Original Article

Relationship of Premenstrual Syndrome and Premenstrual Dysphoric Disorder with Major Depression: Relevance to Clinical Practice

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ABSTRACT

Background: Premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD) and depressive disorder are fairly common; symptoms do overlap, often under-identified and under-emphasized, particularly in rural India. **Objective:** The objective was to assess the occurrence of PMS and PMDD in a sample of students and staff of a nursing college and to find their correlation with depression. **Materials and Methods:** A prospective cohort study; Tertiary Care Hospital in Rural India (Wardha, Maharashtra); 118 female nursing students or staff aged between 18 and 40 years, who were likely to stay within the institution for the study period. The participants were rated on Penn daily symptom report prospectively for a period of 3-month. Those who scored positive were applied diagnostic and statistical manual of mental disorders, 4th edition, text revision (DSM-IV TR) criteria for PMDD; and were applied primary care evaluation of mental disorders depression screening followed by DSM-IV TR criteria for depression. Severity of depression was measured using Hamilton Depression Rating Scale. **Results:** Main outcome measures were frequency and severity of depression in individuals with PMS and PMDD and their clinical and sociodemographic correlation. The age range of the sample was 18-37 years. Some PMS symptoms were observed in 67%; diagnosis of PMDD in 10%; depressive symptoms in 28% of the sample. 46.4% of those with depressive symptoms had major depression. The diagnosis of major depression was significantly associated with the severity of PMS symptoms as well as the presence of PMDD. **Conclusion:** Premenstrual syndrome is present in a substantial proportion of young females. Concurrent depression is increased by the severity of PMS symptoms and the presence of PMDD. Gynecologist needs to screen such subjects for depression and refer to mental-health professional early, in routine clinical practice.

Key words: *Depression, India, premenstrual dysphoric disorder, premenstrual syndrome*

Access this article online	
Website: www.ijpm.info	Quick Response Code
DOI: 10.4103/0253-7176.155614	

INTRODUCTION

Premenstrual syndrome (PMS) is a common disorder of young and middle-aged women, characterized by emotional and physical symptoms that consistently recur in a cyclic manner during the luteal phase of the MS and typically abate by menopause.[1,2] The

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symptoms which exacerbate during the premenstrual period may be present in about 20-40% of women,[3] though some studies quote higher figures.

Premenstrual dysphoric disorder (PMDD) is characterized by a constellation of affective and somatic symptoms manifested during late luteal phase and resolve shortly after the onset of menses.[4] Unlike other mood disorders, the mood disturbances associated with PMDD are cyclical and tightly linked to the menstrual cycle (MS); hence, the occurrence of symptoms ceases during pregnancy and after menopause.[5]

Up to 85% of menstruating women report one or more premenstrual symptoms and 2-10% report incapacitating symptoms.[3,6] More than 200 symptoms have been associated with PMS, but irritability, tension, and dysphoria are the most prominent and consistently described.[6] Symptoms relieve within 4 days of the onset of menses and do not recur until at least day 13 of the MS.[6]

During premenstrual period, onset of a depressive episode may be observed. Approximately, 65% of women with unipolar depression experienced PMS.[7] Women with PMS more frequently suffer from postpartum depression.[8] Women suffering from headache frequently observe cephalalgia during PMS.[9] Significant behavioral symptoms (depression, aggression, agitated depression, irritability and so on) occur during PMS and do interfere with personal, social, and occupational functioning. The exact symptomatology and its prevalence vary across studies.[10,11]

Overall, little data are available on the presence of PMS and PMDD in Indian population[12-16] which houses about a sixth of the world female population and the largest adolescent female population. Moreover, studies have not dealt with rural setting, although 70% of women in India reside in rural areas. There is a suggestion that differences exist in the premenstrual symptoms and severity thereof in the urban and rural areas.[17] Therefore, this study was undertaken in order to evaluate the presence of PMS and PMDD and find their correlation with depression in a female population primarily comprising nursing students and staff in a rural setting.

