

# Social-demographic factors associated with Premenstrual Syndrome among female University students in Central Uganda: A Cross-sectional study.

Elizabeth Atim<sup>a,\*</sup>, Florence Nabushawo Okecho<sup>a</sup>, Regina Ndagire<sup>b</sup>, Catherine Lwanira Nassozi<sup>b</sup>

<sup>a</sup>*School of Nursing and Midwifery, Clarke International University, Uganda*

<sup>b</sup>*School of Graduate studies, Research and Innovation, Clarke International University, Uganda*

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## Abstract

### Background

Premenstrual Syndrome (PMS) is a common disorder among females of reproductive age, which also happens to be the most productive period within the life of a woman. Unfortunately, the aetiology of PMS is still not known; although, the following theories have been proposed to explain PMS symptoms: A genetic predisposition; changes in neurotransmitter levels; or changes in different hormone levels during the menstrual cycle.

In Uganda the factors associated with PMS are hardly documented, making awareness, prevention, and management complicated. The aim of this study, was to determine the social demographic factors associated with PMS among female university students in Central Uganda.

### Methodology

A cross-sectional study was carried out using a self-administered questionnaire between November 2021 and May 2022. 238 female students in 4 universities who consented and met the inclusion criteria participated in the study. Data which was obtained about social demographic characteristics and PMS symptoms was coded and analysed to obtain descriptive statistics and Chi-square correlations.

### Results

The mean age of the respondents was  $22.67 \pm 5.595$ , with most of the respondents (188, 88.7%) being between 19 to 24 years of age, the minimum age was 19 years and the maximum was 55 years. Among this study population, menarche age group  $\chi^2(2, n=212) = 7.756, p=0.021$ , and several menstrual bleeding days  $\chi^2(1, n=212) = 5.188, p=0.023$  were associated with PMS among the female university students.

### Conclusion

The cause of the PMS among this study population is likely biological as respondents who reported that they started their menses started at age  $\leq 12$  years; as well as those whose bleeding days were more than or equal to 5 days were more likely to suffer PMS.

### Recommendation

Studies need to be carried out to investigate the biological causes of PMS to guide management and prevention.

*Keywords:* Premenstrual Syndrome (PMS), Social demographic factors, Female university students, Uganda, Date Submitted: 2022-08-01 Date Accepted: 2022-08-13

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## 1. Background

Premenstrual Syndrome (PMS) is a common disorder among females of reproductive age, which also happens to be the most productive period within the life of a woman. Unfortunately, ladies with this disorder have to endure reduced work productivity, interference with hobbies, increased number of days missed at work or school, increased number of health care visits, increased healthcare costs, and others. Some women suffer the pain and lose positions simply because of ignorance, and poor health-seeking behaviour (Mohib, *et al.*, 2018).

Unfortunately, up until today, the aetiology of PMS is still not known; although, the following theories have been proposed to explain PMS symptoms: A genetic predisposition; changes in neurotransmitter levels; or changes in different hormone levels during the menstrual cycle (Lobo & Pinkerton, 2010; Yonkers, *et al.*, 2008). Pick (2014), adds that PMS symptoms may be a result of not just the sex hormones (oestrogen, progesterone, and testosterone) but an interplay of all hormones including thyroid hormones, cortisol, adrenaline, insulin, and DHEA. She also argues that factors like poor diets and stressful lifestyles predispose us to insulin and cortisol hormonal changes which in turn affect our sex hormones (Pick, 2014). However, the mechanisms with which these stipulated theories induce PMS symptoms to remain to be understood. That is why PMS is referred to as a functional medical disorder - due to the absence of physical, metabolic, or neurologic explanations for its occurrence (Kani, 2019; North, 2007). Various social-demographic characteristics are statistically significantly associated with PMS. Some of which include the following:

Mean age or age group where specific age groups were more prone to PMS symptoms than other age groups, however, there is no known explanation for this phenomenon (Abeje & Berhanu,

2019; Akoku *et al.*, 2020; Durairaj & Ramamurthi, 2019; Hadija, 2013; Molugulu *et al.*, 2016; Rumana *et al.*, 2017).

