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Menstrual disorder and associated factors among medical students in Uganda: a cross-sectional study

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Abstract

Background Menstrual disorders (MD) affect 75% of women worldwide and account for the majority of morbidity in women of childbearing age. Heavy and prolonged menstruation are linked to severe anemia and its sequelae, irregular menstruation predisposes females to unwanted pregnancies, which can result in unsafe abortion with associated maternal injuries and even death. Furthermore, students suffering from PMS, dysmenorrhea, or heavy menstruation are more likely to miss lectures and exams.

Objectives We determined the prevalence and factors associated with menstrual disorders among undergraduate medical students at Mbarara University of Science and Technology (MUST) in southwestern Uganda.

Methods We conducted a cross-sectional study in the Faculty of Medicine (FOM) at MUST from 2nd October, 2023 to 1st November, 2023 using consecutive sampling among the female undergraduate students, We included students from 19 to 45 years and excluded those who were either pregnant or breastfeeding. Socio-demographic, gynecological, lifestyle and clinical data were obtained through self-administered questionnaires. The prevalence of menstrual disorders was the proportion of participants with any of dysmenorrhea, Premenstrual Syndrome (PMS), infrequent, frequent, prolonged, heavy or irregular Menstruation. Modified Poisson regression analysis was used to evaluate associations between menstrual disorders and independent variables.

Results A total of 290 students were enrolled with mean age 23.93 (± 4.40) years. The prevalence of menstrual disorders was 85.6% (249/290) (95%CI 81.83–89.90), indicates that these issues may be a common concern for young women, especially those in academic environments. Having stress [aPR 1.13, 95% CI (1.03–1.24), p = 0.007], being below 24 years [aPR 1.12, 95% CI (1.01–1.25), p = 0.034] and being underweight [aPR 1.15, 95% CI (1.08–1.22), p < 0.001] were independently associated with Menstrual disorders.

Conclusion More than three-quarters of medical students at MUST experience menstrual disorders, highlighting a significant health concern in this population.

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These findings emphasize the need for integrating menstrual health education and stress management programs into medical curricula. Health policies should prioritize screening and management of menstrual disorders, with recommendations for wellness programs such as yoga, sports, and creative activities to support student well-being.

Keywords Menstrual disorders, Medical students, Stress, Prevalence, Uganda

1 Introduction

Menstruation is a normal physiological process characterized by the periodic shedding of the uterine endometrium with resultant blood loss. Typically, it occurs every 24 to 38 days, lasts ≤ 7 days, with a total volume of menstrual blood loss ≤ 80 ml (use of ≤ 6 pads/day), and a cycle variation of ≤ 9 days for those aged 18–25 and 42–45, and ≤ 7 days for those aged 26 to 41. Menstrual disorders result from variations in any of these parameters and include heavy, irregular, frequent/infrequent, prolonged menstruation, dysmenorrhea, and premenstrual syndrome (PMS) [1].

Menstrual disorders affect 75% of women worldwide and account for a significant portion of morbidity in women of reproductive age [2]. In East Africa the burden of irregular menstruation was estimated at 55% [3], and one study at Makerere University College of Health Sciences found a prevalence of menstrual disorders of 97.8% [4]. Menstrual disorders can arise from disruptions in the hypothalamic-pituitary-ovarian and uterine axes, with contributing factors including underweight, sleep duration, age at menarche, stress, alcohol intake, physical activity, polycystic ovarian syndrome (PCOS), anemia, and hypothyroidism, among others [5].

These disorders are associated with several complications, such as severe anemia due to heavy and prolonged menstrual bleeding, unwanted pregnancies resulting from irregular menstruation especially among females who rely on the safe period system for contraception, which can lead to unsafe abortions with potential maternal injuries and even death. Additionally, students with menstrual disorders are more likely to miss lectures and examinations [6]. Despite the widespread impact, the literature on menstrual disorders, particularly in Mbarara University of Science and Technology (MUST), remains scarce. The lack of attention to this issue in our context signifies a gap in both research and healthcare provision for students.

