REVIEW ARTICLE

Premenstrual Dysphoric Disorder: Reviews of Studies in Malaysia, Measures Used, and Validation of the Daily Record of Severity of Problems

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ABSTRACT

Premenstrual Dysphoric Disorder (PMDD) is the most severe form of Premenstrual Syndrome (PMS). It impacts the lives and productivity of women worldwide. The literature review found eight studies conducted on PMS and menstruation in Malaysia. However, none of these studies focused on PMDD and reported the utilization of psychometrically valid and reliable tools in assessing it. One of the common measures used to assess PMDD is Daily Record of Severity of Problems (DRSP). Items in DRSP are based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition. Currently, there are two published studies on the validation of DRSP and its psychometric properties which will be discussed in this paper. The review shows that an ongoing adaptation and validation study of DRSP among Malaysian is being conducted. This will contribute to the body of knowledge regarding PMDD in local settings.

Keywords: Premenstrual Dysphoric Disorder, Premenstrual Syndrome, Daily Record of Severity of Problems, Assessments, Malaysia

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INTRODUCTION

Premenstrual Dysphoric Disorder (PMDD) is the most severe disorder within the Premenstrual Syndrome (PMS) spectrum (1). This spectrum of disorders is a combination of psychological and physical symptoms that commence about a week before menstruation. These symptoms often subsides during the menses and disappear after that (2). These symptoms include irritability, anger, mood swings, depression, tension/anxiety, abdominal bloating, breast pain, and fatigue (3,4). In this light, while PMS is manifested more as physical symptoms (5), PMDD is characterised by prominently moody symptoms (3,6).

It was reported that PMDD affects about 3% to 8% of women in the Western population (3,7–9) while studies in Africa reported a higher prevalence rate of 26.8% to 36.1% among their population (10,11). Studies also found that the prevalence of PMDD is between 1.2% to 6.4% among Asian women (12,13).

Past studies suggested that there is no single aetiology of PMDD (3,14). On the other hand, other studies revealed multifactorial predispositions towards the condition, which includes biological and psychological factors (15,16).

Biologically, several studies reported that hormonal changes that took place during the menstrual cycle of individuals with PMDD affects the neurotransmitter activities in the brain, Gamma-aminobutyric acid (GABA) and serotonin (15–18). This disrupts mood and cognition of the sufferer, which may lead to anxiety and depression (16,18). A recent study reported that the cells of patients with PMDD have a characteristically different reaction when exposed to menstrual hormones, as opposed to women without PMDD (19). These finding at a cellular level support the notion that PMDD is hereditary. From the psychological perspective, it was postulated that women with a history of trauma and abuses like child abuse, sexual abuse, and other life threatening situations like physical attacks (20–24) are more at risk in developing PMDD (20–23).

It was reported that women suffering from this mood disorder may experience the symptoms for up to 3.8 years of their reproductive years (8). Women with

PMDD demonstrate the similar flawed marital and parental relationships, as women with recurrent or chronic clinical depression (8). While another study reported that PMDD sufferers were less effective in the workplace, and may spent less hours or missing from their workplace (25).

The economic burden of depression in the United states of America (USA) reached up to tens of billions of dollars every year, and the value is expected to increase (26). This burden would encompass PMDD, as it is included as a unipolar depressive disorder. A study in South America reported that the average cost of burden for PMDD was up to 1618 BRL (Brazilian Real) (approximately 400 US Dollars) per patient per year (14). While another study implied that the economic burden of PMDD is related to decrease in productivity rather than health-care services or the absence from work-related costs (25).

For treatment, a combination of pharmacological and non-pharmacological approach was suggested. Selective serotonin reuptake inhibitors (SSRIs) are the first line of pharmacological treatment for PMDD (18). While diet modification, exercise, and cognitive behavioural therapy (CBT) are among the non-pharmacological interventions recommended (6,27,28). It was also implied that by combining both kind of measures, the effect may at least contribute up to 50% reductions in the disease severity (2).

In view of the occurrence of this ailment worldwide, the purpose of this article is to review the local studies on PMDD and the common measures used to assess the disorder. Other than that, the study aims to review the validation studies of Daily Record of Severity of Problems (DRSP), one of the common measures used to assess PMDD.