MATERIALS AND METHODS

Setting and participants

The current prospective observational study was carried out at a rural tertiary care medical college and hospital located in Wardha, Vidharbha region of Maharashtra, by the Department of Psychiatry. Female nursing students or staff aged between 18 and 40 years, who were likely to stay within the institution for the study period was included. Those subjects with diagnosed chronic illnesses like epilepsy, migraine, anemia, thyroid disease, polycystic ovarian disease; or those using oral contraceptive pills, any hormonal drugs, propranolol or antihypertensives were excluded. Subjects with previously diagnosed psychiatric illness were also excluded.

Procedure

The students and the staff members (total: 118) were divided into batches of 25 and were given a short sensitizing lecture focusing on the symptomatology and identification of PMS, PMDD, and depressive disorder. Demographic and clinical details were noted after obtaining informed consent. The participants rated 17 symptoms of Penn Daily Symptom Report scoring sheets on a daily basis. The menstrual period (day 1 to end of menstrual flow) and premenstrual period (5 days prior to 1 day prior to start of menstrual flow) were marked on the scoring sheet. The days not ascribed to menstrual or premenstrual period was considered as "other" period. The ratings were done for a 3-month period. Weekly mobile short message service and workplace/classroom reminders were sent to the participants. Subjects with features suggestive of PMDD were further investigated for the presence of PMDD using diagnostic and statistical manual of mental disorders, 4th edition, text revision (DSM-IV TR) diagnostic research criteria. Information was gathered through a structured clinical interview by one of the authors (RR). At the end of the study period, the participants were asked to rate their depressive symptoms if any, on the primary care evaluation of mental disorders (PRIME MD) depression screen. The DSM-IV TR criteria for depression were applied to those scoring above the cutoff on PRIME MD, and Hamilton Depression Rating Scale was applied to assess the severity of depression.

Instruments

Penn daily symptom report:[18] Is a self-administered checklist enquiring 17 symptoms that are rated on a Likert scale of 0 (not at all) to 4 (very severe). The scale is short and reliable, valid with good internal consistency and used in a primary care setting.

Primary care evaluation of mental disorders[19] is a self-reported screening instrument for depression designed to facilitate the recognition and diagnosis of the most common mental disorders in primary care patients. The depression screen has 9 questions with 4 possible responses (not at all to every day). If the response to five or more questions is yes, with one of the first two questions being answered as affirmative, a diagnosis

of depression can be considered. It has sensitivity of 94.6%, specificity of 49.5%, and accuracy of 78.7%.

Hamilton rating scale for depression (HAM-D):[20] Has 17 items with a total score ranging from 0 to 50, is widely used to assess the symptoms of depression. Ratings are made on the basis of the clinical interview, plus any additional available information. The reliability and validity of the scale are fair.

Diagnostic and statistical manual of mental disorders, 4th edition, text revision research criteria for PMDD[21] require the presence of symptoms during the last week of most menstrual cycles of the preceding year which begin to remit after the onset of the follicular phase. For a diagnosis, 5 out of 11 symptoms should be present and with at least one of them being markedly depressed mood, hopelessness or self-deprecating thoughts; marked anxiety, tension or feelings of being "keyed up" or "on the edge," marked affective lability; or persistent and marked anger, irritability or increased interpersonal conflicts. Symptoms should be associated with socio-occupational impairment, not merely be an exacerbation of another disorder, and the criteria should be confirmed by prospective ratings of at least 2 months.

Using SPSS 19.0, descriptive statistics were applied for analysis of demographic and clinical variables; inferential statistics to access relationships between the demographic and clinical variables and PMDD and PMS symptoms.

RESULTS

A total of 118 subjects was approached, of which 100 consented to the study and 18 refused consent. Table 1 shows the sociodemographic and clinical details of the subjects. The mean age of the sample was 21.83 years (±4.85) with a range of 18-37 years. Most of the subjects were unmarried and belonged to the middle socioeconomic status. The MSs were regular in most of the participants, and their duration ranged from 26 to 30 days.