Academic programme or year of study, where students who were studying health-related programmes/ health education were found to be more prone to suffer from PMS symptoms in studies carried out among both health science and non-health science university students in India and Brazil (Durairaj & Ramamurthi, 2019; Majeed-Saidan *et al.*, 2020; Victor *et al.*, 2019). The year of study of medical students in India was also found to be associated with PMS (Rumana *et al.*, 2017). Molugulu *et al.*, (2016), cited academic stress as one of the factors significantly associated with PMS; while the stress levels of medical students were significantly different from those of non-medical students in Saudi Arabia (Majeed-Saidan *et al.*, 2020).

Although, pooled data in Ethiopia showed that menarche age and menstrual pattern were not statistically associated with PMS symptoms (Geta *et al.*, 2020); the length of one's cycle, menorrhagia, and dysmenorrhea have been associated with PMS symptoms in India and Ethiopia (Durairaj & Ramamurthi, 2019; Tolossa & Bekele, 2014). The family history of menstrual problems like dysmenorrhea and PMS was also statistically significantly associated with Premenstrual Syndrome among Indian and Saudi Arabian students (Durairaj & Ramamurthi, 2019; Salem *et al.*, 2020); suggesting a possible genetic predisposition (Lobo & Pinkerton, 2010; Yonkers, *et al.*, 2008).

Unfortunately, in Uganda the factors associated with PMS are hardly documented, making awareness, prevention, and management a little bit complicated. In addition, there is a huge knowledge gap about PMS and its associated factors hence recommendations have been made for more research to be carried out on the subject (Abu Alwafa *et al.*, 2021; Hadija, 2013; Hashim *et al.*, 2019). The aim of this study, therefore, was to determine the social demographic factors associated with PMS among female university students in Central Uganda.

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\*Corresponding author.

Email address: e.atim@student.ciu.ac.ug  
(Elizabeth Atim)

## 2. Methods

The methods used in this study are similar to those used in the study by Atim, *et al.*, (2022) Prevalence and Severity of Premenstrual Syndrome among Female University Students in Central Uganda: A Cross sectional study (Manuscript submitted for publication).

### Study Area

The study was carried out in the districts of Kampala and Mukono within the Central region of Uganda. The central division comprises a representative population of students from all over the country. It boasts of the highest number of educational institutions (National Council for Higher Education (NCHE), 2021) both public and private with the best educational and/or training facilities. The region comprises a wide range of communities namely: urban, semi-urban, sub-urban (ghettos), and rural. It also happens to be highly populated compared to other regions of the country; making this region quite representative.

### Study Design

A cross-sectional study was carried out using quantitative methods to collect data. This study did not intend to establish cause-effect relationships, thus the cross-sectional design.

### Study Population

The target population for this study would ideally be all female university students in Uganda. Since PMS is suffered by females of reproductive age. University students are at the most productive stage of their lives, their decisions are likely to influence not just their careers but their livelihood as well. It is at the university that the young adults learn to become independent and make self-care decisions which include health-seeking behaviour, as well as lifestyle choices among others hence predisposing them to PMS. Studies have also shown that PMS is mostly suffered by women over the age of 20 years (Hadija, 2013)- these would ideally be found in the university.

However, due to resource constraints, not all the students in the country can be reached, therefore, the accessible population was female university students within Central Uganda. This region hosts the largest number of Universities with stu-

dents from all over the country, thus representing the other regions of the country.

The sample was therefore taken from female university students within Central Uganda who met the inclusion criteria and consented to participate in the study.

### Sample size determination

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

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. Considering a non-response rate of 10%, the sample size was 238 female university students.

### Sampling procedures

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. There were two public and twenty-six private universities in this study area (National Council for Higher Education (NCHE), 2021). 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 randomly picked from the students' list by

picking one random number at a time without replacement till the required number was obtained.

### **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.

### **Data collection methods**

A survey was carried out using self-administered questionnaires that were distributed both in print and online. The questionnaire comprised of both open and close-ended questions. The questions were grouped into sections, with each section answering the objective of the study.