PREMENSTRUAL DYSPHORIC DISORDER IN MALAYSIA

Literature search was performed using the university online databases and the Google Chrome search engine. The keywords used were "Premenstrual Dysphoric Disorder", "PMDD", "Premenstrual Syndrome", "PMS", "Malaysia" and "psychometric". The literature found were scrutinized and reviewed by two clinical psychologists with wide experiences in adaptation and validation studies, as well as depressive disorders. Based on the literature search, there were eight studies on PMS or menstrual-related aspects or symptoms found (29–36). However, no study found have focuses primarily on cases of PMDD in Malaysia.

From the eight studies on PMS, four studies reported the prevalence of PMS and menstrual-related symptoms among university and college students (29,32,35,36). Another study stated the prevalence of premenstrual symptoms among a sample of women in rural areas and their methods of remedying it (33). Two studies were on attitudes and perceptions towards menses and PMS among the adolescent populations (30,31). Another study discussed the knowledge and attitudes towards menstrual disorders among premarital course participants in a north-eastern state in Peninsular Malaysia (34). A summary of the studies is presented in Table I.

It was found that four studies utilized different measures to assess PMS among their samples (29,31,32,36). Two of the measures were based on American College of Obstetricians and Gynecologists (ACOG)'s PMS diagnostic criteria (29,32). No psychometric properties or validation procedures of the instruments used to assess PMS were reported in these studies. Hence, the valid local prevalence rate of PMS and PMDD reported may be questionable.

Three studies mentioned PMDD (29,32,33). Two of these studies concluded the prevalence rate of PMDD was between 0% to 7% among their samples (29,32). Although the utilisation of validated measures was not reported in these studies, this number is comparable with the prevalence rate previously reported among the Western population (3% to 8%) (3,7–9) and other Asian population (1.2% to 6.4%) (12,13). Meanwhile, another study indicated the possibility of undiagnosed PMDD among samples suffering severe premenstrual symptoms (33).

Some of the authors argued that PMS and menstrual related symptoms affect the respondents' functions, daily activities, and social relationships (32,33,35,36). Three studies implied the lack of health seeking behaviours related to PMS (30,33,36). All these studies indicate the inadequate knowledge about PMS and menstruations among the local samples, despite the relatively high prevalence of PMS (range from 37% to 69.7%) (29,31,32,36). These authors further recommended that actions should be planned to educate local populations on PMS or menstruation related symptoms, as well as to promote appropriate health seeking behaviours.

ASSESSMENTS OF PREMENSTRUAL DYSPHORIC DISORDER

Like other medical and psychiatric disorders, PMDD diagnostic process usually involves history taking, physical examinations, and objective assessments (i.e., psychological measures) of the patient (3,15,37,38). In adhering to the diagnostic criteria of PMDD in DSM-5, a prospective daily rating of symptoms for at least two menstrual cycles was recommended (3,4,37,39). A daily self-rated measure of the symptoms is the preferred method, compared to everyday visits to professional personnel to examine the symptoms, as it is more convenient as well as being more time and cost saving.

Table I: Summary of studies about Premenstrual Syndrome (PMS) and menstrual-related aspects in Malaysia

