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Assessing the Impact of Premenstrual Syndrome on Physical, Academic and Psychosocial Well-being among Female Students at a Private University in Kenya

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Abstract

Premenstrual syndrome (PMS) is a common condition experienced by women worldwide. Nearly 75% of women in their reproductive age experience premenstrual syndrome symptoms with 3-8% experiencing severe symptoms that affect their day-to-day activities based on epidemiological studies. However, the precise impact of PMS is yet to be properly explored especially in the context of low- and middle-income countries (LMICs). In view of the above, we investigated the impact of PMS on the physical, academic, and psychosocial well-being of female students at Kabarak University, Kenya. A cross-sectional study design was employed to assess the experiences of female students with PMS. A sample of 316 participants was recruited, representing a response rate of 88.76% in respect of the total sample size determined. Participants completed self-report questionnaires that assessed the occurrence of PMS symptoms, physical impacts, academic impacts, psychosocial impacts, and behavioral changes associated with PMS. Majority of the participants reported to experience mood swings, irritability, abdominal bloating, food cravings and appetite fluctuations which decreased their interest in daily activities, delayed submission of assignments, led to late registration of course units, social withdrawal and increased food cravings. There was a statistically significant association between PMS and mood swings ($p = 0.025$) as well as a suggestive association with irritability ($p = 0.06$). Occurrence of PMS had statistically significantly association with decreased interest in routine activities ($p = 0.006$). In conclusion, occurrence of PMS has numerous impacts on the physical, academic and psychosocial lives of female students. We recommend development or strengthening of targeted programs aimed at sensitizing relevant stakeholders on the impact of PMS and how any undesirable ramifications can be scaled down.

Keywords: premenstrual syndrome, Kabarak university, menstruation, mood swings, academic impact, physical effects, psychological impact.

INTRODUCTION

Premenstrual syndrome (PMS) refers to a constellation of physical, psychological, and behavioral symptoms that occur in the premenstrual phase of the menstrual cycle (Tolossa& Bekele, 2014). It is a commonly reported condition affecting a significant proportion of women worldwide, often leading to functional impairment and decreased quality of life. Determining the precise prevalence of PMS poses challenges due to self-treatment practices, disparities in healthcare access and availability, variations in diagnostic criteria, and cultural factors. However, it is estimated that approximately 80% to 90% of females worldwide experience PMS, with 3% to 8% encountering severe symptoms (Steiner, 2000). Common symptoms include cramps, aches, bloating, food cravings, mood swings, breast tenderness, anxiety, tension, and reduced interest in daily activities (Freeman et al, 2011). In more severe cases, PMS progresses to premenstrual dysphoric disorder (PMDD), which is recognized as a mental disorder under the Diagnostic and Statistical Manual of Mental Disorders (Zachar& Kendler, 2014).

These symptoms can significantly impact a student's physical well-being, leading to discomfort and decreased ability to participate in daily activities. As the menstrual cycle progresses from the follicular phase to the luteal phase, there is a consequent increase in body water content and total body mass (Carmichael et al, 2021). These cause changes in body composition during PMS that present as weight gain and menstrual edema (Morino et al, 2022). The academic impact include; difficulties in concentration and focus, absenteeism in severe cases, reduced productivity and poor test performance among others (Buddhabunyakan et al, 2017). Even so, the impact varies widely among individuals. Some women may experience mild symptoms that have minimal effect on their studies, while others might face more severe challenges that require additional support. Moreover, academic performance of female students may be affected due to decreased motivation during PMS episodes. As a result, it can potentially lead to academic underachievement and hindered progress in studies. Evidently, Alkhamis et al. (2021) reports that in King Faisal University in Alahssa-Saudi Arabia, 32.9% of female medical students were absent in school due to PMS and as a result29.1% of medical school girls reported low scores with 22.5% reporting low scores than male students.

Additionally, the psychosocial well-being of female students may also be affected by PMS. Psychosocial impact of PMS refers to the emotional and social consequences that women may experience due to the symptoms of PMS (Freeman et al, 2011). The psychosocial impact can vary depending on the severity of symptoms and an individual's coping abilities. Mood swings, irritability, anxiety, and depressive symptoms are commonly reported during PMS episodes (Abbas et al. 2020). These emotional disturbances can strain interpersonal relationships leading to increased social isolation, difficulties in communication, and reduced overall satisfaction with university life. Even so, a study by Buddhabunyakan et al. (2017) showed various coping mechanisms used by students among them being: recreational activities, consulting friends and family and use of analgesic medications. Despite the potential consequences of PMS on physical, academic, and psychosocial well-being, there is a scarcity of research focusing specifically on this issue among female students, especially in Kenya. Research data would greatly help in creating awareness on PMS and its effects which will help in reducing stigmatization and improve empathy and support. Therefore, this study aimed at investigating the impact of premenstrual syndrome on the physical, academic, and psychosocial well-being of female students at Kabarak University.