This study aims to fill this gap by assessing the prevalence and factors associated with menstrual disorders among undergraduate female medical students at Mbarara University of Science and Technology (MUST). Focusing on medical students is crucial as they represent a highly stressed and academically demanding group, which may exacerbate menstrual health issues. Addressing this gap can lead to better-informed health policies and educational interventions to support the well-being of future healthcare providers.

2 Materials and methods

2.1 Study setting, design and population

This was a cross-sectional study conducted in the Faculty of Medicine (FOM) at MUST from 2nd October to 1st November, 2023. MUST is located in Mbarara city, Southwestern Uganda approximately 269 km from Kampala, Uganda's capital City. The faculty of medicine is one of the founding faculties of the university which was established in 1989 and has both undergraduate and postgraduate programs. Undergraduate programs

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include; bachelor of Medicine & Surgery, bachelor of Pharmacy, bachelor of Nursing, bachelor of Physiotherapy, bachelor of Laboratory science and bachelor of pharmaceutical sciences. The total number of female undergraduate students is about 400 students comprising of those in preclinical years and those in clinical years. The preclinical students have lectures, tutorials from Monday to Friday starting from 8:00 am to 5:00 pm while the students in the clinical years have ward work and night shifts on top of the lectures and tutorials. We included students from 19 to 45 years and excluded those who were either pregnant or breastfeeding as Above 45 years, women may be entering or have already entered menopause and significant number of those below 19 years could be having immature Hypothalamic Pituitary ovarian axis.

2.2 Sample size calculation

The sample size for the study was calculated using the Kish Leslie formula of 1965 for calculating sample size for cross-sectional studies [7]. Using 1.96 as the critical value at 5% level of significance, taking the prevalence of menstrual disorders of 75%, [2], and 0.05 as a margin of error and adjusting for a nonresponse rate of 10%, we estimated a sample size of 288.

2.3 Sampling

Given that there are only 350 students who met the eligibility criteria and were willing to participate in the study during the study period, we used consecutive sampling which could lead to a selection bias. Written informed consent was obtained from each study participant before recruitment and participation in the study.

2.4 Data collection and study variables

Data were collected by six research assistants using an interviewer-administered structured questionnaire. The research assistants were health workers, who were trained on the data collection tool and study procedures. Our outcome variable was menstrual pattern which was dichotomized as menstrual disorders and normal menstrual pattern. It should be noted that the study was not powered to study the factors associated with menstrual disorders and therefore the analysis for factors associated should be considered exploratory. The questionnaire captured data on independent variables including socio-demographic, medical, and gynecological and lifestyle factors. The variables included socio-demographic factors such as age, Programme and year of study Medical factors included BMI and HIV serostatus, gynecological factors included Galactorrhea and history of use of hormonal contraceptives and Lifestyle factors included Stress, Smoking, Alcohol intake, Sleeping hours and Physical activity.

2.5 Measurements

The outcome/ dependent variable was menstrual disorders, where a student was considered to have menstrual disorders if she had any of the following: Heavy, Prolonged, Frequent, Infrequent, Irregular, PMS and Dysmenorrhea [8, 9].

The weight of the participants was measured using a calibrated Secca weighing scale (Seca 762, GmbH & Co. KG, and Hamburg, Germany) to the nearest second decimal. The participants had no shoes, nor heavy clothes on. The height was taken using a

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stadiometer to the nearest decimal in standing up position with the heel, buttock, and upper back along the same vertical plane.

Medical student: Was any undergraduate student offering a medical course in the faculty of medicine. These included students offering Medicine, Pharmacy, Nursing, Physiotherapy, Laboratory science and pharmaceutical science.

BMI (Body Mass Index) was categorized as; < 18.5 as underweight, 18.5 to < 25 as Normal weight, 25 to less than 30 as Overweight and 30 and above as Obese.

Physical activity was assessed by asking the total physical activity time utilized/ engaged-in in a week. At least 150min per week was considered adequate, anything less than 150 min per week was considered low/ inadequate PA as recommended by CDC [10].

Sleep duration was assessed by asking the total hours spent sleeping with day time naps excluded. At least 7 h per day was considered adequate, anything less than 7 h per day was considered low/ inadequate Sleep duration as recommended by CDC [11].