The phenomenology in relation to the MS is shown in Table 2. Overall, fatigue, mood swings, and irritability were the most common symptoms in the premenstrual phase; fatigue, cramps, and body aches were the most common symptoms in the menstrual phase and concentration difficulties, headache, and fatigue were the most common symptoms in the other periods. The majority of the symptoms were mild in severity. When compared to premenstrual and menstrual phase, the lesser number of symptoms were present in the other time periods.

Table 1: Demographic and clinical details

Demographic and clinical parameters	*n* (%) or mean (± SD)
Age in years	21.83 (±4.85)
Marital status	
Married	25 (25)
Not married	75 (75)
Socioeconomic status	
High	4 (4)
Middle	94 (94)
Low	2 (2)
Menstrual cycle regularity	
Regular	77 (77)
Irregular	23 (23)
Menstrual cycle length in days	28.84 (±2.91)
Menstrual cycle duration	
21-25 days	14 (14)
26-30 days	67 (67)
31-35 days	18 (18)
36-40 days	1 (1)

As per the criteria of Penn Daily Symptom Report, the majority of females had some premenstrual symptoms (67 participants). Of these, 26 participants had some premenstrual distress, 20 had mild PMS, 10 had moderate PMS, 8 had severe PMS, and 3 had very severe PMS. The diagnosis of PMDD according to DSM-IV criteria was present in 10 participants. The diagnosis of PMDD according to DSM-IV TR and premenstrual symptom severity (measured by Penn Daily Symptom Report) concurred with each other (Mann-Whitney U = 12.5, $P < 0.001$). The severity of premenstrual symptoms did not have significant correlation with age, socioeconomic status or cycle length (Kendall Tau b of 0.005, −0.039, and 0.089 with $P = 0.950$, 0.669 and 0.264, respectively). However, premenstrual symptom severity and the presence of PMDD diagnosis were associated with lesser age of menarche (Kendall Tau b = −0.170, $P = 0.038$ and Mann-Whitney U = 139.5, $P < 0.001$, respectively).

Depression according to PRIME MD was present in 28 participants [Table 3]. Major depressive disorder according to DSM-IV TR criteria was present in 13 of them (i.e., 46.4% of those with depressive symptoms), and the remaining 15 had subsyndromal depression. Among the 13 with major depressive disorder, 4 had mild depression (HAM D scores 7-17), 5 had moderate depression (HAM score 18-24), and 4 had severe depression (HAM D score of >24).

The relationship of depressive symptoms to that of premenstrual symptoms is shown in Table 4. Significant relationship was found between the diagnosis of PMDD and the presence of depression according to PRIME MD as well as the presence of DSM-IV TR diagnosis of depression ($\chi^2 = 5.644$, $P = 0.027$ and $\chi^2 = 7.162$,

Table 2: Phenomenology of symptoms during premenstrual and menstrual phase and other times according to Penn Daily Symptom Report

Symptoms	Premenstrual		Menstrual		Other times		χ^2 (significance)[a]
	Not present	Present	Not present	Present	Not present	Present	
Fatigue	30	70	23	77	77	23	70.235 (<0.001)
Co-ordination	79	21	81	19	96	4	13.796 (<0.001)
Overwhelmed/out of control	69	31	81	19	90	10	13.875 (0.001)
Feeling of hopelessness/worthlessness	63	37	74	26	92	8	23.728 (<0.001)
Headache	54	46	65	35	71	29	6.402 (<0.001)
Anxiety	57	43	71	29	84	16	17.592 (<0.001)
Aches/body aches	59	41	48	52	92	8	46.955 (<0.001)
Irritability	47	53	56	44	93	7	52.482 (<0.001)
Mood swings	46	54	65	35	91	9	46.403 (<0.001)
Swelling/bloating	59	41	81	19	97	3	43.882 (<0.001)
Cravings (food)	63	37	76	24	87	13	15.535 (<0.001)
Low interest in usual activities	64	36	54	46	80	20	15.330 (<0.001)
Cramps	74	26	30	70	97	3	104.839 (<0.001)
Depression	59	41	61	39	85	15	19.348 (<0.001)
Breast tenderness	68	32	72	28	94	6	22.844 (<0.001)
Sleep	80	20	74	26	78	22	1.065 (0.587)
Concentration problems	60	40	70	30	70	30	3.000 (0.223)

