Prevalence and Severity of Premenstrual Syndrome among Female University Students in Central Uganda: A Cross-sectional study.

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Abstract

Background

Premenstrual Syndrome (PMS) is characterized by recurrent psychological, behavioural, and/or physical symptoms occurring before menses and usually resolve by the end of or during menstruation. These symptoms usually affect the women's quality of life and efficiency. Although over 95% of women worldwide suffer from PMS, in Uganda, little is documented about the prevalence and existence of PMS among students. This study, therefore, sought to determine the prevalence and severity of PMS among female university students in Central Uganda.

Methodology

A cross-sectional study was carried out using a questionnaire between November 2021 and May 2022. The sample of 238 participants was taken from female students in 4 universities who met the inclusion criteria. Sampling was done by proportionate sampling. Primary data was obtained about Premenstrual Syndrome prevalence and severity using modifications of the following tools: The American College of Obstetricians and Gynecologists' diagnostic criteria for PMS; the Diagnostic and Statistical Manual of Mental Disorders criteria (DSM-IV) diagnostic criteria for PMDD; and the premenstrual symptoms screening tool (PSST). The data was analysed to obtain descriptive statistics such as frequencies and percentages. A student was considered to be suffering from PMS if they satisfied the DSM-IV criteria for the diagnosis of PMS.

Results

The prevalence of PMS among female University students in central Uganda was found to be 28.3% (60). However, at least 76.9% (163) of the respondents suffered at least one or more symptoms of PMS.

Conclusion

Over a quarter of female university students suffer from Premenstrual syndrome.

Recommendation

There is a need to create awareness as well as mobilize social support so that there is help available to the students who suffer PMS.

Keywords: Premenstrual Syndrome, Female University students, Central Uganda, Date Submitted: 2022-07-26 Date Accepted: 2022-08-30

1. Background

Women of reproductive age normally have monthly cyclic events referred to as the menstrual

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cycle that make up part of their life. The average menstrual cycle is 28 days, however, depending on the individual it varies from 21 to 35 days (Fehring *et al.,* 2006). The cycle comprises a follicular/proliferative phase, and a luteal/secretory phase (Reed & Carr, 2015). This is a normal physiologic process that occurs on average every single month in the absence of pregnancy and ideally should happen without a hitch.

Unfortunately, a good number of women experience troubles during these cyclic events one of which is Premenstrual Syndrome (PMS). PMS is characterized by recurrent psychological, behavioural, and/or physical symptoms which usually resolve by the end of or during menstruation (Kwan & Onwude, 2015). These symptoms as described by Kwan & Onwude, (2015); and Chumpalova, *et al.,* (2020) include:

Psychological symptoms: irritability, depression, crying/tearfulness, anxiety, tension, mood swings, lack of concentration, confusion, forgetfulness, unsociableness, restlessness, temper outbursts/anger, sadness/blues, and loneliness);

Behavioural symptoms: fatigue, dizziness, excessive sleep or insomnia, decreased efficiency, accident prone, sexual interest changes, increased energy, tiredness, changes in appetite, and food cravings); and

Physical symptoms: headache or migraines, breast tenderness /soreness/ pain/ swelling-premenstrual mastalgia, back pain, abdominal cramps, general pain, bloatedness, oedema and swelling (Chumpalova et al., 2020; Kwan & Onwude, 2015).

PMS occurs in up to 95% of women of reproductive age worldwide. With 20% - over 50% of them having severe complaints that are clinically significant, affecting activities of daily living and resulting in functional impairment (Borenstein *et al.,* 2003; Kwan & Onwude, 2015; Yonkers *et al.,* 2008). The PMS prevalence among university students ranges from 12% in France to over 98% in Iran (Direkvand-Moghadam et al., 2014). However, some student populations have registered a PMS prevalence of 100% in some countries (Abu Alwafa *et al.*, 2021; Hashim *et al.,* 2019). In the African region, studies among university students have shown a PMS prevalence of 77.8% in Cameroon (Akoku *et al.,* 2020); over 89% in Nigeria (Danborno *et al.,* 2018); 96.5% in Eritrea (Eyob *et al.,* 2016); 56.1% in Egypt (Nooh *et al.,* 2016); and in Ethiopia, a meta-analysis showed that over 50% of female students within the reproductive age suffer PMS (Geta *et al.,* 2020); although previous studies found a prevalence of over 81% (Abeje & Berhanu, 2019; Tolossa & Bekele, 2014).