METHODOLOGY

Study Location

The study was conducted at Kabarak University, located in Rongai Sub- County, 20 kilometers from Nakuru Town along the Nakuru-Eldama Ravine Road. The choice of Kabarak University as the study location is relevant for several reasons. Firstly, Kabarak University is a private institution with a diverse population of female students, providing an appropriate demographic for examining the impact of premenstrual syndrome (PMS) on various aspects of their lives. Secondly, Rongai Sub-County serves as a representative location within Kenya, allowing the study to capture insights into how PMS affects female students in a specific region of the country. This geographical context is crucial for avoiding potential biases that might arise from studying a more localized or homogenous population. Additionally, the proximity of Kabarak University to Nakuru Town offers access to essential urban amenities and resources, which may influence the well-being and coping mechanisms of female students experiencing PMS.

Research Design

A cross-sectional descriptive study approach was used as outlined by Setia (2016). The cross-sectional design was chosen due to its suitability for capturing a snapshot of data at a specific point in time. By collecting data from participants at a single time point, the study could efficiently examine the relationships between PMS and physical, academic, and psychosocial factors without the need for longitudinal follow-up. The descriptive nature of the study enabled a comprehensive portrayal of the prevalence and characteristics of PMS symptoms experienced by the participants. It facilitated the exploration of various dimensions of physical discomfort and emotional challenges associated with PMS, shedding light on its potential implications for academic performance and psychosocial functioning among female students.

Study Population

The study population comprised female students aged 18 years and above who were currently enrolled between years one and five at Kabarak University. Inclusion criteria encompassed students who were willing to participate voluntarily and had the ability to provide informed consent. Additionally, students from all academic disciplines and educational levels were eligible to be part of the study. However, certain individuals were excluded from participation based on specific criteria. Pregnant students were excluded due to the potential confounding effects of pregnancy on the assessment of premenstrual syndrome (PMS) symptoms. Similarly, students using hormonal contraception, as hormonal contraceptives could influence the manifestation and severity of PMS symptoms, potentially introducing bias into the study results.

Sample Size Determination

The sample size was determined using the Cochrane's formula at a prevalence rate of 50% and a target population of less than 10, 000 (Cochran, 1963). The final sample size was 356.

Sampling Procedure and Data Collection

Before the commencement of the study, necessary approvals were obtained. Approval to conduct the study was obtained from the Dean, School of Pharmacy; ethical approval was obtained from the Institutional Ethics and Research Committee (ISERC) of Kabarak University. Additionally, a research license from the National Commission for Science, Technology, and Innovation (NACOSTI). This ensured the study's compliance with regulatory requirements and ethical standards. Participants were selected using simple random sampling. Identification of eligible participants was based on their enrollment as female students aged 18 years and above at Kabarak University. The recruitment process involved reaching out to potential participants through online platforms, including class emails and WhatsApp groups.

Data collection was conducted using a self-administered questionnaire containing close-ended questions aligned with the research objectives. To ensure the reliability and validity of the questionnaire, a pilot study was conducted at Rafiki Centre, 5 kilometers from Kabarak University along the Nakuru-Eldama ravine road. Necessary adjustments were made based on the pilot study's findings to enhance the questionnaire's effectiveness in collecting relevant data. From the settings of the Google forms, only one response could be recorded per address to prevent any duplicity of the data. Prior to data collection, informed consent was obtained from all participants to ensure voluntary participation and adherence to ethical guidelines. Participants were assured of their confidentiality and privacy throughout the study. The study adhered to all necessary protocols and guidelines, including obtaining the informed consent.

Data Analysis

The collected data was meticulously entered into an Excel file and subsequently imported into the Statistical Package for Social Sciences (SPSS) version 27 for analysis. Both descriptive and inferential statistics were employed to gain comprehensive insights into the dataset. For categorical variables, the Chi-Square test was conducted to assess potential relationships and associations. The analysis involved calculating expected frequencies and comparing them to observed frequencies to determine the significance of relationships. The findings were presented through tables and graphs, which allowed for a clear visualization of the results. Additionally, a 95% confidence interval was applied to estimate the precision and reliability of the study's outcomes.

