Research Article

Impact of Examination Stress on Premenstrual Syndrome among Female Medical Students

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Abstract

Background: Stress is an unwelcome yet necessary aspect of all our lives which dictate our quality of life. This emotion is particularly unwelcome in the period of exams which is why this research was conducted, and for females specifically. Premenstrual Syndrome is a collection of symptoms occurring one week to ten days prior to a menstrual cycle involving but not limited to, fatigue, abdominal cramps, and restlessness. These symptoms can lead to disruption in their lives and a negative effect on the academic performance of female medical students.

Objective: To determine the effect of examination stress on Premenstrual Syndrome in Pakistani medical students and to see if there is any correlation present.

Methods: This was a cross-sectional study which was conducted between March and September of 2022 in CMH Lahore where 177 females were enrolled, prior to their exams with an exclusion criterion of females on antiepileptic medication, antipsychotics or birth control. Non-probability convenient sampling was used. Two pre-tested questionnaires were used to measure stress and Premenstrual Syndrome simultaneously, the Student Stress Inventory (SSI) and Premenstrual Syndrome Scale (PMSS), consensually and anonymously. Chi-squared test was utilized with a P-value less than 0.05 was taken as significant.

Results: Out of 177 female students, for SSI, 53 had mild stress, 115 had moderate stress while 5 had high stress. As for PMSS, 2 students had no symptoms, 34 had mild symptoms, 63 had moderate symptoms, 57 had severe symptoms and 17 had very severe symptoms. We found a statistically significant link between pre-modular stress and its detrimental effects on premenstrual syndrome. Both the PMSS and the SSI had a p value of 0.004, which established a noteworthy association.

Conclusion: A strong link was found between pre-examinational stress and menstrual irregularities in this research.

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Introduction

Premenstrual syndrome, or PMS, is a collection of symptoms that begin one to two weeks prior to a woman's period. The symptoms are vague and can affect each woman differently, but they normally cease once

menstrual bleeding commences. The occurrence of premenstrual syndrome is relatively high in Pakistani females as proved by a study done in Pakistan.[1,2] It has also been shown that adolescents are more affected by PMS compared to older females.[3,4] There are some factors that can aggravate the symptoms of PMS which include obesity, caffeine consumption, and sleeping medication. PMS can cause severe anxiety, depression, stress, and irregular menstrual cycles that can lead to serious impact on routine activities of females.[5] If the symptoms are more severe, it can be characterized as premenstrual dysphoric disorder (PMDD).[6]

Stress is a psychological and physiological response to a perceived threat, challenge, or pressure. It exists in forms such as chronic or negative and due to stress, medical students are unable to handle their routine tasks or accomplish their study targets. This leads to suppression of normal levels of important regulatory hormones that are necessary for ovulation resulting in severe effects on menstrual cycles. Stress also leads to changes in menstrual cycles which includes excessive irregular bleeding which creates a hindrance in doing field work particularly.

A study was conducted where it was deduced that the connection between academic stress and a medical student's menstrual cycle is statistically significant.[7] It was also found that the degree of stress varied with the amount of stress induced. In another study, it was concluded that high stress levels (PSS >20) were associated with menstrual irregularities.[8] Furthermore another study concluded that high levels of perceived stress and chronic stress levels were associated with high probability of menstrual cycle irregularity.[9]

Studies have been done to see if there was a link between stress and menstrual cycles, but examinational / modular stress has not been examined as a leading factor of premenstrual irregularities, along with other additional variables. We want to investigate if such a variable truly does affect menstrual cycles and its intensity. We solely targeted medical students as our demographic to easier availability.