Galactorrhea was determined by present of milk/white liquid coming from the breast.

Stress was measured using the Medical Students Stress Questionnaire (MSSQ). A student with a score of 2 or more was considered stressed while one with a score of < 2 is not stressed. The MSSQ is scored by assigning 0–4 for each of the corresponding replies. For example, a reply of 'causing no stress and 'causing severe stress' gets scores of 0 and 4 respectively The scores got from asking each of the question in the MSSQ was summated and the sum was divided by 40 which is the total number of questions in the questionnaire then the value got is the stress score. MSSQ was designed purposely for medical students giving it advantage over the other tools. Numerous studies have demonstrated its reliability and validity for use in medical student populations. The Kaiser-Mayer-Olkin (KMO) statistic and Bartlett's Test showed a value of 0.78 and 0.91, respectively, for the validity test of the MSSQ [12].

2.6 Study procedure

The study was conducted in the FOM of MUST. The students were accessed from the lecture rooms and wards during their free time, where they were informed about the study and willing students directed on specific gazetted places within the university premises where the research assistants were located. The class list was used so as to reach out to as many students as possible while also avoiding recruiting a student more than once Participants were recruited by trained research assistants who were health workers. Participants who were eligible for the study were given detailed information about the nature and purpose of the study. A trained research assistant issued the consent document to the participants and they were given the opportunity to ask clarifying questions before providing consent and completing a self-administered questionnaire. This questionnaire captured data on socio-demographic, medical, gynecological and lifestyle factors. Weight and height were taken from selected corner while palpation for enlarge thyroid glands was done in the palpation room.

2.7 Quality control

We pretested the questionnaire among 10 medical students from Kampala International University to ensure that the wordings were well understood and correct any errors in word meaning. We trained research assistants on research ethics, privacy, data collection

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tool, and consent procedures. The Principal Investigator (PI) monitored data collection and cross-checked that the questionnaires were correctly filled.

2.8 Data management and analysis

Raw data were cross-checked for any discrepancies and completeness. The data were then double entered into Excel spreadsheet after which they were exported to STATA version 17 (StataCorp, College Station, Texas, USA) for cleaning and analysis. Independent variables were analyzed using descriptive statistics. Continuous variables were described as mean ± SD while categorical variables were described as percentages. We used a chi-square test or Fisher's exact test (in cases of small counts < 5) for categorical variables and a student t-test for continuous variables to compare baseline characteristics of participants with menstrual disorders and Normal menstrual pattern.

The prevalence of Menstrual disorders was calculated as the number of students with menstrual disorders as a percentage of the total participants. To determine the factors associated with menstrual disorders, we used modified Poisson regression analysis; we used a generalized linear model with Poisson as family and a log link without an offset but including robust standard errors, Modified Poisson regression was used to estimate prevalence ratios (PR) due to its ability to handle high prevalence outcomes like menstrual disorders. Unlike logistic regression, it provides more interpretable relative risk estimates. This method is also better suited for over dispersion and frequent outcomes in epidemiological studies. Variables that had a p-value < 0.2 at bivariate analysis or were biologically plausible were entered into a multivariable modified poison regression model, stepwise back wise elimination to identify factors independently associated (with $p < 0.005$) with menstrual disorders among medical students at MUST.

3 Results

Of the 350 female undergraduate medical students at MUST during the study period, only 331 students aged 19–45 years were willing to participate in this study, 320 were recruited and 11 excluded because they were either pregnant (5) or breastfeeding (6). Out of 320 questionnaires distributed, 302 (94.4%) were returned. However, 12 questionnaires were excluded as they were either incompletely or inappropriately filled. The remaining 290 questionnaires were thus analyzed for the purpose of this study.

The mean age of students with MD was lower than that of students with NMP (23.63 ± 4.11 vs. 25.73 ± 5.61). Majority of the participants were those in year One (71) and were doing medicine (84) (Table 1).

