

Assessment of premenstrual syndrome among female students in Southeast Nigeria

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Abstract

Introduction: Premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) are premenstrual disorders characterized by a cyclical pattern of severe premenstrual symptoms experienced by women, which typically occurs during the days prior to menstruation and ends at the onset of menses. These symptoms may be unbearable in some women and hinder normal daily life including personal relationships, social activities, work and academic activities. The aim of the present study was to assess the prevalence and severity of PMS among female students.

Material and methods: PMS and PMDD were diagnosed using the Calendar of Premenstrual Experiences (COPE) form. Participants were requested to complete the form for two consecutive menstrual cycles. A cross-sectional descriptive study was conducted in 480 female students (aged 15 to 45 years) at the University of Nigeria, Nsukka.

Results: Of the 480 participants, 206 (42.9%) women met the criteria for diagnosis of PMS, and 274 (57.1%) did not meet the criteria for PMS. Among participants with PMS, 98 (47.6%) women met the criteria for severe PMS or PMDD. In women with PMS, the most prevalent symptoms were trouble concentrating (85.0%), irritability (79.2%), abdominal bloating (75.3%), aches and pains (70.0%), mood swings (69.2%), breast tenderness (69.2%), and food craving (68.0%).

Conclusions: The prevalence of PMS, as well as PMDD, was high among female students in Nigeria.

Key words: disorders, symptoms, menstruation, cyclical.

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Introduction

During reproductive age, women generally experience one or more symptoms including psychological, behavioral and physical symptoms regularly during the early menstruation period. Premenstrual syndrome (PMS) is a commonly used term that has been variably defined. The PMS is a condition characterized by distressing psychological, behavioral and physical symptoms in the absence of any underlying diseases, which develops within the luteal phase of the menstrual cycle and resolves shortly after menstruation [1]. These symptoms commonly include depression, irritability, bloating, and isolation, among others. The luteal phase begins after ovulation and ends at the onset of menstruation. The American College of Obstetricians and Gynecologists (ACOG) (2009) includes mainly psychiatric and physical symptoms in defining PMS [2], and stipulated that 85% of menstruating women experience at least one premenstrual symptom which may manifest in varying degrees during their reproductive lives [2]. The American Psychiatric Association (APA) emphasizes psychiatric symptoms as criteria for defining PMS [3].

The severity of premenstrual symptoms can vary very significantly from woman to woman. In PMS, premenstrual symptoms may be severe in some women and can alter normal daily functioning in such women [4]. These symptoms can affect work and academic performances, increase medical expenses, and lower the quality of life in women with PMS [4]. Premenstrual dysphoric disorder (PMDD) is severe PMS, mostly with predominating psychiatric symptoms [3]. In PMDD, the symptoms may be very severe to manifest serious disability and often require pharmacological intervention. In the luteal phase of the menstrual cycle, approximately 80% of women indicate physical and psychological symptoms without impairment in daily activities [5]. A study reported that 36% of women met the criteria for diagnosis of PMS at a 1-year follow-up [6]. Studies have shown that approximately 30–50% of women experience a mild to moderate form of PMS for several days [7], and PMDD is prevalent in 3–8% of women [8].

Despite the common nature of PMS, its etiology still remains unknown [9]. The contributions of socio-cultural and genetic factors are also unclear. Although no genes have been identified, twin studies suggest that there could be possible heritability to PMS [10]. In addition to genetic predisposition, it is quite possible that socio-cultural factors and a woman's personal expectations could influence her premenstrual symptoms [11]. The PMS is likely cross-cultural, with PMS reported across different ethnic and cultural societies [12]. The symptoms may vary among women or groups of women. Hence, the predisposing factors for the development of PMS have not been clearly distinguished. Basically, the body tissues of a woman become sensitive to changes in hormone levels. Changes in estrogen and progesterone levels throughout the menstrual cycle can influence the chemicals in the brain such as serotonin, which affect mood [10]. Studies suggest that changes in estrogen and progesterone levels trigger symptoms of PMS

