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Research Article

Exploring the impact of premenstrual syndrome and dysmenorrhea on students' academic performance

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ABSTRACT

Background
Menstrual problems affect as high as 90% of adolescent females. Dysmenorrhea was the most frequent menstrual disorder for which adolescents and their parents were referred to a physician. Many undergraduate students are adolescents who undergo several hormonal changes that affect menstrual patterns. This study aimed on the impact of premenstrual syndrome and dysmenorrhea on students' academic performance at Mohammed Al mana college for medical sciences.

Methods: A cross-sectional study was adopted, and 328 female medical sciences students of MACHS were selected using convenient random sample approach. A semi-structured and self- administrated questionnaire was used to collect personal and socio-demographic information from the selected female medical sciences students.

Results: For the Descriptive statistics, frequency, percentages, mean, and standard deviation (SD) were calculated. To determine the correlation between the variables the Spearman correlation (non-parametric test) test was employed. Mann-Whitney U test was used to compare dysmenorrhea symptoms between students who exercise and those who do not. The results demonstrated that the student who perform exercise develop low dysmenorrheal symptoms compared with who to perform exercise, in the opposite side the students who expressed high stress level suffering from high dysmenorrhea symptoms compared with who didn't expressed stress, finally the study showed moderate significant correlation between students' academic performance and dysmenorrhea ($r = 0.430$, $P=< .001$). Which displayed that about three quarter of the studied subject reported mood swing which affects their concentration during study hours, attending the classes, exams, and writing the assignments, and leading to feeling of lack of self-confidence & inferiority.

Conclusion: The academic performance of students affected negatively by dysmenorrhea and their coping skills are correlated. As a result, a person should be conscious of their own menstrual pain patterns and competent in developing suitable coping strategies, such as exercise, complementary and alternative therapies, and prescription medications.

Keywords: Dysmenorrhea, premenstrual syndrome, Medical sciences Students, academic performance

1. Introduction

Menstrual disorders that are multifaceted and characterized by a range of physical, emotional, and cognitive symptoms include dysmenorrhea and premenstrual syndrome (PMS) [1]. Even though these disorders are frequently seen as commonplace features of female reproductive health, little is known about how they affect academic achievement. The two most common menstrual disorders are dysmenorrhea and premenstrual syndrome (PMS). PMS is the term for a collection of physical and psychological issues that women encounter one or two weeks before menstruation, whereas dysmenorrhea is typically defined as painful menstruation [2]. A pattern of psychological and physical symptoms usually appears when it first appears. These symptoms include changes in appetite, crying, mood swings, nausea, constipation, irritability, anxiety, anger, fatigue, restlessness, headache, breast tenderness and swelling, and weight gain [3]. Premenstrual syndrome (PMS) is a combination of over 200 complex symptoms, including behavioral, emotional, and physical symptoms. The symptoms appear 2–10 days before the period and disappear just before or shortly after menstruation begins. PMS appears to have a wide range of causes, even though the exact cause is unknown. These include biological factors (such as hormone imbalance and neurotransmitter changes) that interact with psychosocial factors (such as attitude toward menstruation and stress) and routine health behaviors (such as exercise, smoking, drinking, length of sleep, diet, and nutrient intake). Accordingly, the use of multidimensional measurements to assess dysmenorrhea and PMS seems to be more appropriate in the adolescent population [4]. It is critical to investigate the possible effects of PMS and dysmenorrhea on educational outcomes, especially in adolescent and young adult populations, because of the potential severity and chronicity of these symptoms. Many research study related factors have been investigated, focusing on the incidence and severity of PMS and examined the levels of PMS, stress, depression, sleep disturbances, and eating attitude problems in female college students who experience dysmenorrhea and determine influencing factors associated with PMS in order to develop efficient nursing intervention programs for preventing and managing PMS. [5].Adolescents may be less skilled at recalling the accurate time and intensity of menstrual symptoms because they are still learning about their menstrual cycle [6]. Dysmenorrhea was reported as the most frequent menstrual disorder for which adolescents and their parents were referred to a physician and a leading cause for long term school absenteeism in the USA. A study in USA reported 90% prevalence of dysmenorrhea and this makes it a public health concern.([7]. Various studies have been conducted to assess the impact of menstrual symptoms on university students, knowing that stress and menstrual problems are the most common complaints amongst this age group. Premenstrual syndrome has various effects on the emotional state and educational performance of students.