No	Study *	Objective/s	Methodology	Results	Discussion & Suggestions
1.	Premenstrual symptoms and remedies practiced by Malaysian women attending a rural primary care clinic (33)	To assess the prevalence and severity of premenstrual symptoms of women in rural area, the associated factors and the practice for remedy.	Participants were 158 women at a rural primary care clinic in Hulu Langat, Selangor, Malaysia. Premenstrual symptoms and severity were assessed using the SPAF. Any remedy to relieve their symptoms were also recorded.	75% reported at least one of the premenstrual symptoms. Around 60% of the women did not use any remedy to reduce their premenstrual symptom(s). PMDD criteria was not assessed.	Premenstrual symptoms were common and affected them physically and emotionally. Participants with severe symptoms could have PMDD and may benefit from medication. Primary care providers to take an active role in identifying, educating, and managing premenstrual symptoms among women.
2.	Attitudes toward menstruation, menstrual related symptoms, and PMS among adolescent girls: a rural school-based survey (31)	To investigate attitudes toward menstruation, menstrual symptoms, PMS, their impact and treatment-seeking behaviours of rural adolescent girls in Malaysia.	Participants were 1,295 secondary school students age 13-19 years old from Pasir Mas and Rantau Panjang, Kelantan were given questionnaire to assess the objectives of the study.	63.1% have PMS. 61.1% viewed PMS as normal part of menstrual cycle. No relationship between attitude and severity of symptoms.	There is a need to educate the girls of these age group on how to manage symptoms of PMS and how to seek treatment.
3.	PMS and dysmenorrhea: urban-rural and multi-ethnic differences in perception, impacts, and treatment seeking (30)	To explore the in-depth understanding of perceptions, impacts, and treatment seeking on menstruation-related issues from an ethnically mixed group of rural and urban girls.	27 focus group discussions (172 participants), age 13-19 years old from schools in Kuala Lumpur and Kelantan.	Many participants had less knowledge on menstruation, thus, menarche was a shock to them. Participants interpreted their PMS and dysmenorrhea as part of normal menstruation, so they do not seek appropriate treatment.	Education on menstruation, PMS and other menstrual related conditions would be useful to build positive attitudes towards menstruation related matter at home, school, and community.
4.	PMS among female medical students of Universiti Malaysia Sabah (29)	To determine the prevalence of PMS and to investigate its associated factors.	211 medical students asked to fill ACOG's PMS-criteria-based questionnaire and how it affects their daily functioning.	51.65% had PMS. No significant relationships between symptoms of PMS with daily activities and functionality. No student diagnosed with PMDD according to DSM-IV.	Women of reproductive age should be educated on PMS, so they could seek appropriate treatment to reduce their PMS. Future study on PMS should be integrated with the services of follow-up and consultations to minimize the effects of the disorder.
5.	Knowledge and attitudes towards menstrual disorders among premarital course participants in Kota Bharu, Kelantan (34)	To compare the knowledge and attitude between men and women among premarital course participants on menstrual disorders.	430 participants answered the questionnaire. The questionnaire consisted of sociodemographic profile, knowledge, and attitude on menstrual disorders. Psychometric properties of the questionnaire: 1. Content validity performed by obstetric and gynaecologist, family medicine specialist, medical statistician expert and Islamic religious teacher. 2. Face validity was conducted on 10 respondents. 3. Internal consistency (α = 0.6-0.89).	Woman had more knowledge and more positive attitudes towards menstrual disorders than men.	Both men and women had low knowledge on menstrual disorders, but men knew less. Plan should be constructed to: • educate both men and women regarding menstrual disorders • promote appropriate health seeking behaviours.
6.	Study of PMS among future health care professionals in Masterskill Global College, Kota Kinabalu, Sabah (32)	To determine the prevalence of PMS, common Premenstrual Syndrome symptoms, impairment of life, social and emotional well beings, and coping methods among students.	300 female students were recruited. Instrument was adapted from the PSST with addition on 6 items about coping and family history of PMS.	37% had PMS based on ACOG-based criteria. 7% of the sample was diagnosed with PMDD (based on DSM-IV). PMS was more severe with younger age group, stressful lifestyles, academic stress, and sleeping problems.	PMS is quite prevalent. Education on PMS should be constructed to: • increase awareness of the disorder • provide a better coping method in the management of the symptoms
7.	Premenstrual symptoms and dysmenorrhea associated with daily routine activities among female undergraduate medical students (35)	To study the prevalence of menstrual disturbance, factors related to it, and the effect of participants' daily activities.	Participants were 292 undergraduate students from a private medical college in Melaka. Instruments consisted of self-administered questionnaire sociodemographic profile, menstrual symptoms during menstruation, and treatment seeking behaviours. Pain from dysmenorrhea was assessed from the scale of 0 (no pain) to 10 (worst pain). Effect from the symptoms was assessed using Born-Steiner Irritability Scale.	69.5% had dysmenorrhea. 84.9% had premenstrual symptoms. The daily routine activities were affected in 52.7% of respondents.	Dysmenorrhea and premenstrual symptoms were quite prevalent among participants and affected their routines and social relationships. To establish school-based counselling to educate the students in managing dysmenorrhea and premenstrual symptoms.
8.	Association between Premenstrual Syndrome and quality of life among female students at a university in Selangor, Malaysia (36)	To study the association between PMS and quality of life, to identify common medical and psychiatric symptoms of PMS, and how the participants managed their symptoms.	Participants were 300 female students. Instruments consisted of questionnaire on sociodemographic profile, obstetrical history, symptoms of PMS, and its' management. SF-36 was utilized to measure quality of life.	The prevalence of PMS was 69.7%. 8.3% had a severe form of PMS. The symptoms of PMS affected the quality of life of the participants.	PMS is prevalent among the selected population, but untreated. Appropriate support should be constructed for the sufferer of this condition as it may affect their quality of life.

