI-U, 49% of participants had a diagnosis of probable PMDD. A minority of participants had been diagnosed in the past with depression (5%) or other psychiatric illness (3.3%) (Tables 2 and 3).

Frequency of symptoms as per MINI-U and PSST

According to the symptoms assessed by the PSST, the most common severe symptoms were anger or irritability (31.3%), physical symptoms (23%), and being tearful or sensitive to rejection (20.8%). The most common moderate symptoms reported by our participants were physical symptoms (36.5%), anger or irritability (34.6%), and fatigue or lack of energy (27.4%). The severity of these symptoms mainly affected their relationships with their family (moderate, 20.2% and severe 9%) and their work efficiency or productivity (moderate, 19.7% and severe 7.3%). The symptoms that our participants least experienced were feeling overwhelmed or out of control (57.4%), insomnia (58.4%), and difficulty concentrating (53.6%). According to the MINI-U, the most common symptoms were physical symptoms (86.7%), fatigue or lack of energy (74.4%), and anger or irritability (73.3%). The least reported symptoms were difficulty concentrating (31.7%), and feeling overwhelmed or out of control (36.7%) (Table 4).

Table 4 Frequency of symptoms as per the Mini international neuropsychiatric interview, module U and premenstrual symptoms screening tool

	MINI-U (Yes)	Not at all	Mild	Moderate	Severe
PSST symptoms	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Anger/irritability	132 (73.3)	23 (12.8)	38 (21.2)	62 (34.6)	56 (31.3)
Anxiety/tension	98 (54.4)	57 (32.0)	46 (25.8)	46 (25.8)	29 (16.3)
Tearful/sensitive to rejection	97 (53.9)	83 (46.6)	26 (14.6)	32 (18.0)	37 (20.8)
Depressed mood/hopelessness	104 (57.8)	78 (43.8)	40 (22.5)	35 (19.7)	25 (14.0)
Decreased interest in work activities	83 (46.1)(All three)	65 (36.3)	52 (29.1)	41 (22.9)	21 (11.7)
Decreased interest in home activities		53 (29.8)	55 (30.9)	44 (24.7)	26 (14.6)
Decreased interest in social activities		79 (44.1)	49 (27.4)	30 (16.7)	21 (11.7)
Difficulty concentrating	57 (31.7)	96 (53.6)	53 (29.6)	21 (11.7)	9 (5.0)
Fatigue/lack of energy	134 (74.4)	47 (26.9)	56 (32.0)	48 (27.4)	24 (13.7)
Overeating/food cravings	98 (54.4)	92 (51.7)	27 (15.2)	25 (14.0)	34 (19.1)
Insomnia	95 (52.8)(Both)	104 (58.4)	36 (20.2)	21 (11.8)	17 (9.6)
Hypersomnia (needing more sleep)		76 (42.7)	39 (21.9)	33 (18.5)	30 (16.9)
Feeling overwhelmed or out of control	66 (36.7)	101 (57.4)	22 (12.5)	37 (21.0)	16 (9.1)
Physical symptoms	156 (86.7)	16 (9.0)	56 (31.5)	65 (36.5)	41 (23.0)
Symptoms interfered with:					
A - Work efficiency/productivity	94 (52.2)(Altogether)	85 (47.8)	45 (25.3)	35 (19.7)	13 (7.3)
B - Relationship with co-workers		108 (61.4)	41 (23.3)	19 (10.8)	8 (4.5)
C - Relationship with family		69 (38.8)	57 (32.0)	36 (20.2)	16 (9.0)
D - Your social life activities		89 (50.0)	49 (27.5)	29 (16.3)	11 (6.2)
E - Home responsibilities		89 (50.0)	55 (30.9)	23 (12.9)	11 (6.2)

PSST: Premenstrual Symptoms screening tool; MINI-U: The Mini international neuropsychiatric interview, module U.

Scores on PSST items by MINI-U dichotomous responses

We used the Wilcoxon-Mann-Whitney test to assess if the ordinal scores on the PSST items are different between those who answered Yes vs. No on the MINI-U. Among the MINI-U dichotomous answers, all PSST ratings were significantly higher among participants who answered Yes ($P < 0.01$). Participants who answered "No" on the MINI-U had a median score of 1 (Not at all) for all the symptoms except for: (1) Anger or irritability; (2) Anxiety or tension; (3) Decreased interest in home activities; and (4) Physical symptoms where the median rating was 2 (mild). Participants who answered "Yes" had a median score from 1.5 (not at all to mild) to 3 (moderate). Out of the 14 symptoms assessed, nine had a median score of 3 (moderate), four symptoms had a median rating of 2 (mild), and one symptom had a median rating of 1.5 (not at all to mild) (Table 5). The median rating of the interference of these symptoms on work or productivity, relationship with family, relationship with co-workers, relationship with family, on social life activities, and home responsibilities was 2 (mild) (Table 5).