A comprehensive review of university students' menstrual experiences and how they affect their academic performance was carried out [8]. According to the review, students' negative menstrual experiences can have a detrimental effect on their academic performance, rate of absenteeism, focus, and social interactions. Another study on Saudi Arabian medical students concluded that PMS significantly harmed their everyday activities, including their schoolwork and quality of life [9]. Another study discovered that premenstrual syndrome negatively impacts students' academic performance and overall well-being([10]. Particularly, female college students with PMS are significantly associated with eating attitude problems and depression. Another study examines the frequency and severity of premenstrual syndrome and dysmenorrhea among young female adults in North India. While the study may not directly address the impact of these menstrual disorders on academic performance, it provides valuable insights into the prevalence and symptomatology of PMS and dysmenorrhea among the target population, which can contribute to the broader understanding of their potential consequences on various aspects of women's health, including educational outcomes. Educating people about PMS is the first step in managing it. It is strongly advised to establish counseling departments and launch social awareness programs in order to provide high school and university students with awareness training. Making a woman perform a self-screen, follow nutritional advice, implement lifestyle adjustments, and be assisted in using stress management techniques. Among adolescent girls, premenstrual problems are fairly prevalent. Teenagers experiencing premenstrual symptoms may experience a variety of issues, including physical disability, mental health issues, and serious dysfunction in their social or professional lives [11].The present study aims to identify the degree of impact of dysmenorrhea and PMS on daily life and the impact on academic performance among MACHS nursing students (absenteeism, presenteeism, and academic performance), and to identify symptoms that increase the probability of absenteeism.

Methods:

Study Design

Premenstrual syndrome and dysmenorrhea's effects on students' academic performance were investigated using a descriptive cross-sectional study design. Female students in the year one to four of medical science programs at MACHS, including nursing, pharmacy, and CLS, made up the study's population. 328 female medical sciences students in total were determined using the http://www.raosoft.com/samplesize.html website. A convenient random sample approach was implemented to assign students from different levels of school.

Eligibility Criteria

Any male students were excluded from the study also female students who refused to take part in the study were not included in the research. Additionally, all pregnant mothers, postpartum women, and students who do not attend health colleges were excluded.

Data Collection

A self-administered, semi-structured questionnaire tool was developed through a review of prior research and discussions among numerous obstetricians, gynecologists, and nurses. Experts with more than five to ten years of experience in the maternity branch evaluated the tool's content validity. Since English is the language used in all of the programs, the questionnaire was created in that language as well. This survey was divided into four main sections. Five demographic variables (age, academic year, marital status, amount of physical exercise, stress) were condensed into Part 1, and thirteen questions were packed into Part 2 to assess the symptoms of dysmenorrhea, such as fatigue, abdominal pain, and breast pain. Subsequently, Part 3 comprised nine questions about coping mechanisms with dysmenorrhea symptoms, and Part 4, which assessed academic performance, had twenty questions about things like lack of concentration during study hours, lack of interest in attending college, and impact on classroom performance.

Data was entered and analyzed with Statistical Package for the Social Sciences version 22. For the Descriptive statistics, frequency, percentages, mean, and standard deviation (SD) were calculated.

To determine the correlation between the variables the Spearman correlation (non-parametric test) test was employed. Mann-Whitney U test was used to compare dysmenorrhea symptoms between students who exercise and those who do not.

Ethical Consideration

Before conducting the research, permission was obtained from the Scientific Research Unit at MACHS Institutional Review Board.

1. Assess the prevalence of PMS and dysmenorrhea among female students

Table 1 describe the socio demographic data shows, that the sample comprises 328 female students, with 50.9% falling within the age range of 21 to 24 years. Most students (82.3%) were unmarried. The sample was dispersed throughout various academic years, with the majority concentrated in three specific academic years as follows: 32.6% in year one, 24.7% in year three, and 27.4% in year four.

Table 1 Description of the sample

	Categories	Frequency	Percentage
Age	Less than 18	18	5.5 %
	18-20	129	39.3 %
	21-24	167	50.9 %
	More than 24	14	4.3 %
	Total	328	100 %
Marital Status	Single	270	82.3 %
	Married	54	16.5 %
	Widow	2	0.6 %
	Divorced	2	0.6 %
	Total	328	100 %
Academic year	Year 1	107	32.6
	Year 2	50	15.2
	year 3	81	24.7
	Year 4	90	27.4
	Total	328	100 %

Table 2 displays the degree of severity of the dysmenorrhea symptoms among the participants. Around half of the participants experienced mild to moderate symptoms of breast pain (61%), dizziness (57.1%), nausea (56.4%), constipation/diarrhea (51.9%), and loss of appetite (50.6%). However, most of them suffered from a higher level of severity, spanning from moderate to severe abdominal pain (70.4%) and fatigue (63.1%), along with symptoms of anxiety/irritability (65.3%), emotional disturbance (68.3%), mood swings (68.6%), and sleep disturbance (63.4%).