A higher proportion of students with stress had MD compared with those who had NMP (92.37% vs. 7.63%). Majority of the participants were those who didn't smoke (287), were physically active for < 150 min per week (237) and didn't drink alcohol (245) (Table 2).

The proportion of students with Galactorrhea was higher among participants with MD compared to those with NMP (81.25% vs. 18.75%), while the proportion of students using COC was lower among participants with MD compared to those with NMP (20.00% vs. 80.00%). Majority of the participants were, HIV negative (287), didn't have goiter (289), Normal weight (201) and had no history of Thyroid disease (287) (Table 3).

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Table 1 Socio-demographic characteristics of Participants by Menstrual disorders

Characteristic	Overall N = 290	MD N = 249	NMP N = 41	p-value
	n/N (%)	n/N (%)	n/N (%)	
Age in years (mean ± SD)	23.93 ± 4.40	23.63 ± 4.11	25.73 ± 5.61	0.0023*
Academic program				0.211
Medicine	84 (100)	70 (83.33)	14 (16.67)	
Pharmacy	58 (100)	54 (93.10)	4 (6.90)	
Physiotherapy	30 (100)	26 (86.67)	4 (13.33)	
Nursing	62 (100)	50 (80.65)	12(19.35)	
Laboratory	50 (100)	44 (88.00)	6(12.00)	
Pharmaceutical	6 (100)	5 (83.33)	1(16.67)	
Year of study				0.859
One	71 (100)	63 (88.73)	8 (11.27)	
Two	60 (100)	52 (86.67)	8 (13.33)	
Three	65 (100)	55 (84.62)	10(16.38)	
Four	69 (100)	59 (85.51)	10(14.49)	
Five	25 (100)	20 (80.00)	5(20.00)	

MD: Menstrual disorders, NMP: Normal Menstrual Pattern, SD: Standard Deviation

*p ≤ 0.05

Table 2 Lifestyle characteristics of Participants by Menstrual disorders

Characteristic	Overall N = 290	MD N = 249	NMP N = 41	p-value
	n/N (%)	n/N (%)	n/N (%)	
Alcohol use				0.494
Never	245 (100)	208 (84.90)	37 (15.10)	
< Weekly	17 (100)	16 (94.12)	1 (5.88)	
≥ Weekly	28 (100)	25 (89.29)	3 (10.71)	
PA (Minutes/Week)				0.245
< 150	237 (100)	206 (86.92)	31 (13.08)	
≥ 150	53 (100)	43 (81.13)	10 (18.87)	
Sleep duration				0.642
< 7 h	98 (100)	86 (87.76)	12 (12.24)	
≥ 7 h	192 (100)	163 (84.90)	29 (15.10)	
Smoking				1.00
No	287 (100)	246 (85.71)	41 (14.29)	
Yes	3 (100)	3 (100)	0(0.00)	
Stress				0.004*
Yes	131 (100)	121 (92.37)	10 (7.63)	
No	159 (100)	128 (80.50)	31 (19.50)	

MD: Menstrual disorders, NMP: Normal Menstrual Pattern, SD: Standard Deviation, PA: Physical activity

*p ≤ 0.05

Out of the 290 participants' data analyzed, 249 had menstrual disorders giving the prevalence of menstrual disorders among female undergraduate medical students at MUST of 85.86% (95% CI 81.83–89.90) as shown in Fig. 1.

At multivariable analysis, the factors independently associated with menstrual disorders were; Age, Stress and BMI. Prevalence of Menstrual disorders in students who had stress was 1.15 folds the prevalence in students who didn't have stress, it was 1.12 times more prevalent in students below 24 years than in students of more than or equal to 24 years, Menstrual disorders was 1.13 times more prevalent in students who were underweight than in those who had normal weight (Table 4).