Ethical Considerations

Several ethical considerations were diligently addressed before commencing the study. Firstly, the study obtained ethical approval from the Kabarak University Research and Ethics Committee (KUREC). This approval ensured that the research adhered to the highest ethical standards, safeguarding the rights, privacy, and well-being of the participants. In addition to the overarching ethical approval, specific permissions were sought from the School of Pharmacy and the Kabarak University management to access the target population of female students. This step demonstrated respect for institutional regulations and ensured that the research was conducted with the cooperation and support of relevant authorities. Moreover, recognizing the importance of data protection and confidentiality, the study acquired a permit for data collection from the National Commission for Science, Technology, and Innovation (NACOSTI). This permit provided assurance that the data collection process complied with national guidelines and safeguarded the participants' sensitive information. Throughout the study, informed consent was obtained from all participants, emphasizing voluntary participation and their right to withdraw from the study without repercussion. This step underscored the principle of autonomy and respect for individual decision-making. To ensure data anonymity, identifying information was kept separate from the research data, further safeguarding the participants' privacy.

RESULTS

Response Rate

A total of 356 participants were invited to take part in the study, out of which 316 participants acknowledged the invitation and agreed to provide their premenstrual syndrome (PMS) demographics and details. This resulted in a response rate of 88.76%.

Socio-Demographic Characteristics

Table 1 shows the socio-demographic characteristics of the 316 participants. It was observed that a significant portion (43.4%) fell within the age range of 18-20 years, followed by those between 21-23 years (41.5%). The majority of participants (97.5%) reported being single, while the largest proportion (33.9%) were in their first year of education. In terms of academic programs, the highest number of participants were enrolled in the following schools: School of Medicine and Health Sciences

(SMHS) (10.8%), School of Education (EDUC) (16.1%), and the School of Science, Engineering, and Technology (SSET) (18.7%). Additionally, 28.5% of participants reported being enrolled in other academic programs not specified in the table. It is noteworthy that the majority of participants were pursuing their undergraduate studies, with only 10.8% enrolled in postgraduate programs.

Table 1:
Study Subjects' Socio Demographic Characteristics

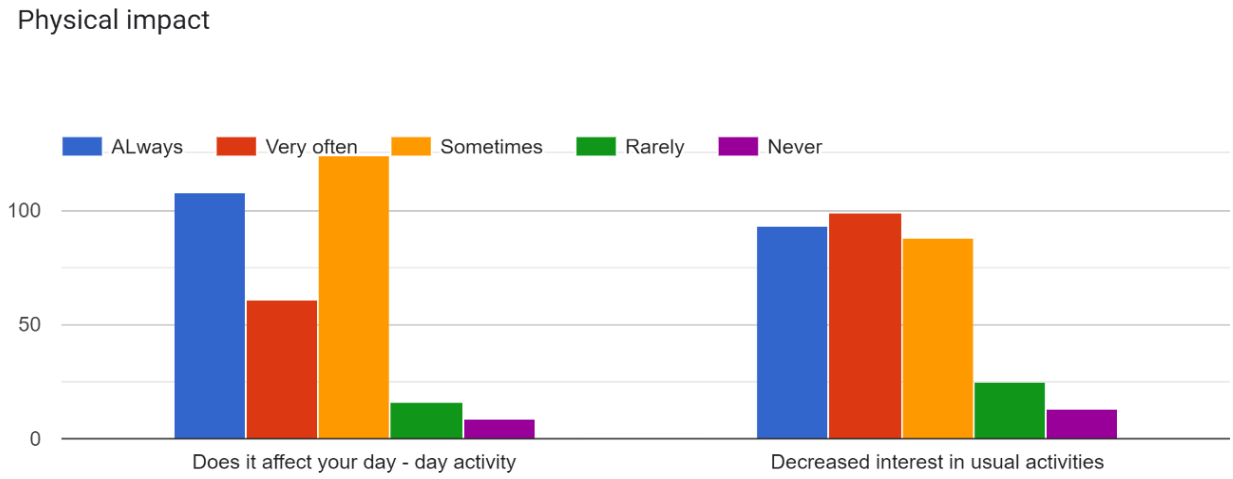
Variable	n (%)
Age (years)	
18-20	137 (43.4%)
21-23	131 (41.5%)
24-26	40 (12.7%)
>26	8 (2.5%)
Marital status	
Single	306 (97.5%)
Married	8 (2.5%)
Year of education	
First year	107 (33.9%)
Second year	49 (15.5%)
Third year	48 (15.2%)
Fourth year	49 (15.5%)
Fifth year	29 (9.2%)
Postgraduate	34 (10.8%)
Course	
SMPA	4 (1.3%)
SMHS	34 (10.8%)
SSET	20 (6.3%)
EDUC	51 (16.1%)
SoP	59 (18.7%)
SBE	26 (8.2%)
SoL	32 (10.1%)
OTHER	90 (28.5%)