[a]Comparisons conducted between the three groups (premenstrual, menstrual, and other times), with 2° of freedom

Table 3: Severity of premenstrual symptoms and depressive symptoms

Severity of Symptoms	Scores	*n* (%)
Penn Daily Symptoms Report		
No premenstrual syndrome	Up to 5	33 (33)
Some premenstrual distress	6-10	26 (26)
Mild premenstrual syndrome	11-15	20 (20)
Moderate premenstrual syndrome	16-20	10 (10)
Severe premenstrual syndrome	21-25	8 (8)
Very severe premenstrual syndrome	26-30	3 (3)
Diagnosis of PMDD according to DSM IV TR		10 (10)
Depression according to PRIME MD		28 (28)
Diagnosis of depression according to DSM IV TR		13 (13)
Severity of depression according to HAM D		
Mild (7-17)		4 (30.8)
Moderate (18-24)		5 (38.4)
Severe (>24)		4 (30.8)

DSM IV TR – Diagnostic and statistical manual fourth edition text revision; HAM-D – Hamilton depression rating scale; PMDD – Pre Menstrual dysphoric disorder; PRIME MD – Primary care evaluation of mental disorders

Table 4: Relation of pre-menstrual symptoms with depressive symptoms

Symptoms/Diagnosis	Premenstrual symptom severity	Diagnosed PMDD
PRIME MD depressive symptoms	811 (0.118)[a]	5.644 (0.027)[b]
Diagnosis of depression according to DSM IV TR criteria	315 (0.008)[a]	7.162 (0.024)[b]
Severity of depression according to HAM D[d]	−0.223 (0.315)[c]	9 (0.164)[a]

Shown as test value (significance) for [a]Mann-Whitney U-test; [b]Chi-square test with Fisher's exact *P* values; [c]Kendall Tau b; [d]Based on a sample of 13 subjects who met DSM IV TR criteria for depression; DSM IV TR – Diagnostic and statistical manual fourth edition text Revision; HAM-D – Hamilton depression rating scale; PMDD – Premenstrual dysphoric disorder; PRIME MD – Primary care evaluation of mental disorders

P = 0.024, respectively). This suggested that a diagnosis of PMDD concurred with the diagnosis of major depression. Furthermore, there was a significant relationship between the severity of premenstrual symptoms and the presence of a diagnosis of depression according to DSM-IV TR (Mann-Whitney U = 315, *P* = 0.008).

DISCUSSION

Main findings

The age range of the sample was 18-37 years. Some PMS symptoms were observed in 67%; diagnosis of PMDD in 10%; depressive symptoms in 28% of the sample. 46.4% of those with depressive symptoms had major depression. The diagnosis of major depression was significantly associated with the severity of PMS symptoms as well as the presence of PMDD.

Strengths and limitations of the study

study takes a systematic look at the occurrence of premenstrual symptoms and PMDD in a rural area (usually neglected population in any country). Some of the key demographic variables have been looked into, and the association with a diagnosis of major depression has been explored. The sensitization lecture imparted as a part of the methodology could itself be indirect means of creating awareness of the same in the community.