Cut-off scores on PSST items by MINI-U dichotomous responses

ROC analyses showed that all areas under the curves were significant with the cut-off scores (and the corresponding sensitivity and specificity values using the Youden index) on the corresponding PSST items using the MINI-U questions as the gold standard. The cut-off scores for the items on anger or irritability, anxiety or tension, decreased interest in work or home activities, overeating, hypersomnia, and physical symptoms were 2.5 on the corresponding PSST items. The remaining items had a corresponding cut-off score of 1.5. The balanced sensitivity and specificity values for all the corresponding cut-off scores were adequate, ranging from 0.50 to 0.83 (Table 6).

Table 5 Scores on Premenstrual Symptoms screening tool items by the Mini international neuropsychiatric interview, module U dichotomous responses

	MINI-U				
	No		Yes		
PSST	Median	IQR	Median	IQR	*P* value[1]
Anger/irritability	2	2	3	1	< 0.001
Anxiety/tension	2	1	3	2	< 0.001
Tearful/sensitive to rejection	1	0	3	2	< 0.001
Depressed mood/hopelessness	1	1	2	2	< 0.001
Decreased interest in work activities	1	1	3	1	< 0.001
Decreased interest in home activities	2	1	3	1	< 0.001
Decreased interest in social activities	1	1	3	1	< 0.001
Difficulty concentrating	1	1	2	1	< 0.001
Fatigue/lack of energy	1	1	2	1	< 0.001
Overeating/food cravings	1	1	2	2	< 0.001
Insomnia	1	1	1.5	2	0.004
Hypersomnia (needing more sleep)	1	1	3	3	< 0.001
Feeling overwhelmed or out of control	1	1	3	2	< 0.001
Physical symptoms	2	2	3	2	< 0.001
Symptoms interfered with:					
Work efficiency/productivity	1	1	2	2	< 0.001
Relationship with co-workers	1	0	2	2	< 0.001
Relationship with family	1	1	2	1	< 0.001
Your social life activities	1	1	2	2	< 0.001
Home responsibilities	1	1	2	2	< 0.001

[1]Wilcoxon-Mann-Whitney test was used to compare the PSST severity scores.
PSST: Premenstrual Symptoms screening tool; MINI-U: The Mini international neuropsychiatric interview, module U.

DISCUSSION

The first aim of this study was to compare the responses between the dichotomous MINI-U answers and the scores on the PSST items. Our study showed a discrepancy in the prevalence of PMDD diagnosis between the MINI criteria (46.7%) and PSST criteria (13.9%). The discrepancy between the two could be attributed to the dichotomous nature of MINI-U questions that assess only the presence or absence of symptoms. At the same time, those in PSST focus more on the severity of symptoms to establish PMDD diagnosis. The high prevalence of PMDD is also higher than that reported worldwide (5%-8%)[9]. Other countries such as Iran[25], Jordan[8], India[26], and Brazil[27] reported a similarly high prevalence of PMDD suggesting that there are ethnic variations in the prevalence of PMDD. It also highlights the need for an efficient and valid diagnosis of PMDD to recognize these patients and initiate treatment as early as needed. In comparing the participants who answered positively vs. negatively on the MINI questions, we found that all PSST symptom ratings were significantly higher among those who answered positively. Furthermore, most symptoms on PSST had a median rating of "moderate," indicating clinical significance (Table 5). The PSST severity measures might allow distinguishing which symptoms are clinically significant. Previous studies reported that 20% of women have subthreshold PMDD and can benefit from further monitoring and treatment[28]. The most commonly reported moderate/severe symptoms for our population were anger/irritability, anxiety, and physical symptoms (Table 4). These were also common complaints among Jordanian and Emirati women[29,30]. One of the major concerns with the MINI and PSST is the requirement to have daily ratings of symptoms for a minimum of two cycles per DSM criteria to confirm the cyclical presence of symptoms for moderate/severe PMS and PMDD. Keeping a daily diary before initiating treatment may cause resistance for women to seek treatment. In research settings, an epidemiological study found that 30% of