[11, 12]. A credible explanation for this is that there is recurrence of PMS symptoms during progesterone therapy in post-menopausal women who were previously diagnosed with PMS [13, 14]. The cyclic effect of estrogen and progesterone on serotonin, γ -aminobutyric acid, and dopamine systems may be the cause of changes in mood, and these may also affect the renin-angiotensin system (RAS), which likewise may be the cause of symptoms such as bloating, swelling and weight gain that occur during PMS [11, 15, 16]. However, studies have found no significant difference in estrogen and progesterone levels of women with and without PMS [6]; women with PMS do not have higher levels of estrogen and progesterone than women without PMS. Thus, it still remains unclear why some women develop PMS and others do not. The most probable explanation based on several studies is that women who develop PMS are more sensitive to normal hormonal changes during the menstrual cycle [10–12]. Additionally, gonadotropin-releasing hormone analogues are involved in PMS as they suppress the estrogen levels [14, 17].

The diagnostic criteria are worthy of mention. There is no single symptom characteristic for diagnosis of PMS or PMDD [3], but, rather, the cyclic occurrence of a symptom complex. Diagnosis focuses on the symptom complex which includes physical and behavioral symptoms for PMS, and mood symptoms for PMDD [1–3]. Generally, symptoms must occur prior to menstruation and resolve rapidly with the onset of menstrual flow, and should not occur until after ovulation. One study found that most women presenting with the chief complaint of PMS actually do not have a symptom-free window following the onset of menses and therefore do not meet the criteria for PMS/PMDD [18]. The symptom complex may or may not interfere with work, school, relationships, or some aspects of daily living. The symptom complex must not occur as a result of an underlying medical condition. Common medical conditions to be considered in diagnosis of PMS include hypothyroidism, substance abuse disorders, bipolar disorders, depressive disorders and anxiety disorders. Confirmation of these conditions entails a careful medical history and consultations as required. Prospective recordings are critical in this determination [2, 3]. Several calendars have been validated, including the Calendar of Premenstrual Experiences (COPE), the Daily Record of Severity of Problems (DRSP), and the Prospective Record of the Impact and Severity of Menstruation (PRISM) [19, 20]. However, these methods require immense time and effort since patients have to report their symptoms daily for at least two menstrual cycles.

Recent treatment of PMS focuses on pharmacologic interventions in addition to non-pharmacologic interventions. The mainstay of pharmacological therapy is the SSRIs. Other treatments include the use of antidepressants, NSAIDs, oral contraceptives, etc. Non-pharmacological interventions focus on modification of lifestyle for relieving symptoms of PMS especially in mild to moderate degrees. These include exercise, yoga, intake of vitamins (A, E and B₆) and mineral supplements (Ca and Mg). In addition, restricted intake of salt, caffeine, sweet and fatty foods is highly recommended.

Research studies in PMS have been extensively evaluated in most Western countries, but to a limited extent in Africa. In Nigeria, due to its personal nature, women regard PMS as a common problem not requiring medical attention. It is also one of the major causes of low academic performance and class absenteeism among young female students [21]. Therefore, in order to increase awareness of menstruation-related symptoms and enhance the quality of life of women of reproductive age, this study is aimed at assessing the prevalence of PMS among reproductive aged females and investigating the frequency and severity of symptoms experienced by women with PMS.

Material and methods

Selection of participants

This cross-sectional descriptive study was conducted at the University of Nigeria, Nsukka, Enugu state. A total of 480 healthy reproductive aged (15 to 45 years) female pharmacy students from the University of Nigeria, Nsukka were recruited for the study. The study duration was from March to October 2017. Written informed consent was obtained from all participants; those who were pregnant, on contraception, amenorrhic, and with current debilitating medical, psychiatry or gynecological problems were excluded from the study.