Locally, in Uganda, Hadija (2013) reported that 92.4% of female university students suffer from PMS. However, her study was only limited to nulliparous females in one university, hence the need to find out about the entire population of female university students irrespective of parity.

The problem is that PMS significantly affects relationships, and the quality of life of women resulting in poor health, increased health care costs, and a decrease in occupational productivity/efficiency like class attendance and performance every single month of their reproductive years (Abu Alwafa *et al.,* 2021; Borenstein *et al.,* 2003; Eyob *et al.,* 2016; Kwan & Onwude, 2015; Tolossa & Bekele, 2014). Yet in Uganda, little is documented about the prevalence and existence of PMS among female University students. This study, therefore, sought to determine the prevalence and severity of PMS among female university students in Central Uganda.

2. Methods

Study Design

A cross-sectional study was carried out using quantitative methods to collect data. This study design was suitable given the limited time and financial constraints available to carry out the study. Besides, the study did not intend to establish cause-effect relationships, thus the cross-sectional design.

Study Area

The area of study was Central Uganda located in the Central Region of the country, in Kampala and Mukono between November 2021 and May 2022. The sample was therefore taken from female university students within Central Uganda

who met the inclusion criteria and consent to participate in the study.

Inclusion Criteria

All female University students aged 18 and above were eligible to participate in the study. They should have been able to read and write without assistance (without visual or motor impairments) since the instrument was self-administered.

They should have had at least 3 menstrual cycles before the survey.

They should have consented to participate in the study.

Exclusion Criteria

Anyone with a known chronic disease of the reproductive system like fibroids, endometriosis, polycystic ovarian syndrome, and so on was excluded from the study.

Females at the university who had never had menses were excluded from the study.

Students who had already reached menopause were excluded from the study.

The study was carried out at Makerere University, Clarke International University, Kampala International University, and Ugandan Christian University. The participants were selected randomly.

Sampling

This took on a multistage procedure where: the total number of Universities in the Central region were stratified into Public and Private from which universities were selected randomly from each stratum making the total 4 Universities. Based on the stratification percentage, 3 universities were randomly selected from the private stratum, while 1 university was randomly selected from the public strata to make 4 universities. After that, the female students in each of these respective universities were assigned ID numbers which constituted the sampling frame. Each of the selected Universities had its sampling frame from which a representative sample of female students was selected by stratified random sampling from the selected universities to give a total of the required sample size of 238 female students. The number of female students selected (the sample) from each University was proportional to the total number of female students in the University. The students were conveniently selected by choosing those who were available at the Universities at the time of data collection one at a time till the required number was obtained.

Study Variables

The study variable was PMS Prevalence and Severity

Data Sources

Primary data from female university students in Central Uganda was obtained and analysed. A questionnaire was used to obtain demographic information as well as the Premenstrual symptom history. The tool used to determine Premenstrual syndrome history/prevalence and severity was a modification of three tools, namely:

I. The American College of Obstetricians and Gynecologist diagnostic criteria for PMS (American College of Obstetricians and Gynecologists, 2000); where

A. Patient reports one or more of the following affective and somatic symptoms 5 days before menses in each of three prior menstrual cycles;

Affective, Depression, Angry outbursts, Anxiety, Irritability, Confusion, Social withdrawal, Somatic, Breast tenderness, Abdominal bloating, Headache, Swelling of extremities.

B. Symptoms relieved within 4 days of menses onset without recurrence until at least cycle day 13

C. Symptoms present in absence of any pharmacologic therapy, hormone ingestion, or drug or alcohol abuse

D.Symptoms occur reproducibly during 2 cycles of prospective recording

E. Patient suffers from identifiable dysfunction in social or economic Performance

II. The Diagnostic and Statistical Manual of Mental Disorders criteria (DSM-IV) diagnostic criteria for PMDD (American Psychiatric Association, 2000).