### **Data collection tools**

The American College of Obstetricians and Gynaecologists (ACOG) criteria for PMS and PMDD (American College of Obstetricians and Gynecologists, 2000), the DSM-IV criteria for PMS and PMDD (American Psychiatric Association, 2000); plus the Premenstrual Symptoms Screening Tool (PSST) (Steiner et al., 2003) - were modified to develop the study tool for the assessment of the prevalence of PMS. The ACOG and DSM-IV criteria focus majorly on only the psychological symptoms for the diagnosis of PMS; and most assessment tools have been modified to suit this criterion for the diagnosis of PMS (King, 2020). Yet, the physical symptoms too have been shown to affect the quality of life of the women who suffer from PMS (Oo *et al.*, 2016). This tool assessed all symptoms (be it psychological, be-

havioural, or physical) because they are all PMS symptoms and have the potential to negatively affect the efficiency of an individual. The students were asked to circle or tick all that apply for all the individual PMS symptoms they experience after ovulation (a few days to their menstruation). The presence of PMS symptoms during the luteal phase as evidenced by a combination of at least one emotional/psychological symptom, and at least 4 physical and/or behavioural symptoms would tantamount to a positive PMS diagnosis.

Social demographic factors assessed were age, education, parity, ethnicity, religious affiliation, occupation, marital status, and menstrual history of the individual students.

### **Study Variables**

The dependent variable was PMS Prevalence.

The independent variable of this study was social-demographic factors.

## **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/prevalence.

Bivariate correlation analyses were used to determine associations between Social demographic factors and PMS Prevalence.

### **Ethical Considerations**

Approval to conduct this study was obtained from the CIU School of Nursing Research Vetting Committee, as well as the CIU Research Ethics Committee / the Uganda National Council of Science and Technology. Permission/Administrative clearance was also sought from the respective University administrations in Central Uganda where the study was carried out. Confidentiality was ensured by assigning the respondents ID numbers which were used instead of their real names. The study and its importance were explained to each individual and informed consent was sought before data was collected from the respondents.

The study did not involve manipulation of variables hence, did not pose any health risk to the participants. Respondents were not compensated

for their time but were given free brochures on PMS.

#### 4. Limitations

Following were the limitations and how these were mitigated.

Inaccurate responses are subject to recall errors. PMS is diagnosed over two to three months, yet the study is cross-sectional and not longitudinal. Meaning that the respondents had to rely on recall of the symptoms they felt in the past recent months. This can result in errors. The respondents need to remember their symptoms accurately and when during the menstrual cycle they have the symptoms and for how long. There is a possibility that not all the respondents are that keen and aware of what goes on with their bodies or if it is even associated with their menstrual cycle. This was mitigated by giving the respondents a whole month to be able to respond, hence allowing them the opportunity to document what they feel in real-time.

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 errors.

#### 5. Results

The mean age of the respondents was  $22.67 \pm 5.595$ , with most of the respondents (188, 88.7%) being between 19 to 24 years of age, the minimum age was 19 years and the maximum was over 55 years.

Although 193 (91.0%) respondents were not married, only 125 (59.0%) were not in any relationship. The majority of the respondents were Ugandan (196, 92.5%). The largest proportion of

the respondents were also Christians (188, 88.7%) although from various denominations (See Table 1):

To determine factors associated with PMS among the study population, the Chi-square Pearson's correlation was obtained and reported as  $\chi^2$  (degrees of freedom,  $n$ =sample size) = chi-square value,  $p$ -value.  $p$ -values that were less than 0.005 ( $p < 0.005$ ) were considered statistically significant.

Among this study population, menarche age group  $\chi^2(2, n=212) = 7.756, p=0.021$ , and several menstrual bleeding days  $\chi^2(1, n=212) = 5.188, p=0.023$  were found to be statistically significantly associated with PMS among the female university students. Other social-demographic factors were not statistically significantly associated with PMS among the students. Details are presented in Table 2.

Respondents who reported that they started their menses started at age  $\leq 12$  years; as well as those whose bleeding days were more than or equal to 5 days were more likely to suffer PMS. Age group at menarche and bleeding days were statistically significantly associated with PMS at the  $\alpha$ -level of 5% in this study population.

#### 6. Discussion

In Central Uganda, the following factors were statistically significantly associated with PMS among female university students, namely: age group at menarche, and the number of bleeding days. None of the other socio-demographic characteristics were found to be associated with PMS.

The age or age group in this study population was not in any way associated with PMS. This completely contradicts some other studies that found that mean age or age group and PMS were statistically significant, where specific age groups were more prone to PMS symptoms than other age groups, although, there was no known explanation for this phenomenon (Abeje & Berhanu, 2019; Akoku *et al.*, 2020; Durairaj & Ramamurthi, 2019; Hadija, 2013; Molugulu *et al.*, 2016; Rumana *et al.*, 2017).