This study was designed to see how stress due to exams affects PMS among Pakistani female students of medical sciences resulting in various ovulatory disorders leading to short, irregular menstrual cycles or frequent excessive bleeding. Due to this, females experience a major setback to their social lives, such as not going out for public gatherings due to a feeling of humiliation. This is a major issue that needs to be brought into the spotlight because a high percentage of women in Pakistan suffer from it. Objective of the study was to evaluate the effect of examination stress on menstrual cycles in Pakistani students of medical sciences and to see if there is any correlation present

Methods

This cross-sectional study was conducted at CMH Lahore Medical College between March 2022 and September 2022. A total of one hundred and seventy-seven female students, currently enrolled in medical science programs and aged between 18 and 25, participated in the study. They completed the Student Stress Inventory (SSI) and Premenstrual Syndrome Scale (PMSS) voluntarily and anonymously. The exclusion criteria consisted of students who were on antiepileptics, antipsychotics and birth control. The students were requested to complete the questionnaire one week before their exams to evaluate whether modular stress had an impact on the regularity of their menstrual cycles. The sample size was calculated using Cochran's formula, with a 95% confidence interval and a 6% margin of error. Moreover, a non-probability convenience sampling technique was employed.

The Student Stress Inventory (SSI) was used to assess stress levels among the participants prior to the exams. SSI contains 4 subscales, which are as such - physical, interpersonal relationships, academics, and environmental factors. Each subscale consisted of 10 statements and the participants had to rate each statement using a 4-point Likert scale: 1 for “Never”, 2 for “Somewhat frequent”, 3 for “Frequent” and 4 for “Always”. Stresses were categorized as such 40-80 (mild stress), 81-121 (moderated stress) and 122-160 (high stress). Cronbach’s alpha showed the validity and reliability to be 0.805 and 0.857, respectively.[10]

The Premenstrual Syndrome Scale (PMSS) contains 3 subscales, which are physiological symptoms (16 questions), psychological symptoms (12 questions) and behavioral symptoms (12 questions). Participants had to rate each symptom based on a 5-point Likert scale, with 1 for “Never”, 2 for “Rarely”, 3 for “Sometimes”,

4 for "Very often" and 5 for "Always". Scores were assigned as such - 1-40 (no symptoms), 41- 80 (mild symptoms), 81-120 (moderate symptoms), 121-160 (severe symptoms) and 161-200 (very severe symptoms). Inter-rater reliability was 0.97.[11]

The data was analyzed using Statistical Package for Social Sciences version 25 (SPSS v-25). Chi-square test was used and a $p < 0.05$ was statistically significant.

Results

Out of One Hundred and Seventy seven female students, For SSI,(53) had mild stress (Score range of 40-80), 115 had moderate stress (Score range of 81-121) while 5 had high stress(Score range of 122-160.) (Table 1)

As for PMSS, 2 students had no symptoms. 34 had mild symptoms (A score range of 41-80), 63 had moderate symptoms (A score range of 81-120), 57 had severe symptoms (A score range of 121-160) and 17 had very severe symptoms (A score range of 161-200). (Table 2)

Table 1: *Student stress inventory (SSI)*

Stress level	Score Range	No of students	*P-value*
Mild stress	40-80	53	0.004
Moderate stress	81-121	115	
High stress	122-160	5	

P <0.05 was considered statistically significant

Table 2: *Premenstrual Syndrome Scale (PMSS)*

Symptom level	Score range	No of students	*P-value*
No symptoms	1-40	2	0.004
Mild	41-80	34	
Moderate	81-120	63	
Severe	121-160	57	
Very severe	161-200	17	

P <0.05 was considered statistically significant

Table 3 showed that most participants had severe symptoms of PMSS related to stress and most of them had severe symptoms when they had moderate levels of stress. High stress was relatively uncommon.

Discussion

Stress is a complex physiological and psychological response that can be triggered by a wide range of environmental and physical factors. Many studies have examined the potential effect of stress on the menstrual cycle and how different factors are associated with menstrual irregularities.[12,13] These menstrual irregularities could be present due to an alteration in the ratios between estrogen and progesterone.[14]

One study has found that elevated levels of stress can lead to changes in the hormonal balance that regulates the menstrual cycle, which can in turn lead to menstrual irregularities. A recent study conducted in 2021 showed that enhanced anxiety and stress levels due to the pandemic of Covid-19 was high enough to alter healthy, regular menstrual cycles.[15] This newfound stress lead to increased menstrual symptoms with reduced menstrual periods. Moreover, a study showed that women with more intense PMS symptoms scored higher on depression, stress, anxiety and rumination.[16] Other studies have focused on stress alongside other factors, such as headaches. A study conducted by Holm and colleagues hypothesized a presence of a triad between stress, menstrual cycle, and headaches.[17] The relation between migraines and stress was reinforced by the changes occurring in the pre-menses.

