Original Article

Premenstrual syndrome and its impact on the quality of life among female medical students at King Faisal University, Al Ahsa, Saudi Arabia

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ABSTRACT

Background: Premenstrual Syndrome (PMS) affects many women, impacting daily activities and potentially hindering academic performance. Female students, in particular, may experience exacerbated effects due to neglecting symptoms. This study investigated the prevalence of PMS and its association with factors influencing female medical students' quality of life (QoL) at College of Medicine, King Faisal University, Saudi Arabia.

Materials and Methods: A cross-sectional survey distributed to 264 students assessed demographics, family background, menstrual characteristics, PMS symptoms, and study-related QoL. Data were analyzed using Statistical Package for the Social Sciences (SPSS) software.

Results: PMS prevalence was 34.8% (92/264). Students in clinical years (40% vs. 29% in pre-clinical) and with introverted personalities (43.5%) were more likely to experience PMS. The most commonly reported symptoms were depressive effect, anxiety, fatigue, and irritability (all 100%). Students with PMS reported a higher impact on study-career satisfaction (28.3% vs. 20.3% without) and stress levels (57.6% vs. 37.8% without).

Conclusion: This study suggested a significant prevalence of PMS (34.8%) among female medical students. An association was found between PMS, year of study, personality type, and specific aspects of study-related QoL, particularly impacting study-career satisfaction and stress.

Keyword: Premenstrual syndrome, medical student, quality of life, Saudi Arabia.

Introduction

Menstrual disorders constitute the most significant proportion of gynecological complaints, particularly among adolescents [1]. Premenstrual syndrome (PMS) consists of a variety of emotional symptoms; often accompanied by physical symptoms, which are associated with the menstrual cycle. A significant impairment to daily life activities usually occurs before menstruation and disappears with the flow of menstruation [2]. In women of childbearing age, PMS prevalence is estimated to be 30%–40% [3]. The pathophysiology of PMS suggests that ovarian progesterone production drives the disorder [4]. Various social and environmental factors have also been linked to PMS, including exercise habits, high-calorie diets, coffee consumption, smoking, alcohol consumption, use of oral contraceptives, higher education, major stressors in life, family history of PMS, and mental health problems [5,6].

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Female students, in particular, are affected by considerable morbidities related to PMS [7, 8]. Due to students' tendency to neglect PMS symptoms, PMS has a greater impact on quality of life (QoL) than is often assumed and described. Healthcare providers should be aware of the signs and symptoms of PMS during regular checkups [9]. The World Health Organization reported that 20–31% of women in universities worldwide suffer from mental health disorders related to menstruation [10, 11]. PMS leads to significant psychosocial dysfunction since the symptoms are typically associated with anxiety and other psychological symptoms. It is the most prominent determinant for young women to miss classes and exams on a regular basis, score poor marks, and even stop learning. Furthermore, it restricts the country's entire growth by increasing mood instability and lowering daily activity among women [12]. A study done at Bisha University, Saudi Arabia, on female medical students found that 64.9% of female students had PMS. About 35 percent of those female students had extroverted personalities [13]. Additionally, 13.4% of those with PMS were obese or overweight, and 19.5% exercised regularly. Significantly, menstruation affects the QoL subscales related to it [13]. In another study evaluating the prevalence, severity, and impact of PMS on females in Saudi Arabia., the study Hanadi Bakhsh et al. found a prevalence rate of 47.1% of students reported PMS impacts their emotional, behavioral, and physical health, with 10% reporting severe symptoms. There was a significant functional impairment in over 60% of the participants. Nevertheless, significant functional problems were 1.4% and 5.8% in academic achievement and household responsibilities, respectively [14]. In the Eastern region of Saudi Arabia, only a few data have been published on PMS symptoms as well as their implications on physical daily activities, and social relationships, which include students' academic performance. This study use to improve the overall quality and reach the maximum patient benefit. So, this study aims to determine PMS frequency and associated factors to assess quality of life (QoL) among female medical students at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia.