Study design

The questionnaires were distributed in the respective female students' hall of residence. First, the study was individually explained to the subjects and they were given assurance of confidentiality of their information. Subjects' characteristics including socio-demographics, menstrual history, and others were collected according to pro forma. The subjects were briefed on how to appropriately complete the self-reported COPE form throughout two menstrual cycles. Each subject was instructed to record her experiences of each symptoms in COPE only during the evening (previous 12–18 h) as absent, mild, moderate or severe. For monitoring, each subject was visited after completion of the COPE form for the first menstrual cycle. The first set of questionnaires was collected and reviewed for errors; these errors were further explained to the subject to prevent similar errors in the second set of questionnaires. They further completed the COPE form for the next consecutive menstrual cycle. At the end of the second menstrual cycle, the second set of questionnaires was collected and assessed for PMS.

Study instrument

The COPE is another valid and reliable tool for diagnosis of PMS [22–24]. It is a single sheet calendar diary consisting of 21 premenstrual symptoms to assess psychological, physical, and behavioral factors for each day of the menstrual cycle [21]. The premenstrual symptoms are recorded by self-report visual analogue scales [21]. The COPE scoring for each symptom is a 3-point rating scale: absent = 0, present = 1, severe (enough to distort daily routine in various aspects) = 2. The COPE is one of the most acceptable prospective records for clinical and research investigations of PMS [24].

Criteria for PMS

Clinical criteria for diagnosis of PMS have been established by ACOG [2]. According to ACOG, criteria for diagnosis of PMS include at least one moderate to severe mood symptom and one physical symptom [2]. Mood or affective symptoms include depression, anxiety, irritability, confusion, anger outbursts, and loneliness. Somatic pain symptoms are abdominal bloating, breast tenderness, headache, muscle pain and weight gain.

Assessment of PMS

The PMS was assessed in subjects with COPE for two consecutive menstrual cycles according to the DSM-IV. Subjects were considered to have PMS if they had at least one severe (score rating = 2) psychological symptom (Items 1 to 8 of COPE), and one severe (score rating = 2) physical symptoms (Items 9 to 13 of COPE) in the luteal phase of the menstrual cycle, but absent in the follicular phase. Subjects with five or more symptoms in total including one severe (score rating = 2) mood symptom (Items 1 to 4 of COPE) in the luteal phase of the menstrual cycle, but absent in the follicular phase, were considered to have severe PMS or PMDD [23].

Ethical clearance

The study was approved by the institutional ethical review committee.

Statistical analysis

The collected data were coded into Microsoft Excel and analyzed using SPSS v. 16. Categorical variables were expressed as frequency and percentage.

Results

Socio-demographic data

A total of 480 respondents were recruited for the study. Table I shows the characteristics of respondents. The mean age was 20 ± 2 years. The majority of the respondents were single (95.0%), Christians (97.5%), and 36.7% were in the second year of their study. Most of the respondents (62.5%) had menarche at age 13–16 years, and 54.2% had the menstrual interval between 25 and 29 days.

Prevalence of premenstrual syndrome

Out of the 480 respondents surveyed, 206 (42.9%) women met the criteria for diagnosis of PMS. Among the women with PMS, 98 (47.6%) had symptoms severe enough to interfere and cause impairment in normal daily activities, and hence met the criteria for severe PMS or PMDD. The remaining 108 (52.4%) women with PMS had mild or moderate PMS.

Prevalence of premenstrual symptoms

Table II also shows the premenstrual symptoms experienced by respondents with PMS. The most prevalent symptoms in respondents with PMS were trouble concentrating (85.0%), irritability (79.2%), abdominal bloating (75.3%), aches and pains (70.0%), mood swings (69.2%), breast ten-

Table I. Characteristics of respondents

Characteristics	Frequency (n = 480)	Percentage (%)
Age [years]:		
15–17	52	10.8
18–20	200	41.7
21–23	184	38.3
> 23	44	9.2
Marital status:		
Single	456	95.0
Married	24	5.0
Religion:		
Christian	468	97.5
Muslim	12	2.5
Academic level:		
First year	60	12.5
Second year	176	36.7
Third year	88	18.3
Fourth year	96	20.0
Final year	60	12.5
Menarche age [years]:		
9–12	132	27.5
13–16	300	62.5
> 16	48	10.0
Menses duration [days]:		
1–3	8	1.7
4–6	420	87.5
> 6	52	10.8
Menstrual interval [days]:		
1–24	96	20.0
25–29	260	54.2
30–34	76	15.8
> 34	48	10.0

derness (69.2%), and food craving (68.0%). Crying spells (19.3%) and insomnia (20.2%) were the least prevalent symptoms in respondents with PMS.