Table (2): Distribution of the studied subject according to the severity level of the Dysmenorrhea symptoms

Dysmenorrhea symptoms	NO Symptom	Mild	Moderate	Sever	Total
Breast Pain	89	114	86	39	328
	27.10%	**34.80%**	**26.20%**	**11.90%**	**100%**
Abdominal Pain	45	52	111	120	328
	13.70%	**15.90%**	**33.80%**	**36.60%**	**100%**

Fatigue	61 **18.60%**	60 **18.30%**	103 **31.40%**	104 **31.70%**	328 **100%**
Leg Cramps	77 **23.50%**	74 **22.60%**	103 **31.40%**	74 **22.60%**	328 **100%**
Anxiety & Irritability	49 **14.90%**	65 **19.80%**	114 **34.80%**	100 **30.50%**	328 **100%**
Dizziness	74 **22.60%**	93 **28.40%**	94 **28.70%**	67 **20.40%**	328 **100%**
Nausea	80 **24.40%**	99 **30.20%**	86 **26.20%**	63 **19.20%**	328 **100%**
Vomiting	115 **35.10%**	106 **32.30%**	58 **17.70%**	49 **14.90%**	328 **100%**
Emotional Disturbance	37 **11.30%**	67 **20.40%**	86 **26.20%**	138 **42.10%**	328 **100%**
Mood Swing	43 **13.10%**	60 **18.30%**	101 **30.80%**	124 **37.80%**	328 **100%**
Sleep disturbance	53 **16.20%**	67 **20.40%**	105 **32.00%**	103 **31.40%**	328 **100%**
Constipation/Diarrhea	94 **28.70%**	97 **29.60%**	73 **22.30%**	64 **19.50%**	328 **100%**
Loss of Appetite / or Craving	61 **18.60%**	81 **24.70%**	85 **25.90%**	101 **30.80%**	328 **100%**

Table 3 Distribution of the studied subject according to the coping mechanism used by female students to alleviate dysmenorrhea symptoms. The table indicates that the primary coping mechanisms employed by female students to mitigate the dysmenorrhea symptoms were oral analgesics (60.7%), hot showers (68%), and rest (79%).

Table (3): Distribution of the studied subject according to the coping mechanism used by female students to alleviate dysmenorrhea symptoms.

	No	Yes	Total
Oral Analgesic	129 **39.3%**	199 **60.7%**	328 **100%**
Strong Analgesic	223 **68%**	105 **32%**	328 **100%**
Hot Pack	146 **44.5%**	182 **55.5%**	328 **100%**
Hot Shower	105 **32%**	223 **68%**	328 **100%**
Rest	69 **21%**	259 **79%**	328 **100%**
Home Herbals	163 **49.7%**	165 **50.3%**	328 **100%**
Oral Contraceptive Pills	244 **74.4%**	84 **25.6%**	328 **100%**
Exercise	201 **61.3%**	127 **38.7%**	328 **100%**
Hormonal IUD	268 **81.7%**	60 **18.3%**	328 **100%**

Table 4 Distribution of the studied subject according to academic performance. The table shows that about three quarter of the studied subject (70.7%) reported mood swing followed by (64.6%) have lack of concentration during study hours, (60.7%) have lack of concentration in attending the classes, exams, and writing the assignments, and (51.8%) reported lack of self-confidence & feeling of inferiority.

Table (4): Distribution of the studied subject according to academic performance.

	No	Yes	Total
Lack of concentration during study hours	116 **35.4%**	212 **64.6%**	328 **100%**
Lack of concentration in attending the class, exam and writing the assignment	129	199	328

	39.3%	**60.7%**	**100%**
Lack of self-confidence& feeling of inferiority	158	170	328
	48.2%	**51.8%**	**100%**
Getting mood swing	96	232	328
	29.3%	**70.7%**	**100%**

2.The correlation between dysmenorrhea symptoms, coping mechanisms, and academic performance.

All three variables—total dysmenorrhea symptoms (D = 0.111, p < .001), total coping score (D = 0.153, p < .001), and total academic performance (D = 0.088, p < .001)—had p-values below 0.05 when tested using the Kolmogorov-Smirnov test, indicating that the data does not follow a normal distribution. Hence, the three variables were correlated using the Spearman test.