Methods

A cross-sectional study was carried out from December 3rd to December 31st, 2023, on female medical students from all levels (1st year, 2nd year, 3rd year, 4th year, and 5th year) at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia. All female medical students who were aged 18 years and above at College of Medicine, King Faisal University in Al Ahsa were included in the study. However, female students in another specialty, those who were under 18 years old, those who had not menstruated for the past two months, those with medical, gynecological, or psychiatric conditions, as well as pregnant students or those using medications that could affect their menstrual cycle, were excluded. The study utilized a sample size of 264 female medical students, which was determined using the Raosoft Sample Size Calculator. The calculator accounted for a population size of 825 female medical students, a margin of error of 5%, a confidence level of 95%, and a response distribution of 50%. We circulated an online questionnaire through WhatsApp groups for female medical students, prepared in English that takes about five minutes to complete, along with a consent form (link to Google Forms). The questionnaire used in the study was self-administered and based on previous work by Al-Shahrani et al. [13]. It consisted of multiple sections. Age, year of study, place of residence, and grade point average (GPA) were among the sociodemographic data that were acquired in the first section. General knowledge questions about living arrangements, family income, parents' educational background, work status, personality type, smoking habits, weight, and physical activity were included in the second part. Menstrual features, including age at menarche, length of menstrual cycle, length of menstrual flow, pharmacological use for menstrual regulation, dysmenorrhea, and family history, were covered in the third segment. Premenstrual syndrome (PMS) screening questions included depressed symptoms, anxiety, weariness, irritability, depressive thoughts, pain, changes in appetite, changes in sleep patterns, bloating in the abdomen, painful or tender breasts, and abrupt mood swings in the fourth part. The last section included study-related quality of life [13], which included overall health, work-life balance, career and study satisfaction, control over one's work environment, working circumstances, and stress connected to one's job. A pilot research was carried out to evaluate the validity of the questionnaire before its administration, and reliability analysis was carried out using Statistical Package for the Social Sciences (SPSS) for statistical analysis. Following data extraction, the information was edited, coded, and entered into SPSS version 22, a statistical program (SPSS, Inc. Chicago, IL). Two-tailed tests were used for all statistical analyses. P-values below 0.05 were considered statistically significant. PMS was assessed and diagnosed using the Premenstrual Syndrome Scale (PSS) [15]. According to the American Psychiatric Association (adapted) [16], the diagnosis of PMS was made if five or more severe premenstrual symptoms were present and went away after menstruation. A descriptive analysis using frequency and percent distribution was conducted for every variable, which

included graphed information on the student's study-related quality of life, menstruation symptoms, and family and demographic data. The study students' PMS prevalence was also plotted. Using the Pearson chi-square test and the exact probability test for small frequency distributions, cross-tabulation was utilized to evaluate the sociodemographic and family characteristics of female medical students with PMS, symptoms related to PMS, and PMS and QoL among female medical students were conducted. Responding to answer the questionnaire was considered as a written consent. Further, the Research Ethics Committee at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia, gave its approval for the study to be carried out (KFU-REC-2023-DEC-ETHICS1810).

Results

A total of 264 medical female students completed the study survey. Student's ages ranged from 18 to 27 years with a mean age of 21.7 ± 1.8 years old. A total of 124 (47%) students were in their pre-clinical years (1st to 3rd years) and 140 (53%) were in their clinical years (4th to 5th years). A total of 201 (76.1%) of the students live with their families 38 (14.4%) live in student houses, and 25 (9.5%) live in house-apart. The most reported personality type was emotional personality (28.8%), introverted personality (26.1%), extraverted personality (22%), and rational-strict personality (18.2%). Exact 203 (76.9%) of student's mothers had high school education and 209 (79.2%) of their fathers. Also, 121 (45.8%) students had employed mothers and 213 (80.7%) had employed fathers. Of 181 (68.6%) students had monthly family income exceeding 10000 SR and 20 (7.6%) reported less than 5000 SR. Only 9 (3.4%) students were smokers, 56 (21.2%) were overweight/obese and 81 (30.7%) did regular physical exercises. As for GPA, it was 4 to 5 among the vast majority of the students (78.8%; 208) (Table 1). A total of 56 (40%) of students in their clinical years had PMS versus 36 (29%) of others in the pre-clinical years with a recorded statistical significance (P=.047). Also, 30 (43.5%) of the introverted students had PMS compared to 28 (36.8%) emotional students and 17 (35.4%) rational-strict students but only 2 (15.4%) of aggressive-angry students (P=.049) (Table 2). The most reported symptoms among students with PMS were depressive effect (100%), anxiety (100%), fatigue (100%), irritability (100%), depressive thought (100%), rapid mood changes (97.8%), and painful or tender breasts (83.7%). The least reported were sleep change (73.9%), and abdominal bloating (80.4%) (Table 3). A total of 28.3% of PMS had a high impact on study-career satisfaction versus 20.3% of others without PMS (P=.049). Also, 57.6% of PMS showed a high impact on stress in the study compared to 37.8% of others without PMS (P=.001). All other QoL domains showed insignificant association without PMS (Table 4). Prevalence of premenstrual syndrome among female medical students is exact of 92 (34.8%) students fulfilled the PMS criteria while 172 (65.2%) did not (Figure 1). The learning-related QoL sub-scales among the study students showed high stress among 44.7% of the study students with high impact of study condition among 21.2% of them. On the other hand, 25.8% reported a high impact of a home-study interface, 23.1% reported high satisfaction with their study career, 23.1% had high general well-being and 22.3% had high control at study (Figure 2).