Adaptive coping strategies

Table III shows the strategies adopted by respondents. The most common strategies of all women with PMS were warm or cold shower (96.3%), listening to music (94.2%), meditation (81.0%), self-medication (79.1%), and exercise (61.5%). Warm or cold shower (80.0%) and listening to music (70.0%) were most prevalent in respondents without PMS.

Effect of premenstrual symptoms on life activities

Table IV shows the consequences of premenstrual symptoms for normal life activities of respondents. Forty percent of respondents indicated that the symptoms affect their social interactions, while general personality is affected

in 66.1%. More crucially, respondents (65.4%) indicated that symptoms often interfered with their academic presence. Twenty-nine percent reported that it affected their academic performance.

Discussion

The prevalence of PMS in our study was 42.9%. According to ACOG, 30–40% of menstruating women have premenstrual symptoms severe enough to affect their daily life activities [1]. The prevalence in our study (42.9%) did not differ much from the prevalence stated by ACOG. However, the prevalence of PMDD among PMS women in the present study differs greatly from the ACOG report. The present study reported 47.6% prevalence of PMDD among PMS women, while ACOG estimated 3–4% prevalence [1]. The PMS estimates vary widely in the literature because of differences in study instruments, symptom patterns, and the use of prospective or retrospective protocols. Observations from the present study are similar to a study conducted in Nigeria among medical students, in which 36% of the subjects had DSM-IV-TR PMDD [25]. Again, another study among medical students in Saudi Arabia found that approximately 36% of surveyed cases had PMS, based on the ACOG criteria [26]. Nevertheless, the rate of severe PMS or PMDD in the present study is relatively high when compared to findings in other studies performed among medical and non-medical students, the reported PMDD ranging from 6% to 18% of their sample population [27, 28]. Assuming that studying a medical course is in itself stressful, this could have contributed to the high rate of PMDD observed in our study. Medical students supposedly have more study-related stress, and psychosocial stress levels are reported to be related to severity of PMS [29]. Many lifestyle factors which included sleep, daily physical activity, and food intake have been associated with severe PMS or PMDD. Arguing that pharmacy and medical students are highly predisposed to these factors could provide evidence that contributed to the high rate of PMDD among the students in our study.

The prevalence of PMS in the present study was found to be similar, considering previous findings from other studies in young women in which respondents showed a high prevalence of PMS [30–33]. However, the assessment of PMS and PMDD in 1187 Japanese women using a premenstrual symptom questionnaire reported prevalence of 5.3% and 1.2% respectively [34]. Another study in Asia conducted among 423 Thai nurses reported a prevalence of 25.1% [35]. A previous study of 200 students (aged 16 to 31 years) from the University of Calabar, Nigeria reported that 85.5% regularly experienced symptoms consistent with those of PMS [36]. In another study among Nigerian students, 94.8% of the study respondents were diagnosed with PMS [37]. In a meta-analysis of 17 studies, prevalence of PMS was reported as 40% in Europe, 85% in Africa, 46% in Asia and 60% in South America [38]. Findings from these studies suggest that the prevalence of PMS varies greatly. An explanation for this great disparity lies in the study tool utilized and difference in sample populations [38]. Considering the different tools