A. In most menstrual cycles, five (or more) of the following symptoms are present, with at least one of the symptoms being either 1, 2, 3, or 4:

1. Markedly depressed mood, feelings of hopelessness, or self-depreciatory thoughts

2. Marked anxiety, tension, feeling of being "keyed up" or "on edge"

3. Marked affective lability (e.g., feeling suddenly sad or tearful or with increased sensitivity to rejection)

4. Persistent and marked anger or irritability or increased interpersonal conflicts

5. Subjective sense of difficulty in concentrating

6. Decreased interest in usual activities (e g , work, school, friends, hobbies

7. Lethargy, easy fatigability, or marked lack of energy

8. Marked change in appetite, overeating, or specific food cravings

9. Hypersomnia or insomnia

10. Sense of being overwhelmed or out of control

11. Other physical symptoms, such as breast tenderness or swelling, headaches, joint or muscle pain, a sensation of "bloating", weight gain

B. Symptoms markedly Interference with work, school, or social relationships

C. Symptoms of PMDD must be present most of the time during the last week of the luteal phase (premises) and absent during the week after menses

D. The disturbance cannot be merely an exacerbation of the symptoms of another disorder

E. The first three criteria must be Confirmation by prospective daily ratings for two consecutive menstrual cycles

Bias

The majority of the respondents were not able to access the internet or data to fill in the online questionnaire. This was handled by making print questionnaires that were delivered to the universities for the respondents to fill.

Using only the questionnaire predisposed the study to instrument error as there was no triangulation of data. The tool was pre-tested before it was used to ascertain the quality and validity of the data collection instrument/tool. The sample size calculation included the DEFF (Design Effect) to cater for sampling errors.

Sample size

The number of female university students needed for this study was determined using the following formula by (Daniel, 1999): $n = \frac{Z^2 * p(1-p)}{d^2}$ *DEFF

Where: n = Sample size; Z = Z value at 95% Confidence Level (1.96); p = Prevalence of Premenstrual Syndrome estimated at 92.4% was used as the p value, which was the prevalence of PMS among nulliparous females University Students in Kampala International University Western Campus (Hadija, 2013); d = Desired level of absolute precision; which was set at 5%. Design effect, DEFF, was set at 2 to cater for variance resulting from sampling errors and bias. Therefore, sample size:

$$n = \frac{1.96^2 * 0.924(1-0.924)}{0.05^2} * 2$$
$$n = 107.9 * 2$$
$$n = 215.8$$

Assuming a non-response rate of 10%; n = Sample size + $(\frac{10}{100} * n)$

$$n = 215.8 + 21.58 \qquad n = 237.38$$

n = 238 female university students

3. Data analysis

The data from self-administered questionnaires were coded and entered into Statistical Package for Social Scientists (SPSS version 26) and analysed to obtain descriptive statistics such as frequencies and percentages. A student was considered to be suffering from PMS if they satisfied the DSM-IV criteria for the diagnosis of PMS.

Severity was assessed using the severity of the symptoms, whether they affect the quality of life and the characteristics of the most severe form (PMDD) which is also stipulated in the tools above.

4. Results

A total of 238 female University students were considered for this study. The response rate was 96%, unfortunately, of the 229 respondents that returned the self-administered questionnaires, 8% were incomplete (dropped out) giving a total of 212 complete respondents. This study was carried out among female university students in the

(please mark an "X" in the appropriate box)

Do you experience some or any of the following premenstrual symptoms which *start before* your period and *stop* within a few days of bleeding?

Symptom	Not at all	Mild	Moderate	Severe
1. Anger/irritability				
2. Anxiety/tension				
3. Tearful/Increased sensitivity to rejection				
4. Depressed mood/hopelessness				
5. Decreased interest in work activities				
6. Decreased interest in home activities				
7. Decreased interest in social activities				
8. Difficulty concentrating				
9. Fatigue/lack of energy				
10. Overeating/food cravings				
11. Insomnia				
12. Hypersomnia (needing more sleep)				
13. Feeling overwhelmed or out of control				
14. Physical symptoms: breast tenderness, headaches, joint/muscle pain, bloating, weight gain				