Table 1: Univariate analysis of Social-Demographic Characteristics of the study population

Variables	Responses	Frequency (n=212)	Percentage (%)
Age	19-24 years	188	88.7
	25-30 years	8	3.8
	Above 30	16	7.5
Nationality	Ugandan	196	92.5
	Non-Ugandan	16	7.5
Religion	Christians	188	88.7
	Muslims	22	10.4
	Other	2	0.9
Marital Status	Married	19	9.0
	Not married	193	91.0
Employment status	Employed	43	20.3
	Unemployed	169	79.7
	Certificate	9	4.2
Current education level being pursued	Diploma	25	11.8
	Bachelor's Degree	174	82.1
	Postgraduate	4	1.9
Age at Menarche	≤12 years	44	20.8
	13-15 years	151	71.2
	≥16 years	17	8.0
Bleeding days	4 days or less	144	67.9
	5 days or more	67	31.6
Ever conceived	No	192	90.6
	Yes	20	9.4
Contraceptive use	Used contraceptives	45	21.2
	Did not use contraceptives	167	78.8
Visit Health care professional for PMS symptoms	Sought Care	53	25.0
	Never sought care	159	75.0

(Source: Primary Data, 2022)

While stress levels associated with the program of study were cited as factors associated with PMS among students studying various courses in India, Brazil, and Saudi Arabia (Durairaj & Ramamurthi, 2019; Majeed-Saidan *et al.*, 2020; Victor *et al.*, 2019; Molugulu *et al.*, 2016; Majeed-Saidan *et al.*, 2020), it was different in this study. The programme or level of education being studied was not associated with PMS prevalence among female university students in Central Uganda. Probably, irrespective of the course, the fact that all the students are at the university, they experience similar pressures and stressors.

While in Ethiopia, pooled data showed that menarche age and menstrual pattern were not statistically associated with PMS symptoms (Geta *et al.*, 2020); the story was different in this study. The only factors found to be associated with PMS among this study population were age at menarche, and the number of bleeding days (days spent menstruating). Students who started menses between the ages of 10 and 12 years were more likely to suffer PMS symptoms compared to those who started menses later on in life. Students who spent five or more days bleeding during their menses were more prone to suffer PMS compared

Table 2: Bivariate analysis showing factors associated with PMS

Variable	Category	PMS		df	$\chi^2$	P-value
		No (n=152)	Yes (n=60)			
Age group	19-24 years	133(87.5%)	55(91.67%)	2	0.847	0.655
	25-30 years	6(3.95%)	2(3.33%)			
	Above 30 years	13(%)	3(%)			
Marital status	Married	14(%)	5(%)	1	0.041	0.840
	Single	138(%)	55(%)			
Nationality	Ugandan	139(91.45%)	56(93.33%)	1	3.269	0.195
	Non-Ugandan	13(8.55%)	4(6.67%)			
Age group at Menarche	≤12 years	26(17.10%)	18(30.0%)	2	7.756	<b>0.021*</b>
	13-15 years	110(72.37%)	41(68.33%)			
	≥16 years	16(10.53%)	1(1.67%)			
Number of bleeding days	≤4 days	110(%)	34(%)	1	5.188	<b>0.023*</b>
	≥5 days	41(%)	26(%)			
Have you ever conceived	No	137(90.13%)	55(91.67%)	1	0.119	0.731
	Yes	15(9.87%)	5(8.33%)			

\*Statistically significant p-value at  $\alpha$ - level of 5%. (Source: Primary Data, 2022)

to those who spent lesser days. The determinants of age at menarche, menstruation days, and PMS could be similar, thus indicative of biological factors, which may also point to possible genetic predispositions (Lobo & Pinkerton, 2010; Yonkers, *et al.*, 2008); that need further investigations.

## 7. Conclusions

Age group at menarche and number of days spent bleeding during each menstrual cycle were statistically significantly associated with PMS symptoms among female University students in Central Uganda. The cause of the PMS among this study population is likely biological and thus needs further investigations.

### Recommendations

Studies need to be carried out to investigate the biological causes of PMS as this will guide

management and prevention.

The scope of this study was limited to social demographic factors. There is thus a need to determine the individual, dietary, and lifestyle factors associated with PMS in Uganda.

## 8. Acknowledgement

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## 9. 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

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## 11. Conflict of interest

The authors have no conflicts of interest in this study

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