In perimenopausal women, research was done to assess the connection between menstrual cycle characteristics and stress.[18] Analysis of data from a single year from 206 women showed no link between stress and cycle irregularities, such as menstrual interval length, bleeding duration, and cycle variability. Yet another study done on the psychological factors affecting menstrual cycle concluded that stress-induced impairment need not manifest only as irregularities in the menstrual cycle, and the effects of stress may be present in other aspects

Table 3: *Relationship observed between SSI and PMSS results based on count and percentage.*

	PMSS					
SSI	**No symptoms**	**Mild**	**Moderate**	**Severe**	**Very Severe**	**P**
Mild Stress	1(1.9%)	20(37.7%)	21(39.6%)	9(17.0%)	2(3.8%)	0.004
Moderate Stress	1(0.9%)	14(12.2%)	40(34.8%)	46(40.0%)	14(12.2%)	
High Stress	0(0.0%)	0(0.0%)	2(40.0%)	2(40.0%)	1(20.0%)	
Total	2(1.2%)	34(19.7%)	63(36.4%)	57(32.9%)	17(9.8%)	

P <0.05 was considered statistically significant

of the women lives.[19]

In Jeddah, Saudi Arabia, a study was carried out to see the effect of examinations on menstrual cycle irregularities.[20] It was found that college students had an increased frequency of menstruation abnormalities during the examinations with dysmenorrhea, heavier bleeding and longer cycles were the most common findings.

On the contrary, a study done in Malaysia concluded that no direct interconnection of psychological stress and menstrual abnormality after studying undergraduate medical students' menstrual patterns over a period of six months.[21] It was commented that, "stress, if present, tends to regress with time."

Limitations may include findings of this study only being applicable to the specific population, setting, or time period that was studied. The restricted scope of the findings can curtail their applicability to other situations and pose a challenge in extrapolating the outcomes. Moreover, as we utilized questionnaires pertaining majorly to stress, the presence of various other mood variables could not be isolated as specific risk factors to premenstrual irregularities.

With this research being undertaken at a single facility, it also predisposed the environmental factors of participants to not be vastly contrasting. The demographic being medical students made it slightly difficult for us to localize the exact source of their stress, since it is well known that medical students have a very stressful life.[22]

Our findings are supporting the hypothesis that stress can influence the menstrual cycle, there are very few studies that have found no significant relationship. These findings in literature suggest that the relationship between stress and menstrual cycle irregularities is intricate and may be influenced by a variety of factors. Additional research is required to elucidate the mechanisms that underlie this connection and to pinpoint personal factors that might moderate the influence of stress on menstrual patterns. Such research could have important implications for the prevention and treatment of menstrual irregularities.

Conclusion

Based on our analysis, it may be concluded that there is a connection between examinational stress and intensity of a menstrual cycle. Through rigorous data collection and analysis, we have demonstrated that the predictions of the theory are consistent with the observed phenomena.

Ethical Approval: The Ethical review committee approved the study vide letter No. 52/ ERC/ CMHLMC.

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Authors' Contribution:

SSB: Literature search, study design and concept, drafting

SAAKB: Literature search, study design and concept, drafting

FI: Drafting, critical revision and final approval

RSJ: Literature search, drafting acquisition of data, or analysis & interpretation of data

FR: Literature search, drafting acquisition of data, or analysis & interpretation of data

MAA: Literature search, drafting acquisition of data, or analysis & interpretation of data

MTT: Literature search, drafting acquisition of data, or analysis & interpretation of data

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