Have your symptoms, as listed above, interfered with:

	Not at all	Mild	Moderate	Severe
A. Your work efficiency or productivity				
B. Your relationships with coworkers				
C. Your relationships with your family				
D. Your social life activities				
E. Your home responsibilities				

Scoring

The following criteria must be present for a diagnosis of **PMDD**

1) at least one of #1, #2, #3, #4 is **severe**
2) in addition at least four of #1 – #14 are **moderate to severe**
3) at least one of A, B, C, D, E is **severe**

The following criteria must be present for a diagnosis of **moderate to severe PMS**

1) at least one of #1, #2, #3, #4 is **moderate to severe**
2) in addition at least four of #1 – #14 are **moderate to severe**
3) at least one of A, B, C, D, E is **moderate to severe**

Figure 1: (Steiner et al., 2003)

following Universities in Central Uganda: Makerere University (90, 42.5%), Kampala International University (38, 17.9%), Uganda Christian University (37, 17.5%), and Clarke International University (47, 22.2%).

Prevalence and Severity of PMS among female University students

To obtain the prevalence of PMS, one was diagnosed as having PMS based on the DSM-IV criteria. If they had at least one or more emotional symptoms (moderate to severe), at least four or more other moderate to severe symptoms, and the symptoms affected their efficiency or relationships moderately or severely. These symptoms had to begin before the menses and not just during the menses. According to the DSM-IV classification, the prevalence of PMS among female University students in central Uganda was found to be 28.3% (60).

While symptoms were varied, not all fulfilled the DSM-IV criteria for the diagnosis of PMS or PMDD. However, at least 76.9% (163) of the respondents suffered at least one or more symptoms of PMS. Of the 163 who suffered some form of PMS symptoms, 103 (48.6%) had mild Symptoms, while 45 (21.2%) had moderate symptoms that affected either their relationships, regular activities, or school. The most severe form of PMS, also known as PMDD was faced by 7.1% of the students (see Figure 2 for details).

5. Discussion:

Prevalence and Severity of PMS among female University students

In Central Uganda, out of a hundred female university students, over twenty-eight of them suffer moderate to severe PMS symptoms that moderately to severely affect their school efficiency, relationships, and activities. This figure is way lesser than the global prevalence of 95% (Borenstein, et al., 2003; Kwan & Onwude, 2015; Yonkers *et al.,* 2008).

While, the prevalence in this study is more than the prevalence of PMS in countries like France at 12% (Direkvand-Moghadam *et al.*, 2014); this PMS prevalence is lesser than those documented for the rest of Africa which ranges from 50% to over 96% (Akoku *et al.,* 2020; Danborno *et al.,* 2018; Eyob *et al.*, 2016; Nooh *et al.,* 2016; Geta *et al.,* 2020; Abeje & Berhanu, 2019; Tolossa & Bekele, 2014).

Even the prevalence (92.4%) documented for the nulliparous university students in Western Uganda was higher than this prevalence. The criteria used in Hadija's (2013) study were based on the presence of any symptom of PMS aside from including only nulliparous females. That study did not consider whether the symptoms caused poor efficiency/affected relationships. In that case, her prevalence would be compared to the three-quarters of the students (76.9%) that experienced at least one PMS symptom in this study – which is still lower than the 92.4% (Hadija, 2013). Similarly in Palestine and the UAE, the prevalence of PMS was found to reach 100%; with everyone presenting with at least one of the PMS symptoms that compromise their quality of life during the luteal phase (Abu Alwafa *et al.,* 2021; Hashim *et al.*, 2019). These variations that exist in the PMS prevalence need to be investigated further.