EDUC: School of Education; SBE: School of Business & Economics; SMHS: School of Medicine & Health Sciences; SMPA: School of Music and Performing Arts; SoL: School of Law; SoP: School of Pharmacy; SSET: School of Science, Engineering Technology

Physical Impact of Pre-Menstrual Syndrome (PMS)

Occurrence of symptoms of premenstrual syndrome were categorized by study participants as always (occurred every time during their menstruation), very often (occurred most of the time), sometimes (occurred but not frequently, may or may not be experienced), rarely (meant the symptoms may not be present during their menstruation or it may occur once in a while), or never (meant the symptoms don't occur at all). Figure 1 shows majority of the participants (132) reported to sometimes experience abdominal bloating followed by 78 participants who always experience it. The second variable was breast tenderness of which 96 of the participants sometimes experienced it during their menses, 81 always experienced it, and 30 never experienced it at all. Headache was the third variable, whereby, 132 of the participants attested to experiencing it during their menses while 34 always experiencing it and 49 never experience headache at all. For cramps and pain, 128 of the participants always experiencing it during menstruation followed closely by 89 participants who sometimes experience it and only 10 participants said they never experience cramps and pain at all.

Figure 1:
Impact of PMS on Subjects' Physical Wellbeing



Association of PMS with Different Physical Symptoms

Based on the bivariate analysis there was an association between occurrence of PMS with mood swings, pain and irritability with a P-value of 0.025, 0.042 and 0.06 respectively among female students at Kabarak university ($p < 0.05$). (Table 2)

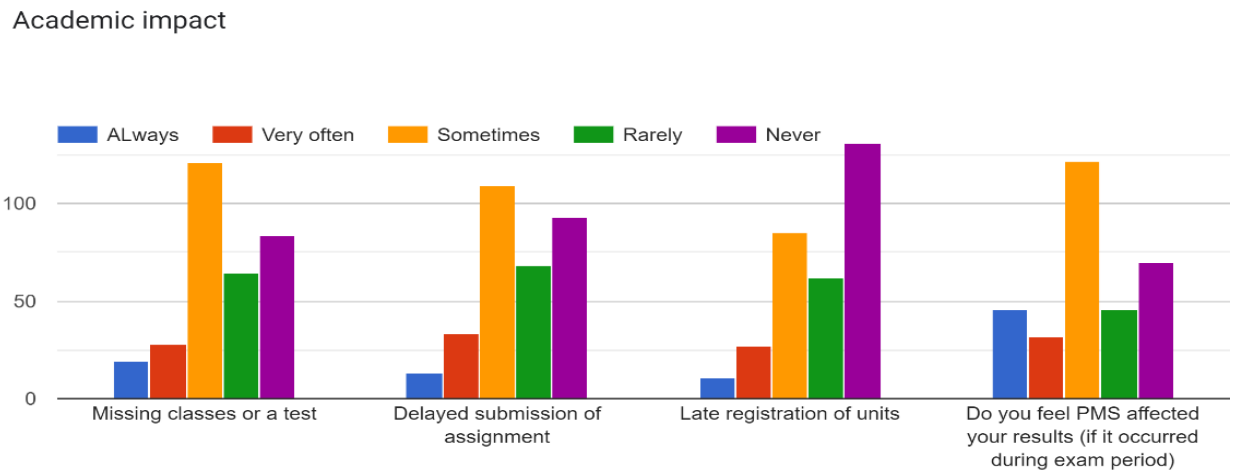
Table 2:
Inferential Analysis of Association of PMS with Different Physical Symptoms

Variable	Chi square	Odds ratio	p-value	Lower limit	Upper limit
Pain	4.129	3.397	.042	.977	11.816
Breast tenderness	2.667	2.114	.102	.846	5.279
Mood swings	5.020	3.897	.025	1.091	13.928
Irritability	7.446	3.597	.006	1.361	9.508
Trouble concentrating	.713	1.464	.398	.602	3.565
Food cravings	.379	1.5	.538	.409	5.497
Appetite change	.762	1.786	.383	.478	6.682

Academic Impact of Pre-Menstrual Syndrome (PMS)

Figure 2 represents the distribution of PMS association with academic aspects on study subjects' wellbeing. The variables assessed include missing classes or a test, delays submission of assignment, late registration of units and effect of PMS on results of subjects' grades. Majority of the participants (n=121) reported to sometimes missing classes while 84 of them never missed classes and only 19 reported to always miss classes/test. In terms of delayed submission of assignment, most of participants (n=109) reported to submit assignments late due to PMS. Further,85 participants reported to sometimes delaying registration of units while only 11 attested to always delaying registration due to PMS. Lastly, 122 participants reported to have their scores affected whenever PMS occurred during an examination.