Table 5 Spearman Correlation between Students' dysmenorrhea Symptoms, their academic performance, and coping. The table shows that students' coping and academic performance had a moderately significant correlation with dysmenorrhea (r = 0.360, p <.001 and r = 0.430, p <.001, respectively). Furthermore, a moderately significant association exists between students' ability to cope and their academic performance (r = 0.381, p <.001). [The strong correlation varied from .50 to 1, the moderate correlation ranged from .30 to .49, and the weak correlation spanned from .10 to .29].

Table (5): Spearman Correlation between Students' dysmenorrhea Symptoms, their academic performance, and coping

		Total Symptom	**Total Coping**	**Total performance**
Dysmenorrhea Symptom	Spearman's rho	—		
	p-value	—		
Students Coping	Spearman's rho	0.360	—	
	p-value	**< .001**	—	
Academic Performance	Spearman's rho	0.430	0.381	—
	p-value	**< .001**	**< .001**	—

3.The impact of exercise and stress on the dysmenorrhea symptoms

Table 6 The impact of exercise and stress on the overall score of dysmenorrhea symptoms was compared using the Mann-Whitney U test. Since the data did not adhere to a normal distribution, the median (Mdn) was used for analysis. Results showed a statistically significant difference between the exercisers and non-exercisers' group with dysmenorrhea symptoms (U = 10829, p =.0005, less than .05), as shown in Table 5. The median score for total dysmenorrhea symptoms was lower (Mdn=20) for the exerciser group, whereas it was higher in the group that does not exercise (Mdn=25). This suggests that compared to non-exercisers, those who exercise experience fewer symptoms of dysmenorrhea.

Table (6): Mann-Whitney U test compares dysmenorrhea symptoms between students who exercise and those who do not.

	Group	**N**	**Mean**	**Median**	**SD**	**SE**
Dysmenorrhea Symptom	No exercise	142 (43.3%)	**22.85**	25.00	8.64	0.725
	Yes	186 (56.7%)	19.56	20.00	10.96	0.804
					Statistic	**p**

	Group	N	Mean	Median	SD	SE
Dysmenorrhea Symptom	Mann-Whitney U			10829		**0.005**

Note. H_a $\mu_{\text{No exercise}} \neq \mu_{\text{Yes}}$

Table 7 Mann-Whitney U test compares dysmenorrhea symptoms between students who had stress and those who haven't. In addition, as seen in Table 7, there is a statistically significant difference between female students experiencing stress and those without stress concerning dysmenorrhea symptoms (U = 7661, p =.001, less than 05). Students experiencing stress had a higher median score (Men=24) for total dysmenorrhea symptoms compared to those who had no stress (men=19). The finding indicates that students who were under stress exhibited a greater number of dysmenorrhea symptoms than those who did not report stress.

Table (7): Mann-Whitney U test compares dysmenorrhea symptoms between students who had stress and those who haven't

	Group	N	Mean	Median	SD	SE
Dysmenorrhea Symptom	No stress	87 (26.5%)	17.24	19.00	10.97	1.176
	Yes	241 (73.5%)	**22.34**	24.00	9.49	0.612

		Statistic	p
Dysmenorrhea Symptom	Mann-Whitney U	7661	**< .001**

Note. H_a $\mu_{\text{No stress}} \neq \mu_{\text{Yes}}$

DISCUSSION

Modern women encounter several demands that can significantly influence their coping mechanisms. Premenstrual syndrome (PMS) was notably greater among university students aged 18-21 years [12]. College students may find it crucial to handle symptoms such as dysmenorrhea and premenstrual syndrome (PMS) well, as these symptoms might affect their academic performance due to the demands they face. For that, the present study aimed to address the influence of PMS and dysmenorrhea on students' academic performance. Notably, the majority of the sample tested who reported PMS were unmarried, which aligns with Kannan, L. S et al. where around three-quarters of the subjects were also single [13]. Concerning the intensity of dysmenorrheal symptoms experienced by the students, most students suffered from mild to severe abdominal pain and fatigue, along with symptoms of anxiety/irritability, emotional disturbance, mood swings, and sleep disturbance during their menstrual period. Another study reported that individuals frequently experienced abdominal cramps, depression, and exhaustion as premenstrual symptoms, which is consistent with the current finding [14]. Kannan, L. S et al. (2020) also identified abdominal pain as the primary symptom of dysmenorrhea, followed by emotional disturbances such as anger and depression [13]. However, current study results stated that aches and pain, specifically muscle pain, were the most prevalent somatic complaints, followed by abdominal bloating. Additionally, Suguna's study conducted in India (2019) reported different results, and he found that the majority of participants experienced sleep problems and pelvic pain, while the minority of participants experienced anger during their menstrual periods [15].