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Table 3 Medical & Gynecological characteristics of Participants by Menstrual disorders

Characteristic	Overall N = 290	MD N = 249	NMP N = 41	p-value
	n/N (%)	n/N (%)	n/N (%)	
HIV status				1.000
Negative	287 (100)	246 (85.71)	41 (14.29)	
Positive	3 (100)	3 (100)	0 (100)	
History of thyroid disease				0.368
No	287 (100)	247 (86.06)	40 (13.94)	
Yes	3 (100)	2 (66.67)	1 (13.33)	
BMI categories				0.069
Under weight	16 (100)	16 (100)	0 (0.00)	
Normal weight	201 (100)	175 (87.06)	26(12.92)	
Over weight	73 (100)	58 (79.45)	15 (20.55)	
History of hormonal contraceptives				0.001*
None	263 (100)	231 (87.83)	32 (12.12)	
COC	5 (100)	1 (20.00)	4 (80.00)	
OHC	22 (100)	17 (77.27)	5 (22.73)	
Galactorrhea				0.043*
No	274 (100)	238 (86.13)	36 (13.87)	
Yes	16 (100)	13 (81.25)	3 (18.75)	
Goiter				1.000
No	289 (100)	248 (85.81)	41 (14.19)	
Yes	1 (100)	1 (100)	0 (0.00)	

BMI: Body Mass Index, MD: Menstrual disorders, NMP: Normal Menstrual Pattern, OHC: Other hormonal contraceptives

*p ≤ 0.05

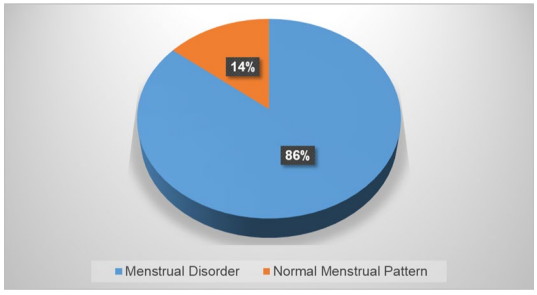


Fig. 1 Prevalence of menstrual disorders

4 Discussion

Menstruation is an indicator of normal reproductive health of a woman and deviation from normal is common. In this study significant proportion of medical students, specifically 85.86%, experienced at least one of the forms of menstrual disorders. This prevalence is high due to the demanding and stressful nature of medical training, the intense academic workload, long hours of study, and high-pressure environment which all can contribute to hormonal imbalances and disruptions in the menstrual cycle, The finding underscores the importance of addressing menstrual health in this specific group, as untreated or unmanaged menstrual disorders may lead to further health complications, academic absenteeism, and reduced quality of life. Universities can implement comprehensive menstrual health education programs to raise awareness, provide access to healthcare services such as regular screenings and consultations. Additionally, offering stress management initiatives (e.g., counseling, yoga, or mindfulness practices) and

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Table 4 Factors associated with Menstrual disorders

Characteristic	Bivariate analysis		Multivariable analysis	
	cPR (95% CI)	p-value	aPR (95% CI)	p-value
Age category (years)				
< 24	1.14 (1.02–1.27)	**0.024**	1.12 (1.01–1.25)	0.034*
≥ 24	Ref		Ref	
Smoking				
Yes	1.17 (1.11–1.22)	**< 0.001**	1.07 (0.96–1.20)	0.230
No	Ref		Ref	
Stress				
Yes	1.15 (1.05–1.26)	**0.003**	1.13 (1.03–1.24)	0.007*
No	Ref		Ref	
Alcohol				
No	Ref		Ref	
Weekly or less	1.11 (0.97–1.26)	0.121	1.13 (0.98–1.29)	0.086
More than weekly	1.06 (0.92–1.21)	0.477	1.05 (0.93–1.19)	0.415
BMI				
Under weight	1.15 (1.09–1.21)	**< 0.001**	1.15 (1.08–1.22)	< 0.001*
Normal weight	Ref		Ref	
Over weight	0.91 (0.80–1.04)	0.163	0.95 (0.84–1.07)	0.391
History of hormonal contraceptive Use				
None	Ref		Ref	
COC	0.23 (0.04–1.32)	0.099	0.89 (0.70–1.13)	0.338
OHC	0.88 (0.70–1.11)	0.278	0.25 (0.04–1.45)	0.122

Bold valuesindicate statistical significance (p < 0.05)

cPR: crude Prevalence Ratio, aPR: Adjusted Prevalence Ratio, Ref: Reference group, CI: Confidence Interval, OHC: Other Hormonal Contraceptives

*p ≤ 0.05

providing a platform for open discussions about menstrual health can also reduce stigma and ensure students feel supported. We believe that these institutional interventions will not only improve students' menstrual health but also enhance their academic performance and overall quality of life.