Table II. Prevalence of symptoms in respondents with premenstrual syndrome

No.	Complained symptoms	PMS (<i>n</i> = 206)	Mild and moderate PMS (<i>n</i> = 108)	Severe PMS or PMDD (<i>n</i> = 98)
Psychological symptoms				
1	Depression	45.8	38.4	55.2
2	Anxiety	64.2	40.0	47.0
3	Irritability	79.2	57.2	63.4
4	Anger outbursts	43.9	25.4	75.8
5	Mood swings	69.2	48.6	63.5
6	Lethargy/fatigue	73.3	62.5	88.1
7	Trouble concentrating	85.0	30.8	94.3
8	Tension	65.0	55.6	62.6
Physical symptoms				
9	Breast tenderness	69.2	48.3	71.0
10	Headache	54.7	50.0	64.3
11	Abdominal bloating	75.3	61.1	90.0
12	Aches and pains	70.0	56.5	80.9
13	Swelling in extremities	32.8	16.3	39.4
Behavioral symptoms				
14	Appetite change	64.2	45.7	77.1
15	Food craving	68.0	59.3	70.2
16	Insomnia	20.2	14.0	29.2
17	Crying spells	19.3	17.6	28.6
18	Short temper	50.8	57.7	45.2
19	Forgetfulness	32.5	24.2	39.0
20	Lack of interest	51.8	67.8	36.5
21	Isolation	41.7	43.6	50.4

that have been used in many studies and designs of studies based on limited samples, further research needs to consider the prevalence of PMS in various countries of the world.

In the assessment of premenstrual symptoms among pre-medical students in Nigeria conducted by Ikeako *et al.* 65.8% of students had pelvic discomfort, 59.5% had breast fullness, 41.0% had mood changes, 27.9% had irritation and 20.8% had fatigue [39]. The most prevalent symptoms of women with PMS in the present study were troubled concentration, irritability and lethargy/fatigue, while the least frequent symptom was crying spells. Abdominal bloating was the most common symptom both in women with mild or moderate PMS and PMDD. The psychiatric symptom (troubled concentration) observed in the present study may be associated with the relatively young age of the students. A similar study in Iran reported that psychiatric symptoms were the predominating symptoms in younger respondents with PMS [40].

Promoting a positive attitude toward the management of PMS among young women is a priority. Socio-cultural

Table III. Strategies adopted by respondents for managing symptoms

Adopted strategy	PMS (<i>n</i> = 206)	No PMS (<i>n</i> = 274)
Psychological interaction:		
Praying	79.5	65.8
Meditation	81.0	50.8
Listening to music	94.2	70.0
Body manipulation:		
Massage	59.8	49.2
Exercise	61.5	50.8
Warm or cold shower	96.3	80.0
Medical care:		
Visit to hospital	13.8	5.8
Visit to pharmacy	62.0	27.5
Herbal remedies	14.4	3.9
Self-medication	79.1	52.5

Table IV. Effect of premenstrual symptoms on participants

Outcome	Mild and moderate PMS (<i>n</i> = 108)	Severe PMS or PMDD (<i>n</i> = 98)
It affects my academic presence in class	64.5	73.3
It affects my academic performance	35.8	29.2
It affects my social interactions	40.0	72.5
It affects my general personality	66.1	55.0

factors influence self-care practices of young women [41]. However, some women have developed their own strategy to cope with premenstrual symptoms. According to the present study, adaptive coping strategies during premenstrual symptom episodes include psychological interaction: praying, meditation, music; body manipulation: massage, exercise, warm/cold shower; and medical care: visit to hospital or pharmacy, herbal remedies and self-medication. Studies have shown that superstitious beliefs and misinterpretation are common in the process of menstruation and self-care practice [41].

The proportion of respondents who avoided social activities and had poor academic attendance and performance is congruent with findings from other studies [42, 43]. Prior stress could induce or worsen symptoms of premenstrual syndrome [44], which could be a plausible explanation of the high prevalence of PMS observed in medical and pharmacy students.

Conclusions

Findings from the present study revealed that the prevalence of PMS in female students was high (42.9%). The PMDD was also high (47.6%) in women with PMS. The study sample comprised female pharmacy students who indulge mostly in rigorous academic activities. The findings from this study suggest that stressful lifestyle and events may be a predisposing factor to PMS or PMDD. Further research should be conducted to effectively determine whether a reduction in stress would be beneficial for the occurrence of PMS or PMDD.

Conflict of interest

The authors declare no conflict of interest.

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