The criteria used for PMS diagnosis must also be standardized in studies whose PMS prevalence is to be compared. The prevalence in this study was based on the American College of Obstetricians and Gynaecologists (ACOG), as well as the DSM-IV, stipulated criteria for the diagnosis of PMS and PMDD (American College of Obstetricians and Gynecologists, 2000; American Psychiatric Association, 2000). These criteria emphasize the presence of psychological or emotional symptoms and impairment of physical and social activities in addition to four other symptoms (whether emotional, physical, or behavioural). The symptoms experienced were used to determine the PMS diagnosis for each respondent. They included the following documented symptoms experienced by women in their luteal phase, namely: Pain which may be in the head, the back, the abdomen, the thighs, the joints, or the muscles; swollen extremities; breast tenderness (premenstrual mastalgia), bloating, pimples/acne; Fatigue, lethargy, depression or withdrawal from so-

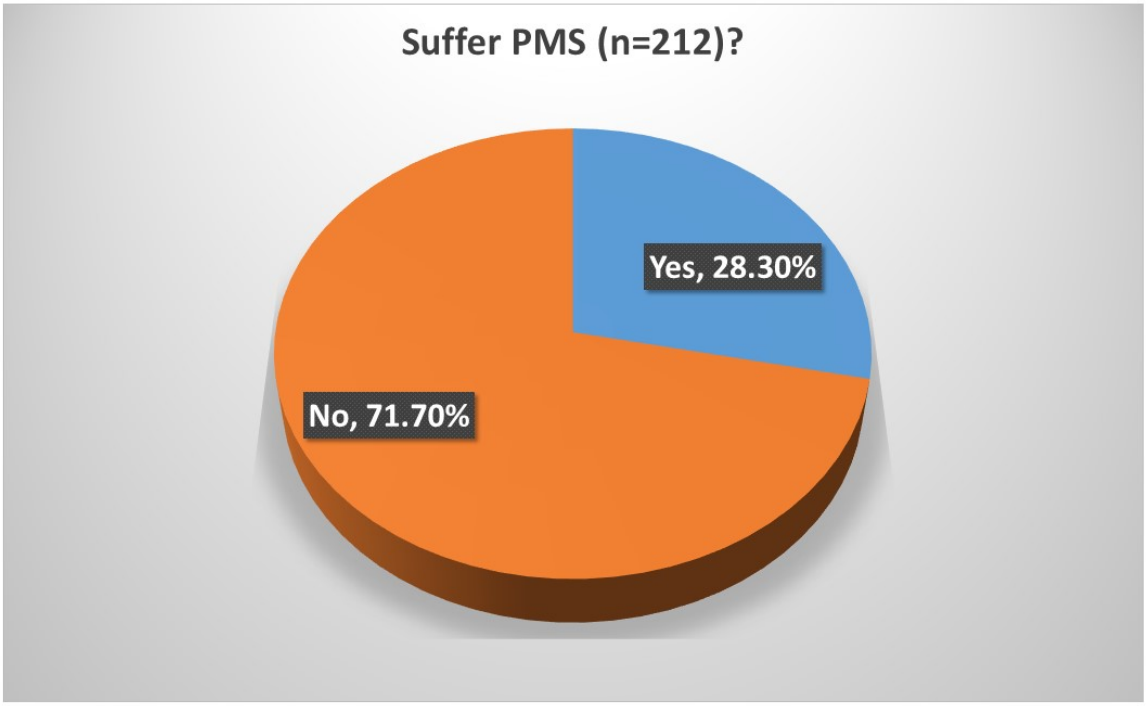

Chart 1: Pie chart showing the prevalence of PMS among female University Students in Central Uganda based on the DSM-IV Criteria