The prevalence is similar to the prevalence of 84.2% found among students in a cross-sectional study conducted in Sunkoshi Rural Municipality, Sindhuli [1]. The prevalence of menstrual disorders among medical students in this study was lower than reported among female undergraduate students in Makerere University College of Health Sciences 97.8% (95%CI: 95.2–99.0), it is important to note that the age range of participants in the two studies differed. As study at Makerere University recruited participants from 18 years and yet age below 19 years is the age about which girls start their menstruation and for the first two years after menarche, it is very common to skip periods because the brain part which regulates periods is not yet fully functional, [4].

However a cross sectional descriptive study, which was carried out among all the undergraduate students regardless of whether they were medical students or not in Borno state, Nigeria reported a lower prevalence in that 66.5% of the students had one or more dysfunctions of menstruation [13], this lower prevalence is justifiable by the fact that the study was not done in only medical students who are more at risk of menstrual disorders and also this study didn't include premenstrual syndrome as one of the menstrual disorders and yet premenstrual syndrome constituted majority of menstrual disorders in our study.

The observed association between stress and menstrual disorders aligns with existing literature highlighting the impact of psychological stress on menstrual disorders [14, 15].

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Stress predisposes to menstrual disorders through activation of the hypothalamic–pituitary–adrenal (HPA) axis. This is associated with increase release of cortisol which reduces the sensitivity of the gonadotrophs to GnRH hence suppressing the release of FSH and LH. Now, if there is suppression in the release of FSH and LH, it can disrupt the normal menstrual cycle in several ways. For example, reduced FSH levels can lead to inadequate development of ovarian follicles, resulting in a lack of estrogen production and ultimately anovulation (lack of ovulation). This can cause irregular or absent menstrual periods.

Similarly, reduced LH levels can also prevent ovulation from occurring since its surge is a pre requisite for ovulation hence irregular or absent menstrual periods. Additionally, decreased LH levels can result in inadequate production of progesterone by the corpus luteum, leading to a condition known as luteal phase defect. This can cause a shortened luteal phase and inadequate preparation of the uterine lining. Suppression of FSH and LH may also alter progesterone synthesis and release which may increase the action of prostaglandin. Other stress related hormones like adrenaline and cortisol also can influence prostaglandin synthesis and/or binding in the myometrium and may explain the role of stress in dysmenorrhea [14].

The observed higher prevalence of menstrual disorders among students below 24 years of 1.12 times compared to that in students 24 years and above aligns with previous researches indicating that younger age groups are more susceptible to menstrual disorders [3, 13]. In Ethiopia, a cross sectional study among college students reported that Students under the age of 20 years were 3.88 times [AOR = 3.88, 95% CI (1.25, 12.18)] more likely to have irregular menstrual cycles than women over the age of 25 years [3].This is because:—Most students under the age of 24 are typically not mothers, and studies have shown that women tend to experience a reduction in menstrual disorders after giving birth. This could potentially explain why there is a higher prevalence of menstrual disorders among students under 24 years old compared to their older counterparts. Additionally, some individuals may experience a delay in the maturation of the Hypothalamic-Pituitary-Ovarian Axis (HPO), which is responsible for regulating the menstrual cycle and yet when the HPO is not fully developed, there is fluctuation in the ovarian sex steroids, this might be responsible for high prevalence of menstrual disorders in students below 24 years [13].