Notes:
SPAF = Shortened Premenstrual Assessment Form; ACOG = American College of Obstetricians and Gynecologists; PSST = Pre-Menstrual Severity Screening Tool; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, fourth edition; SF-36 = Short form Health Survey

Some of the common measures to assess PMDD and PMS include Daily Record of Severity of Problems (DRSP) (37), Premenstrual Symptoms Screening Tool (PSST) (40), Calendar of Premenstrual Experiences (COPE) (41), PRISM Calendar (Prospective Record of the Impact and Severity of Menstrual symptoms) (42), Self-Rating Scale for Premenstrual Assessment Form (PAF) (43,44), and the Premenstrual Tension Syndrome (PMTS) Rating Scales (45,46). All of these measures have adequate and satisfactory psychometric properties. The comparisons between these measures are summarized in Table II.

DRSP is one of the most widely used prospective daily self-rated measures to assess both PMS and PMDD (1,3,4,15,39,47). Initially, DRSP was developed based on the criteria of PMDD stated in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) (in section "depressive disorder not otherwise specified") (37). Currently, the items are noted to adhere with the DSM-5 diagnostic criteria of PMDD (3).

Twenty-one items in DRSP measure physical and psychological symptoms related to the menstrual cycle, and three items measure the dysfunctionality related to daily routines, hobbies or social activities, and relationship with others. A six-point scale, ranging from 1 (Not at all) to 6 (Extreme) was used to rate the symptoms. Despite its wide use in both clinical and research practices (1,4,8,37,39,48), only two published studies found have analysed the DRSP's psychometric properties (37,39).

VALIDATION STUDIES OF DRSP

The original study presented the development of DRSP

Table II: Comparison between common measures to assess Premenstrual Dysphoric Disorder (PMDD) and Premenstrual Syndrome (PMS)