Table 6 The cut-off scores of the Premenstrual Symptoms screening tool items with the corresponding the Mini international neuropsychiatric interview, module U items

Symptom	PSST	MINI-U	AUC	95%CI	*J*	Cut-off	Sensitivity	Specificity
Anger/irritability	1	U3 - D	0.804[a]	(0.73-0.88)	0.48	2.5	0.780	0.696
Anxiety/tension	2	U3 - B	0.740[a]	(0.67-0.81)	0.41	2.5	0.608	0.800
Tearful/sensitive to rejection	3	U3 - C	0.835[a]	(0.77-0.90)	0.63	1.5	0.814	0.812
Depressed mood/hopelessness	4	U3 - A	0.735[a]	(0.66-0.81)	0.38	1.5	0.718	0.658
Decreased interest in work activities	5	U3 - E	0.752[a]	(0.68-0.83)	0.45	2.5	0.590	0.860
Decreased interest in home activities	6	U3 - E	0.743[a]	(0.67-0.82)	0.39	2.5	0.602	0.783
Decreased interest in social activities	7	U3 - E	0.768[a]	(0.70-0.84)	0.43	1.5	0.795	0.634
Difficulty concentrating	8	U3 - F	0.806[a]	(0.74-0.88)	0.55	1.5	0.842	0.706
Fatigue/lack of energy	9	U3 - G	0.728[a]	(0.64-0.81)	0.36	1.5	0.823	0.535
Overeating/food cravings	10	U3 - H	0.700[a]	(0.62-0.78)	0.36	2.5	0.495	0.861
Insomnia	11	U3 - I	0.614[a]	(0.530.70)	0.17	1.5	0.500	0.671
Hypersomnia	12	U3 - I	0.732[a]	(0.66 0.81)	0.39	2.5	0.537	0.852
Feeling overwhelmed or out of control	13	U3 - J	0.714[a]	(0.63 0.80)	0.39	1.5	0.667	0.722
Physical symptoms	14	U3 - K	0.723[a]	(0.60 0.85)	0.33	2.5	0.643	0.682
Symptoms interfered with:								
Work efficiency/productivity	A	U2	0.696[a]	(0.62 0.77)	0.32	1.5	0.677	0.639
Relationship with co-workers	B	U2	0.674[a]	(0.60 0.75)	0.30	1.5	0.527	0.771
Relationship with family	C	U2	0.686[a]	(0.61 0.76)	0.30	1.5	0.753	0.542
Your social life activities	D	U2	0.729[a]	(0.65 0.80)	0.38	1.5	0.677	0.699
Home responsibilities	E	U2	0.724[a]	(0.65 0.80)	0.40	1.5	0.688	0.711

[a]$P <$ 0.01. PSST: Premenstrual Symptoms screening tool; MINI-U: The mini international neuropsychiatric interview, module U; AUC: Area under the curve; CI: Confidence interval; *J*: Youden index.

women refused to participate in a study because they did not want to fill daily ratings, and the latter is usually associated with a high dropout rate[31]. Our results suggest that the severity measures of PSST can capture the PMDD cases with significantly severe symptoms who would benefit from treatment initiation.

The study's second aim was to establish the cut-off scores on the dimensional PSST items by using the categorical MINI-U as a gold standard. All the cut-off scores showed significant differentiation and ranged from 1.5 to 2.5 with adequate sensitivity and specificity (Table 6). The MINI-U is a diagnostic instrument, whereas the PSST is a diagnostic and dimensional instrument[16]. However, both scales are based on DSM-IV-TR criteria for diagnosing PMDD and thus are assessing the same symptoms (Table 1). The concordance between these instruments showed that most symptoms corresponding to a "Yes" in the MINI-U had a cut-off score of 1.5 or a rating of at least 'mild' on the corresponding PSST items. On the other hand, affirmative answers to anger/irritability, anxiety/tension, decreased interest in home activities, and physical symptoms in the MINI-U had a corresponding cut-off score of 2.5 or at least 'moderate' symptoms in the PSST, meaning that the latter captured mainly the moderate to severe cases. However, the challenge is distinguishing which women need treatment from those whose symptoms are not clinically relevant[31]. Moderate/severe PMS and PMDD are poorly diagnosed and mostly untreated conditions[32]. Furthermore, women with moderate/severe PMS symptoms have a higher rate of work absences and increased medical expenses[1]. Therefore, these women can benefit from a prompt referral and timely treatment[1].