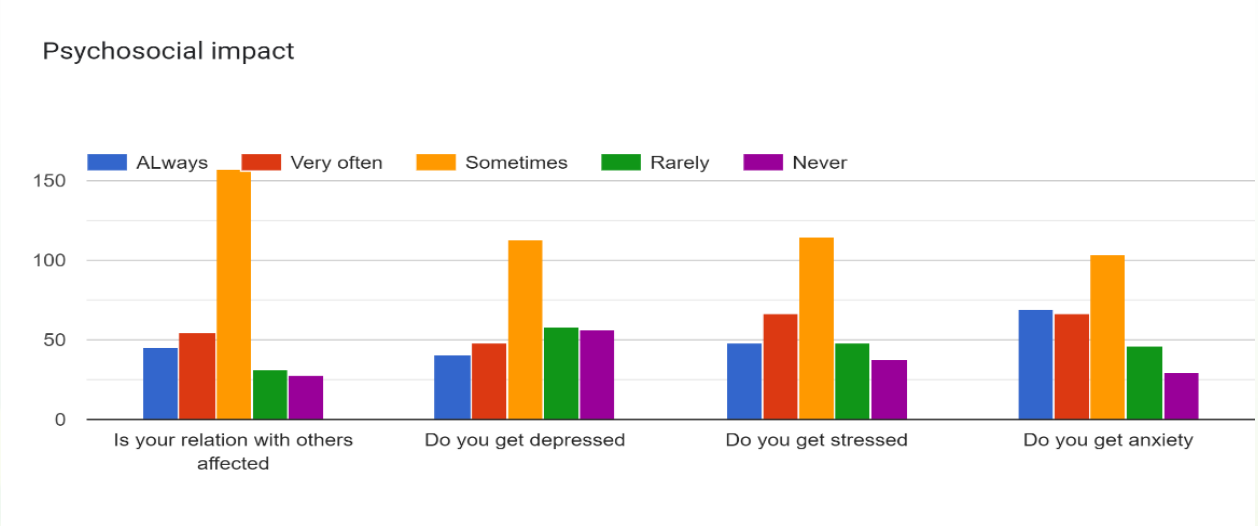
Figure 2:
Impact of PMS on Subjects' Academic Well-being

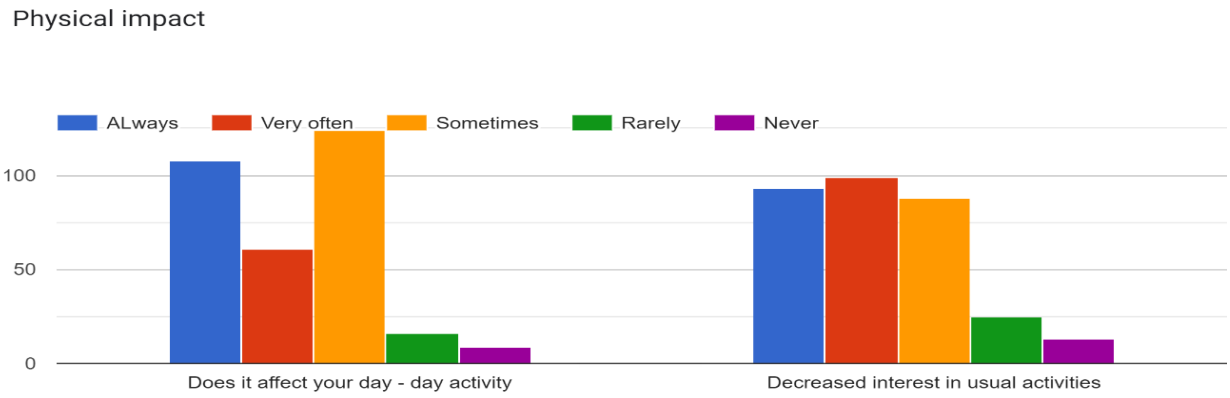


Psychosocial Impact of Pre-Menstrual Syndrome (PMS)