No	Instrument (order based on year of latest publication)	Objective & Use	Items & Scale	Psychometric Property	Other Information & Limitation
1.	Daily Records of Severity of Problems (DRSP) (37)	For diagnosis of PMS and PMDD, and monitoring symptoms severity through prospective daily rating.	21 items on PMDD symptoms and 3 items on individual functioning. Likert scale 1 to 6 (the higher rating, the severe the symptoms).	Internal consistency (α = 0.91-0.96). Validity indexes are satisfactory.	Items of DRSP are based on DSM-5 diagnostic criteria of PMDD. DRSP can be downloaded online and used with permission from the original author readily.
2.	Premenstrual Symptoms Screening Tool (PSST) (40)	For screening of PMS and PMDD through one-time rating.	14 items on PMS/PMDD symptoms and 5 items on individual functioning. 4 points Likert scale from "Not at all" to "Severe".	Internal consistency (α = 0.91-0.93). Validity indexes are satisfactory.	PSST is useful and convenient for screening, but not for the diagnosis or monitoring of the symptoms' severity for PMS and PMDD.
3.	Calendar of Premenstrual Experiences (COPE) (41)	For diagnosis of PMS and PMDD, and monitoring symptoms severity through prospective daily rating.	22 items of premenstrual distress symptoms. Daily self-rating. Likert scale 0 to 3 (higher rating, more severe the symptoms).	Test-retest (r = 0.78). Validity indexes are satisfactory.	Items were constructed based on the ACOG criteria of PMS, thus the usage is more for PMS, rather than PMDD.
4.	PRISM Calendar (Prospective Record of the Impact and Severity of Menstrual symptoms) (42)	For diagnosis of PMS and PMDD, and monitoring symptoms' severity through prospective daily rating.	23 items of PMS/PMDD symptoms. Likert scale 0 to 3 (higher rating, more severe the symptoms).	Recent literature did not report psychometric property. However, this measure had been used in various clinical trials and practices.	It was noted that some of the items did not reflect PMDD diagnostic criteria in DSM-5 (i.e., bowel activity) and certain items required more effort to rate (i.e., weight measurement after emptying the bladder before breakfast).
5.	Self-Rating Scale for Premenstrual Assessment Form (PAF) (43, 44)	To assess changes in mood, behaviour, and physical condition during the pre-menses, through retrospective rating. Patient is required to rate their symptoms from about 7 days before the onset of menses to the time it started.	Long form – 95 items. Short form – 10 items. Likert scales 1 to 6 (from "no change" to "extreme change").	Internal consistency (α = 0.69-0.91). Validity indexes are satisfactory.	Given the nature of retrospective administration and item's construction (based on literature and established questionnaires on depression, anxiety, and premenstrual distress), PAF is useful for differentiating between clinical population of PMS or PMDD with non-clinical population, but not for the diagnosis of PMS or PMDD.
6.	The Premenstrual Tension Syndrome (PMTS) Self-Rating Scales (45, 46)	For diagnosis of PMS and PMDD, and monitoring symptoms severity through prospective daily rating (for Self-Rating version).	The self-rating version contains 36 items on PMS/PMDD symptoms. Dichotomous items (Yes or No). Items constructed based on interviews and other established questionnaires on menstrual symptoms. Other versions: Observer rating form (11 items) and Visual rating forms (VAS) (11 items) as complementary versions.	Internal consistency ($\square$ = 0.89-0.93). Validity indexes are satisfactory.	PMTS-SR had been used in numerous studies and clinical trials related to PMS and PMDD. However, it was noted that some of the items did not reflect PMDD diagnostic criteria in DSM-5 (i.e., changes in hand writing and clumsiness). Furthermore, a dichotomous rating scale used in this measure provide limited range of description for severity of symptoms, as compared to wider range/point Likert scale. The VAS form is more sensitive in detecting symptoms' changes in severity.

Notes:

DSM-5 = Diagnostic and Statistical Manual, Fifth edition; ACOG = American College of Obstetricians and Gynecologists

among the United States samples (37), and the second highlighted the adaptation and validation of DRSP among nursing students in China (39). Generally, both studies demonstrated good reliability and validity indexes. Table III presents a summary of the psychometric properties of both studies.

In both studies (37,39), the respondents were required to make daily ratings for at least two menstrual cycles. For the purpose of discussion here, the values from these studies (37,39) have been described in range (taken from both of menstrual phases: luteal and follicular phases), and based on the total items score, rather than each factors or groups score (except for internal consistency for each factors in the Chinese study).

The original study (37) was divided into two studies: study A and study B. For study A, the respondents were 27 individuals whose symptoms ranged from no or few premenstrual problems to having PMDD, while for study B, the respondents included 243 samples who fulfilled the PMDD criteria stated in the Diagnostic and Statistical Manual of Mental Disorder, fourth edition (DSM-IV) (37).

It was found that the reliability indexes for study A and study B ranged from good to excellent, with internal consistency (α = 0.93 to 0.96) and test-retest (r = 0.73 to 0.99) (37). The validity indexes in the original study revealed that DRSP correlated satisfactorily with the criterion measures: depressive measure and impairment in social situation measure (concurrent validity, r = 0.38 to 0.75), and inversely correlated with different construct measure: quality of life and satisfaction measure (divergent validity, r = -0.44) (37).

Meanwhile, the original study did not report exploratory factor analysis (37). However, the authors have classified 21 items on physical and psychological symptoms of PMDD in DRSP into three theoretical groups in the data analysis, including (a) depressive symptoms (b) physical symptoms (c) anger/irritability (37). The authors also reported that DRSP is able to measure less severe premenstrual symptoms and the changes of severity over the cycle (37). Moreover, for clinical purposes, DRSP is able to detect changes in PMDD symptoms with at least two types of treatment (37).