Furthermore, data showed that a majority of students exercise, whereas a minority do not engage in any physical activity. The same finding was informed in two studies by [16] and [12]. Another study referred to exercise has demonstrated its potential to enhance overall well-being and mitigate the negative effects of PMS and dysmenorrhea on daily functioning. Regular exercise has been associated with a reduction in physical and psychological symptoms of PMS and dysmenorrhea, including pain, fatigue, mood disturbances, and water retention [17].

Despite the favorable impact of exercise, two-thirds of the students were found to experience stress, according to the study analysis. This finding is consistent with an Iranian study conducted by which documented that most students encountered stress during their menstrual cycle [18]. Also a study reported that 75% of the PMS group had significant stress levels compared to the normal group without PMS [12]. Similarly, the Poland study revealed that 41.2% of respondents experienced stress several times a week [19]. In addition, the data analysis showed a statistically significant distinction between females experiencing stress and those without stress concerning dysmenorrhea symptoms (p .001). The study stated that women who experience stress early in their menstrual cycle are more likely to have more severe symptoms before and during menstruation [20].

Moreover, Alwafa (2021) added that experiencing monthly repeated menstrual pain might increase the risk of experiencing depression, anxiety, or stress and vice versa [21]. This high incidence of students with stress may be attributable to the combination of PMS and academic stress, which increases female stress reporting. According to the Cushman, M., 2021 a health assessment survey discovered that 34.2% of undergraduate college students identified stress as the primary obstacle to learning [22]. Additionally, 45.3% reported experiencing higher-than-usual stress levels.

As usual, menstruation significantly impacts female students' academic performance. A study in Saudi Arabia found that the menstrual period increases female students' absenteeism and decreases their concentration in academic work, potentially affecting school performance and their ability to reach their life goals when premenstrual syndrome (PMS) is present, the adverse effects are exacerbated [23]. Also it was supported by another study that the PMS can impact academic performance and decrease students' quality of life [24]

Current study showed moderate significant correlation between students' academic performance and dysmenorrhea (r = 0.430). Which displayed that about three quarter of the studied subject reported mood swing which affects their concentration during study hours, attending the classes, exams, and writing the assignments, and leading to feeling of lack of self-confidence & inferiority. This finding is congruent with Suguna (2019), who found that a majority of students experienced significant difficulty managing their academic performance while menstruating [15]. Additionally, over half of the participants were unable to finish their assignments, lacked interest in taking exams, and struggled with concentration during study hours.

Constant discomfort and stress on a monthly basis motivate students to seek coping mechanisms to alleviate tension and achieve a state of equilibrium in their functioning. According to the findings, rest was the most frequently employed coping mechanism by female students to lessen the tension caused by dysmenorrhea symptoms, followed by hot showers and oral analgesics. This is consistent with research conducted in Ethiopia by Eshetu (2021); the most common coping methods the students primarily used were sleeping and resting [25]. Students who suffered from premenstrual syndrome (PMS) found relief through activities including spending time alone, getting enough rest and sleep, exercising and massaging their muscles, avoiding arguments and conflicts, and consuming herbal tea [26] (Read, Perz, & Ussher, 2014). The female students in our study usually adopt problem-focused coping strategies to alleviate their monthly pain and discomfort by using intervention to eliminate the PMS symptoms. In contrast, Graves et al. (2021) found that women employed emotion-focused coping mechanisms, including self-distraction, instrumental support, emotional support, and emotional release, to manage stress [27]. Moreover, the finding proved that students' coping moderately correlated with dysmenorrhea (r = 0.360) and academic performance (r = 0.381).

Conclusions

Students who experience primary or secondary dysmenorrhea discover that their lives are interrupted. Abdominal pain, fatigue, anxiety, irritability, emotional disturbance, mood swings, sleep disturbance, and appetite loss are all associated with dysmenorrhea and PMS in medical students. The academic performance of students affected by dysmenorrhea and their coping skills are somewhat correlated. As a result, a person should be conscious of their own menstrual pain patterns and competent in developing suitable coping strategies, such as exercise, complementary and alternative therapies, and prescription medications. The findings showed that students who expressed stress exhibited more dysmenorrhea symptoms than students who did not. These findings demonstrate the pressing need for more information and training in both the educational system and society at large.

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