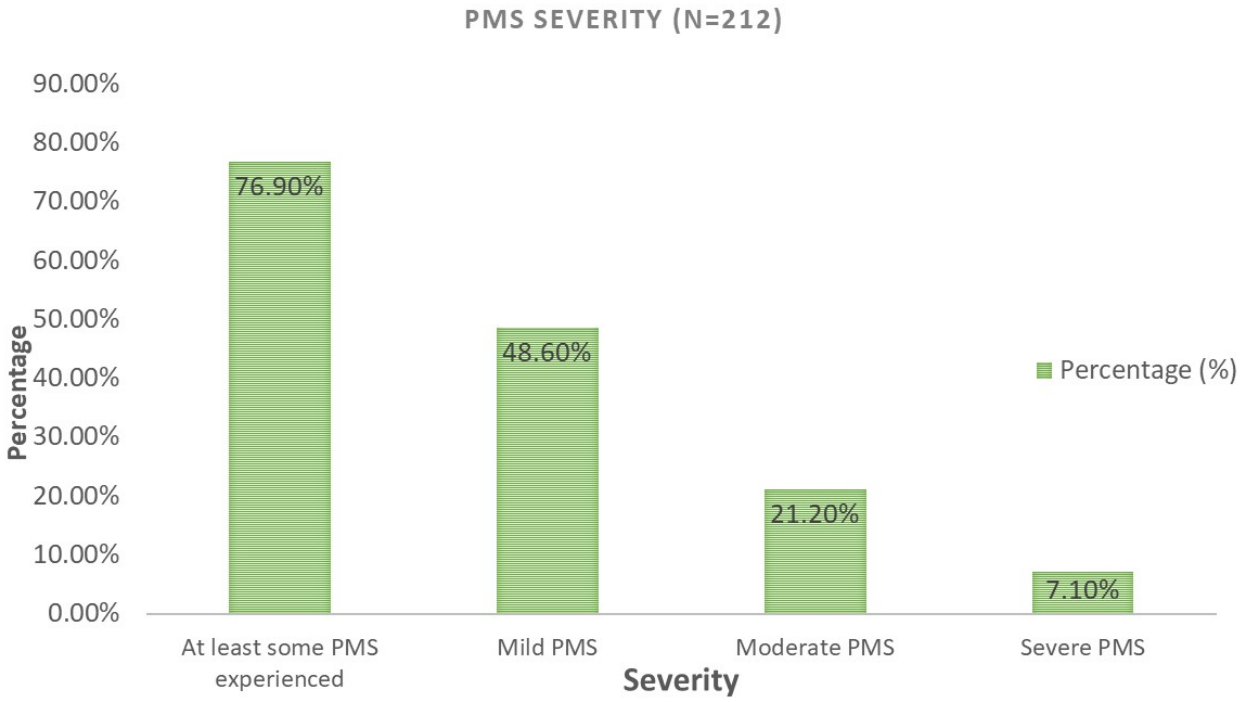

Chart 2: **Bar graph showing PMS Severity among study population**

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ciety (sense of wanting to be alone), mood swings, anger, irritability, increased appetite (Badkur *et al.,* 2016; Costanian *et al.,* 2018; Danborno *et al.*, 2018; Kalsoom *et al.,* 2018; Naeimi, 2015; Oo *et al.,* 2016; Shahbazi *et al.,* 2020; Shamnani *et al.*, 2018).

The presence of PMDD among the student population is worrying. This is because the severity of this condition renders over 7% of the students inefficient during every luteal phase of every single month. The question is: how are they able to favourably compete and accomplish tasks within the given time? There is, therefore, a need to sensitize the masses and create awareness about PMS and its shortcomings so that educators are not only more understanding but also accommodative. Students can also learn how to seek medical attention and manage their symptoms in ways that allow them to be more efficient even during the luteal phase.

6. Conclusion

In Central Uganda, over a quarter of female university students suffer from Premenstrual syndrome.

Recommendations

Since there is a large number of students who suffer from PMS, health workers must equip themselves with tools and resources to help the students efficiently manage PMS symptoms and improve their productivity and relationships.

The PMS symptoms are psychological, physical, and behavioural. Using the DSM-IV PMS diagnostic criteria, medical practitioners can quickly screen and diagnose clients with PMS or PMDD and manage them accordingly. These tools should be availed in all health facilities that have reproductive health services.

Similar studies should be carried out among high school female students in Uganda to establish whether PMS is a contributor to decreased efficiency in this age group too and sensitize the students as well as their parents and teachers. This will enable the girls to have social support because their problem is well-known and understood.

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8. List of Abbreviations

ACOG American College of Obstetricians and Gynecologists
DHEA Dehydroepiandrosterone
DSM-IV Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition)
IUD Intra-Uterine Device
PMS Premenstrual syndrome
PMDD Premenstrual Dysphoric Disorder
PSST Premenstrual Symptoms Screening Tool
NHCE National Council for Higher Education
OCP Oral Contraceptive Pills
SDA Seventh day Adventist
WFP World Food Programme
WHO World Health Organisation

9. Conflict of interest

The authors have no conflicts of interest in this study.

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