The second validation study was conducted among Chinese female nursing students in China (39). It was found that the validity indexes for this study are excellent with internal consistency (α = 0.96 to 0.97) and test-retest (r = 0.84) (39). The validity indexes in the study showed that the Chinese version of DRSP correlated satisfactorily with the convergent measure: measure to assess PMS/PMDD (convergent validity, r = 0.43 – 0.45), and the criterion measure: depressive measure (concurrent validity, r = 0.43 to 0.55) (39).

The Chinese study also reported exploratory factor analysis of the Chinese version of DRSP (39). It showed four factor structures with 75.6% accounted variance (Factor 1 (Mood) - 12 items (34.5% variance), Factor 2 (Behaviour) - 5 items (18.51% variance), Factor 3 (Pain) - 2 items (11.81%) and Factor 4 (Physical) - 2 items (10.80%)) (39). The internal consistency for each factor ranged from moderate to excellent (α = 0.66 to 0.97) (39).

CURRENT PROGRESS IN MALAYSIA

Currently, a series of ongoing adaptation and validation studies for psychological measures assessing PMDD are being conducted. The Daily Records of Severity

Table III: Summary of psychometric properties of the original and other validation study on the Daily Record of Severity of Problems (DRSP)

No	Study	Samples	Reliability*		Validity*			Factor Structure
			Internal consistency	Test-retest	Convergent	Divergent	Concurrent	
1.	The original study (37)	American samples: Study A: 27 respondents range from who had no or few menstrual problems to PMDD.	Study A α = 0.93-0.96	Study A *r* = 0.98-0.99	Not available	Study A — Not available	Study A HDRS (*r* = 0.75)	EFA was not performed. However, the authors theoretically classified the items into 3 groups in the data analysis: (a) Depressive Symptoms (b) Physical Symptoms (c) Anger/Irritability
		Study B: 243 respondents met DSM-IV criteria of PMDD	Study B α = 0.95	Study B *r* = 0.73-0.86	Not available	Study B Q-LES-Q (*r* = -0.44)	Study B HDRS (*r* = 0.38), SAS (*r* = 0.45)	
2.	The Chinese study (39)	Chinese sample: 126 nursing students in university at urban area in China	α = 0.96-0.97 F1, α = 0.96-0.97 F2, α = 0.87-0.89 F3, α = 0.66-0.84 F4, □ = 0.73-0.90	*r* = 0.84	PMTS-SR (*r* = 0.43-0.45)	Not available	SDS (*r* = 0.43-0.55)	Exploratory factor analysis: 4 factors, 75.63% accounted variance. F1 (Mood): 12 items (34.5%) F2 (Behaviour): 5 items (18.51%) F3 (Pain): 2 items (11.81%) F4 (Physical): 2 items (10.80%)

Notes: DSM-IV: Diagnostic and Statistical Manual of Mental Disorder, fourth edition; F: Factor; HDRS: Hamilton Depression Rating Scale; PMTS-SR: Premenstrual Tension Syndrome Self-Rating; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire; SAS: Social Adjustment Scale; SDS: The Zung Self-Rating Depression Scale
* The values of reliability and validity indexes were utilized from the total score of items in each study.

of Problems (DRSP) has been chosen for adaptation and validation based on its adherence to the DSM-5 diagnostic criteria of PMDD. The objective of this study is to determine the reliability index, validity index, and factor structure of the Malay adapted version of DRSP.

CONCLUSION

From the review, it can be concluded that little is known about PMDD in Malaysia. This could be due to a limited number of local studies in this field, in addition to the lack of validated measure to assess PMDD among the Malaysian population. Hence, the ongoing study is meant to address this situation by taking the initial step in adapting and validating tool(s) to assess the disorder. Previous findings showed that despite PMDD is a debilitating condition, it is relatively manageable. Considering the significant burden and impacts of this disorder, it is hoped that the outcome of this study could encourage further local research in this field.

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