The observed 1.13 times higher prevalence of menstrual disorders among underweight compared to normal weight students in our study is consistent with findings from previous studies [16, 17]. One of the key physiological mechanisms underlying this disruption is the critical body mass hypothesis. This hypothesis suggests that a certain level of body fat is necessary for the normal functioning of the reproductive system, particularly the hypothalamic-pituitary–gonadal (HPG) axis. When an individual is underweight could be due to inadequate nutritional intake or any other cause and has low levels of body fat, the body may perceive this as a state of energy deficiency or starvation. In response to this perceived energy deficiency, the hypothalamus may down regulate the production of gonadotropin-releasing hormone (GnRH), a key hormone that stimulates the release of luteinizing hormone (LH) and follicle-stimulating hormone (FSH) from the pituitary gland. This can lead to a decrease in the production of estrogen and progesterone by the ovaries, ultimately disrupting the normal menstrual cycle. Another important factor involved in the link between underweight and menstrual disorders is the hormone leptin which is a key regulator of energy balance, plays a crucial role in the regulation of the HPG axis and is primarily produced by adipose tissue. Low levels of body fat in underweight individuals can lead

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to lower levels of circulating leptin and this can directly impact the production and release of GnRH, LH, and FSH. Furthermore, deficiencies in key nutrients such as iron, calcium, and vitamins (e.g., vitamin D) can exacerbate menstrual dysfunctions and contribute to other health complications, such as anemia, which is often associated with heavy menstrual bleeding [16].

5 Limitations

The cross-sectional design limits causal inferences, as it captures data at a single point in time and may not accurately reflect the chronicity or the changes in menstrual disorders over time. However, the relatively large size of the study sample was probably enough to enable a robust analysis of the menstrual disorders identified.

6 Strength of the study

Its substantial sample size of 290 students, which enhances the generalizability of the findings to the undergraduate female population at MUST. The use of modified Poisson regression analysis to identify associations between menstrual disorders and independent variables provides a robust statistical approach for understanding the dynamics of these disorders in relation to stress, age, and body weight. Moreover, the focus on a specific population of medical students allows for targeted interventions and recommendations that can directly benefit this high-risk group.

7 Conclusions

At MUST in the FOM, more than three-quarters of undergraduate female medical students had menstrual disorders, PMS and dysmenorrhea were the most prevalent menstrual disorders. Students who were stressed, those below 24 years and students who were underweight were more likely to have menstrual disorders.We recommend Seminars and lectures on stress management and mental health awareness be hosted by the University, Screening and management of menstrual disorders among the students. Additionally Health education programs on the importance of maintaining a healthy weight and its impact on menstrual health be incorporated into orientation sessions, workshops, or regular health education initiatives.

Abbreviations

ACOG	American College of Obstetricians and gynecologist
BMI	Body mass index
CRH	Corticotrophin releasing hormone
FOM	Faculty of Medicine
FRC	Faculty of Medicine Research Committee
GnRH	Gonadotropin releasing hormone
HPA	Hypothalamic pituitary axis
MD	Menstrual disorders
MSSQ	Medical Student's Stress Questionnaire
MUST	Mbarara University of Science and Technology
MUST-REC	Mbarara University of Science and Technology Research Ethics Committee
NMP	Normal menstrual pattern
OHC	Other hormonal contraceptives
PA	Physical activity
PMS	Premenstrual syndrome
WHO	World Health Organization

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Author contributions
JOO, RN, ROO, SO, CA, VM, JSO, AO, DJO, RO, JJE and DCA contributed to the conception and design of the study. JOO and MR performed formal data analysis. RO, RN and DCA contributed to drafting the manuscript. JOO, SO, DJO and AO contributed to study implementation and data acquisition. MR, DCA, CA, VM, JS, ROO, JJE, and SO critically reviewed and revised the manuscript for key content. JOO, EO and DCA prepared the final manuscript. All authors read and approved the final manuscript.

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Data availability
The data and materials used to support the findings of this study are available on request from the corresponding author.

Declarations

Ethics approval and consent to participate
This study was approved by the Faculty of Medicine Research Committee, Mbarara University of Science and Technology Research Ethics Committee (REC No. MUST-2023-952). Administrative clearance was obtained from the dean Faculty of Medicine Mbarara University of Science and Technology, before conducting the study. Written informed consent was obtained from each study participant before recruitment into the study and confidentiality of the study participants was ensured by using unique identifiers. Participation was voluntary and participants were free to withdraw from the study at any time during the study. In general, this study adhered to the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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