Figure 3 illustrates the impact of PMS on psychosocial wellbeing of study participants. The variables studied are; impact on relationships with others, PMS association with depression, stress and anxiety, effect on day-to-day activity as well as interest on normal activities. Majority of the participants (n=157) reported that PMS sometimes affected their interpersonal relationships with others. A total of 113 participants attested to sometimes experiencing depression during their menses while 58 rarely experienced it and 56 never experienced it. Most participants (n=115) reported to sometimes getting stressed during their menses while 67 reported to getting stressed very often and 38 participants never got stressed at all. Most participants (n=104) reported experiencing anxiety during menses. Pertaining day-to-day activities of participants, 124 reported having their activities sometimes affected by PMS while 108 always had their activities affected. Lastly, majority of the participants (n=99) reported to have decreased interest in activities and only 19 never had a decreased interest in activity.

Figure 3:
Impact of PMS on Subjects' psychosocial well-being

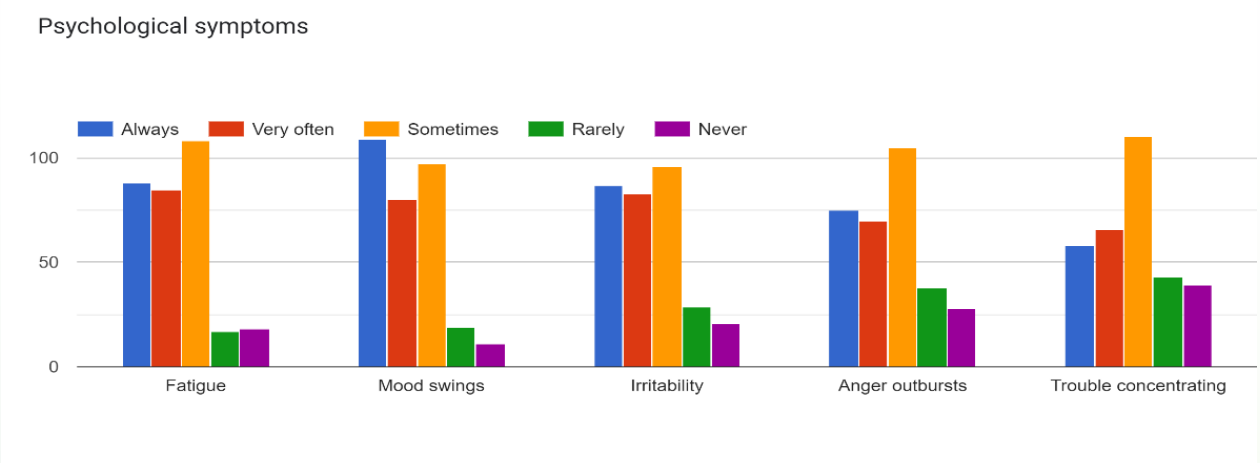




Psychological Impact of Pre-Menstrual Syndrome (PMS)

Psychological features studied were associations of PMS with fatigue, mood swings, irritability, anger outbursts and trouble concentrating on study subjects as shown in figure 4. Majority of the participants (n=108) reported experiencing fatigue sometimes during their menses while only 88 participants always experienced it; and 18 of them never experienced fatigue. The majority of participants (n=109) reported always experiencing mood swings whereas 97 of them experience it occasionally and 11 never experienced it. Further, 96 participants attested to sometimes being irritable while 87 were always irritable during their menses. Majority of participants (n=110) sometimes experienced anger outburst while 75 of them reported to always have anger outburst during their menses. Finally, 110 participants reported sometimes having trouble concentrating during menses while 66 of them experienced it very often and 39 participants never had trouble.