Limitations

This study has many strengths, like its design and applying the validated Arabic dimensional PSST with the Arabic equivalent categorical scale MINI. Still, a few limitations can affect the results of our study. The sample size is probably not large enough to cover the representation of the multiple Arabic countries and the potential variability in PMDD presentation in different countries. It is worth adding

that the cut-off scores on PSST are based on retrospective symptoms, and DSM requires daily records for two consecutive months to confirm the diagnosis. Thus, further validation of the significant and relevant cut-off scores on PSST against future prospective recordings is necessary to confirm the utility of using the dimensional PSST in the early treatment of PMDD as defined in the categorical DSM.

CONCLUSION

In conclusion, our results showed a significant relationship between the Arabic MINI-U and PSST responses, providing evidence to support that the PSST is a practical measure for PMDD. Participants who answered positively on the MINI had significantly higher ratings and relevant cut-off scores on the corresponding PSST items. Thus, this study reassures that the MINI-U provides an adequate assessment for the probable diagnosis of PMDD. Furthermore, the severity measures of the PSST can recognize patients with moderate/severe PMS and PMDD who would benefit from immediate treatment. Thus, there is a clear advantage of using PSST to early identify these patients with moderate/severe symptoms who clinically cannot wait for the daily measures of MINI-U. In addition, these patients with significant mood symptoms can benefit from treatment with selective serotonin inhibitors[33]. However, prospective studies are still needed to confirm the validation scores and comply with the DSM criteria.

ARTICLE HIGHLIGHTS

Research background

Premenstrual symptoms (PMS) are very common in child-bearing women and include several physical and emotional symptoms lasting for one week before menstruation. The premenstrual dysphoric disorder consists of the symptoms of PMS and, more significant depressive symptoms that affect the functioning of women. Some instruments measure the severity of these symptoms (Premenstrual Symptoms screening tool, PSST). Others assess the presence or absence of these symptoms and are usually used to diagnose if the premenstrual symptoms recur over two consecutive cycles (Mini international neuropsychiatric interview, module U).

Research motivation

As required by the Diagnostic and Statistical Manual of Mental Disorders, the daily recording of symptoms over two months is challenging to comply with regularly. Further, women might not receive the proper treatment if no adequate assessment or diagnosis is made. We believe that using appropriate scales like PSST that measures the severity of symptoms can be validated as tools for diagnosis.

Research objectives

To compare the scores of both PSST and MINI module U. We also calculated the cut-off scores on the dimensional PSST items by using the categorical MINI-U as a gold standard.

Research methods

We recruited eligible women from primary care centers. Two blinded raters independently administered the dichotomous Arabic MINI module U and the Arabic PSST to women. We compared the scores on the PSST items by MINI-U responses (Yes *vs* No) using the median and interquartile range. To determine the cut-off scores on the PSST (including sensitivity and specificity measures), we used the receiver operating characteristics analyses using the MINI-U answers as the gold standard.

Research results

According to the MINI-U, the most common symptoms were physical symptoms (86.7%), fatigue or lack of energy (74.4%), and anger or irritability (73.3%). Out of the 14 symptoms assessed, nine had a median score of 3 (moderate), four symptoms had a median rating of 2 (mild), and one symptom had a median rating of 1.5 (not at all to mild). Among the MINI-U dichotomous answers, all PSST ratings were significantly higher among participants who answered Yes ($P < 0.01$). The cut-off scores for the items on anger or irritability, anxiety or tension, decreased interest in work or home activities, overeating, hypersomnia, and physical symptoms were 2.5 on the corresponding PSST items. The balanced sensitivity and specificity values for all the corresponding cut-off scores were adequate, ranging from 0.50 to 0.83.

Research conclusions

Our results suggest that the severity measures of PSST can capture the PMDD cases with significantly severe symptoms who would benefit from treatment initiation. Furthermore, women with moderate/severe PMS symptoms have a higher rate of work absences and increased medical expenses.

These women can, therefore, benefit from a prompt referral and timely treatment.

Research perspectives

Larger prospective studies are needed to further validate the utility of cut-off scores from PSST to confirm the diagnosis and justify the initiation of treatment.

FOOTNOTES

Author contributions: Hassen A and Rana E designed the research; Rifka C performed the research; Ziyad M and Rifka C analyzed the data; all authors wrote the paper.

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