The limitations of the study are

highly selective sample comprising rural nursing students and staff from one academic institute that limits the generalizability of the findings; small sample size; longitudinal relations between potential

confounders such as examination stress and outcome were not assessed; and the presence of medical and gynecological disorders were not systematically evaluated or ruled out which may have influenced the symptom profile encountered with PMS. The diagnosis of depression was based upon clinical interview, and structured instruments like Mini International Neuropsychiatric Interview were not used. Recall bias cannot be ruled out for certain aspects of the clinical information. The recruitment was through purposive sampling and only those women who consented to participate were enrolled.

Interpretation

This study in a relatively young female population finds that distressing premenstrual symptoms are fairly common and present in about two-thirds of the studied population. Rates of premenstrual symptoms across the globe range from 25% to 96%.[22,23] A cross-cultural study comprising 14 culturally different areas in 10 countries reported prevalence of 23-34% in non-Western cultures; 71-73% in western countries.[22] However, recent studies from Asian countries including Egypt, Saudi Arabia, and Japan show a high proportion of women do suffer from premenstrual symptoms.[23-25] The differences in reported rates of premenstrual symptoms depend to some extent on the definitions used methods of data collection, sampling technique, and the type of study population.

The occurrence of PMDD in our study (10%) is in line with published literature. PMDD, as per the DSM-IV criteria, is found to occur in 3-8% of women and these figures have been closely replicated in several epidemiological studies and surveys.[26,27] Gehlert and Hartlage[28] found that prevalence rates for PMDD, even when DSM-IV criteria are used, significantly vary depending upon the method of measuring symptom change. The restrictive nature of the DSM-IV PMDD criteria, particularly the requirement of an arbitrary cutoff point of at least 5 severe symptoms, remains controversial.[29] A question arises as to whether there are a substantial proportion of symptomatic women in the general population who have premenstrual impairment and distress, and may need treatment but do not meet DSM-IV criteria for PMDD due to lesser number of symptoms reported. In this regard, Chawla *et al*.[30] reported that 12.6% of women met full PMDD criteria for one cycle. Wittchen *et al*.[31] found 35.3% of women had four or more premenstrual symptoms, and prevalence of sub-threshold PMDD was 18.6%. Looking at studies from India, PMDD has been reported in about 10% of the population.[12]

Relationship of the symptoms of PMS with depression has been evaluated by many authors. McHichi alami *et al*.[32] remarked on the high rates of depressive symptoms such as low mood, fatigue, and sleep abnormalities in those women with PMDD. Similar results of increased rates of depression in those suffering from PMS have been found by other authors.[17,33-36] Typically, irritable and depressed moods increased in the late luteal phase.[33] Our results concur with previous findings as we observed presence of depressive symptoms to be associated with premenstrual symptoms, as well as PMDD.

Though a wide range of symptoms have been associated with premenstrual complaints,[2] we evaluated a specific set of a-priori 17 symptoms. We found that increased appetite, sleep disorders (insomnia and hypersomnia), fatigue, feeling of lack of energy, and decrease of interest for everyday activity were quite common. Similar findings have been observed by other researchers.[34] Some other studies have reported different frequencies and rank order of symptoms with breast tenderness and muscle pain as predominant complaints.[17,37,38] The reason why different symptoms are reported even when using scales of similar items may be partially attributable to cultural differences and prior bias toward a set of symptomatology due to preconceived notions about premenstrual problems and symptoms.

CONCLUSION

Premenstrual syndrome is present in a substantial proportion of young females. Concurrent depression is increased by the severity of PMS symptoms and the presence of PMDD. Gynecologist needs to screen such subjects for depression and refer to mental-health professional early, in routine clinical practice. There is a need for conducting larger prospective studies focusing on PMDD and its relation with depressive disorder.

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How to cite this article: Padhy SK, Sarkar S, Beherre PB, Rathi R, Panigrahi M, Patil PS. Relationship of premenstrual syndrome and premenstrual dysphoric disorder with major depression: Relevance to clinical practice. Indian J Psychol Med 2015;37:159-64.

Source of Support: Nil, **Conflict of Interest:** None declared.