Figure 4:
Impact of PMS on Subjects' Psychological wellbeing

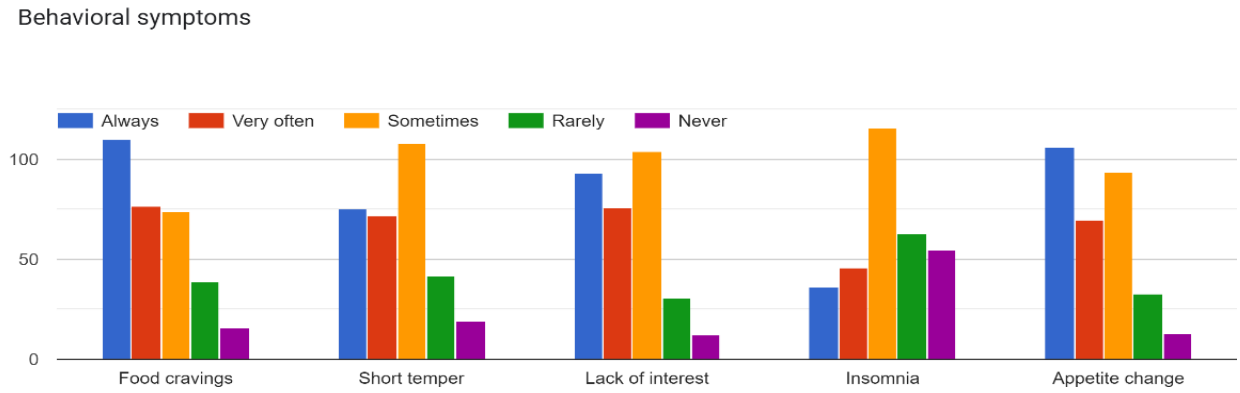


Impact of Pre-Menstrual Syndrome (PMS) On Behavioral Wellbeing

The behavioral symptoms were with variables ranging from food cravings, short temper, lack of interest, insomnia to change in appetite as shown in figure 5. The majority of participants (n=110) reported always having food cravings, with 77 of them having them very often while 74 of them had cravings occasionally. A total of 108 participants reported occasionally having a short temper, while 75 of them reported always having it. Loss of interest was reported by the majority of participants (n=104) on an occasional basis while 93 participants reported always experienced it during their period. Of the participants, 116 reported experiencing insomnia on an occasional basis while 36 of

them reported experiencing it always. Finally, a majority of participants (n=106) always experience a change in appetite, while 94 participants occasionally had a change in appetite during their menstrual cycle.

Figure 5:
Impact of PMS on Subjects' Behavioral wellbeing



Association Between Occurrence of PMS and Different Impacts

Based on the bivariate analyses done, there was an association between occurrence of PMS and decreased interest in usual activities amongst ladies at Kabarak university (X^2 = 7.453, p< 0.05) as depicted in Table 3.

Table 3:
Inferential Analysis to Check Association Between Occurrence of PMS and Different Impacts

Outcome Impact	Occurrence of PMS						
		X^2	Df	*p*-value	Odds ratio	95% confidence interval	
						Lower	Upper
Academic Impact	Missing classes or a test	1.131	1	.288	.686	.342	1.377
	Delayed submission of assignment	0.17	1	.896	1.049	.512	2.151
	Late registration of units	.658	1	.417	1.322	.673	2.596
	Do you feel PMS affected your results (if it occurred during exam period)	1.158	1	.282	.671	.324	1.392
Psychosocial impact	Is your relation with others affected	3.655	1	.056	.415	.164	1.047
	Do you get depressed	.058	1	.809	.903	.393	2.072
	Do you get stressed	2.258	1	.133	.523	.221	.1233
	Do you get anxiety	1.295	1	.255	.576	.220	1.505
Physical impact	Does it affect your day - day activity	3.229	1	.072	.291	.070	1.211
	Decreased interest in usual activities	7.453	1	.006	.223	.069	.716

X^2 = Chi square value; P = p-value; significant level α = 0.05

DISCUSSION

The primary objective of this research study was to examine the impact of premenstrual syndrome (PMS) on the physical, academic, and psychosocial well-being of female students enrolled at Kabarak University. A total of 316 students, corresponding to a response rate of 88.76%, voluntarily participated in this study.. This participation rate is above 65% and was considered satisfactory, as emphasized by Holtom et al. (2022).Among the 316 participants, the majority (43.4%) fell within the age range of 18-20 years. This aligns with the typical student population at Universities as these ages typically correspond to age of students during undergraduate studies. Following closely were between the ages of 21-23 years (41.5%). Notably, a considerable proportion (33.9%) of the participants were in their first year of study. This corresponds to the comparative study conducted by (Ackigoz et al.2017) at Eylul University in Turkey which reported that 58.1% of first-year students experienced PMS; highlighting the relevance of exploring PMS in the early years of academic pursuit. Further, majority of participants (97.5%) identified themselves as being single which allowed us to exclude factors such as pregnancy or contraceptive use among married females that could potentially influence the regularity of the menstrual cycle and thus have an impact on the data.In terms of academic programs, the School of Science, Engineering, and Technology (SSET) had the highest enrollment, accounting for 18.7% of participants, followed by the School of Education (16.1%).

The physical impact of PMS was assessed based on symptoms experienced by the participants during menstruation. The findings revealed that abdominal bloating (61%) was the most commonly reported symptom, with a majority of participants (n=132) indicating that they sometimes experienced it. In comparison to a study conducted alarge general hospital in Winnipeg, Canada.l, Bernstein et al. (2014) found that 58% of women experience abdominal bloating during their menstrual cycle. Breast tenderness (44%) was another prevalent symptom, with 96 participants reporting sometimes experiencing it. Similarly, Verma et al. (2014) found that 59% of women experiencing breast tenderness during their menstrual cycle. Headache (61%) and cramps/pain (59.2%) were also frequently reported symptoms. These results are consistent with those of Pavlović et al. (2015) who reported that 53.8%% of participants experiencing headache during their menstrual cycle. Notably, the prevalence of cramps and pain in this study is comparably higher than the findings of Grandi et al. (2012)which stood at 84.1% of the adolescent girls experience menstrual pain.

Regarding the academic impact of PMS, the findings revealed that a considerable number of participants reported sometimes missing classes (38.3%), submitting assignments late (34.4%), and having a delayed registration of units due to PMS. This is in line with studies done on other countries that show occurrence of PMS tend to affect class attendance (Alkhamis et al., 2021; Minichil et al. 2020). Additionally, PMS was reported to affect academic performance, with 38.6% of participants stating that their results were affected if PMS occurred during examinations. Bilir et al. (2020) reported that PMS leads to substandard academic performance among 56% of university students in turkey.

The study also examined the psychosocial impact of PMS on the participants. It was observed that PMS had an adverse effect on interpersonal relationships, with a majority of participants reporting that their relations with others were sometimes affected (49.7%). This was slightly lower than that of a study conducted in three medical colleges in India where PMS was experienced by 60.5% of the participants with 67.08 % experiencing social withdrawal syndromes (Singh et al.,2008). Depression (35.8%) and stress (36.4%) were also prevalent affecting participants during their menstrual cycles. Additionally, PMS was found to impact day-to-day activities (34%) and decrease interest in usual activities (31.3%). In comparison, this was slightly lower than that of a study conducted at an Iran college where 76% of participants reported a negative impact on their daily activities and 35% reported absenteeism from class during their menstrual period (Ghaderi et al., 2017).Indeed, based on inferential analysis, it was found that there was a statistically significant association between PMS and mood swings ($p = 0.025$) as well as a suggestive association with irritability ($p = 0.06$) based on inferential analysis. This suggests that PMS can have an impact on the emotional well-being of female students, contributing to mood disturbances.

Psychological features associated with PMS, such as fatigue, mood swings, irritability, anger outbursts, and trouble concentrating, were also explored. The study found that fatigue (27.8%) was a common symptom experienced by participants, with mood swings(34.4%) and irritability (27.5%) also being frequently reported. A study by Chumpalova et al. (2020) found that fatigue was the most commonly reported symptom of premenstrual syndrome, affecting 43.5% of women while Henderson (2022) found that mood swings were the most commonly reported symptom, affecting 64% of women.

The study also investigated the behavioral impact of PMS. This focused on variables such as food cravings, short temper, lack of interest, insomnia, and change in appetite. The results indicated that food cravings (34.8%) and short temper (23.7%) were prevalent behavioral symptoms associated with PMS. Study by Souza et al. (2018) found that the desire for sugary foods was higher during the premenstrual period.Lack of interest (29.4%) and insomnia (11.4%) were also reported by a significant number of participants to occur with every menstrual cycle. Similarly, Oinonen and Mazmanian (2002) found that 73% of women experience a decrease in interest in usual activitieswhile Nowakowski et al. (2013) reported that menstruating women often have poor sleep quality and greater sleep disturbance during their premenstrual week. Evidently, the study found that there was a statistically significant association between the occurrence of PMS and decreased interest in usual activities ($p = 0.006$).

CONCLUSION

We conclude as follows; majority of the participants were aged between 18-21 years with most of them being in their first year of study. Most of the participants reported to experience cramps and pain, abdominal bloating, mood swings, irritability, food cravings and appetite change. Delayed submission of assignment and late registration of units were common occurrences associated with PMS while a large proportion of participants reported a decreased interest in usual activity during PMS. Overall, the occurrence of PMS has potential detrimental effects on the physical, behavioral, psychological, psychosocial and academic life of female students at Kabarak university.

RECOMMENDATIONS

Based on the study findings and discussion we recommend that the health facility at the university in liaison with the University management team to upscale PMS awareness campaigns, increase and make available support mechanisms and coping strategies for PMS-affected female students at the university.

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