Discussion

As premenstrual syndrome symptoms typically include anxiety and other psychological symptoms, it is well known that PMS poses a serious risk for psychosocial dysfunction [12]. In the present study, the prevalence of PMS among female medical students was determined to be 34.8%, a figure significantly lower than those reported in comparable studies conducted within the Saudi Arabian context [13]. Notably, the prevalence observed at King Saud University was recorded at 80.1%, whereas Bisha University and King Abdulaziz University in Jeddah reported lower prevalences of 64.9% and 60.9%, respectively [13,17,18]. This illustrates the varying rates of PMS among medical students across different universities in Saudi Arabia, suggesting that possible social, cultural, subjective character of the symptoms, or methodological differences may influence the reported prevalence of PMS [13] The variety of diagnostic criteria to establish a diagnosis of PMS further reflects the difficulty of unifying the degree of comparability across different studies [19]. Among the affected population of this study, according to the learning-related QoL subscales, 44.7% of the study participants reported high levels of stress, and 21.2% reported high study learning condition influence [13]. This observation is further strengthened by a systematic review that reported that the menstrual experiences of female university students can adversely affect their education, underscoring the necessity for universities to develop programs and policies aimed at enhancing students' well-being and educational involvement [20]. Furthermore, a study that investigated the relationship between premenstrual symptoms, and psychosocial stress among Japanese college students reported that psychosocial stress is independently associated with premenstrual symptoms and irregular menstrual cycles in college students, indicating a relationship connecting changes in menstrual function and changes in women's functional potentiality as a result of stress [21]. These interchangeable interactions between the two conditions might be acting in a circle loop, which

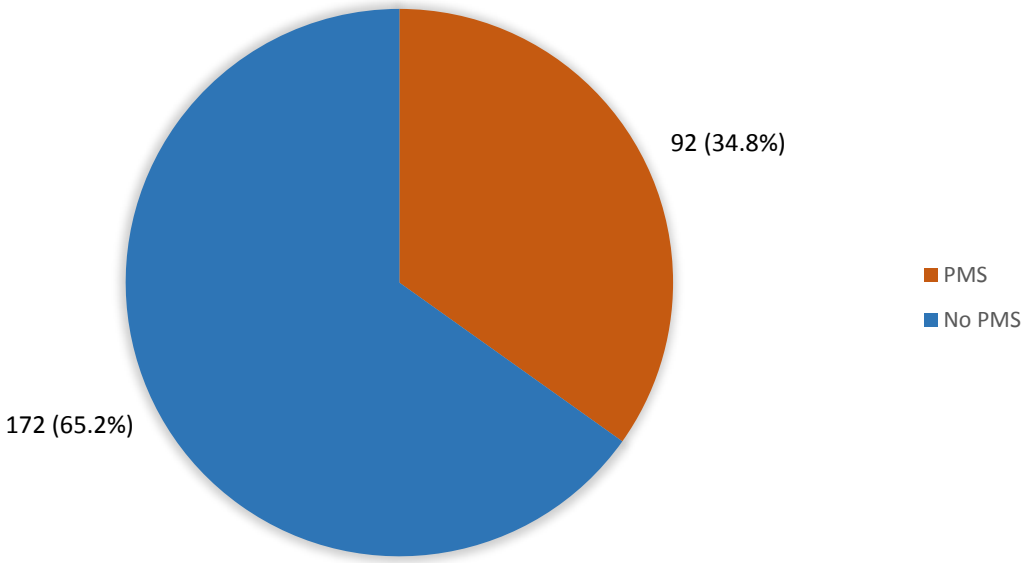

Figure 1: Prevalence of premenstrual syndrome among female medical students at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia.

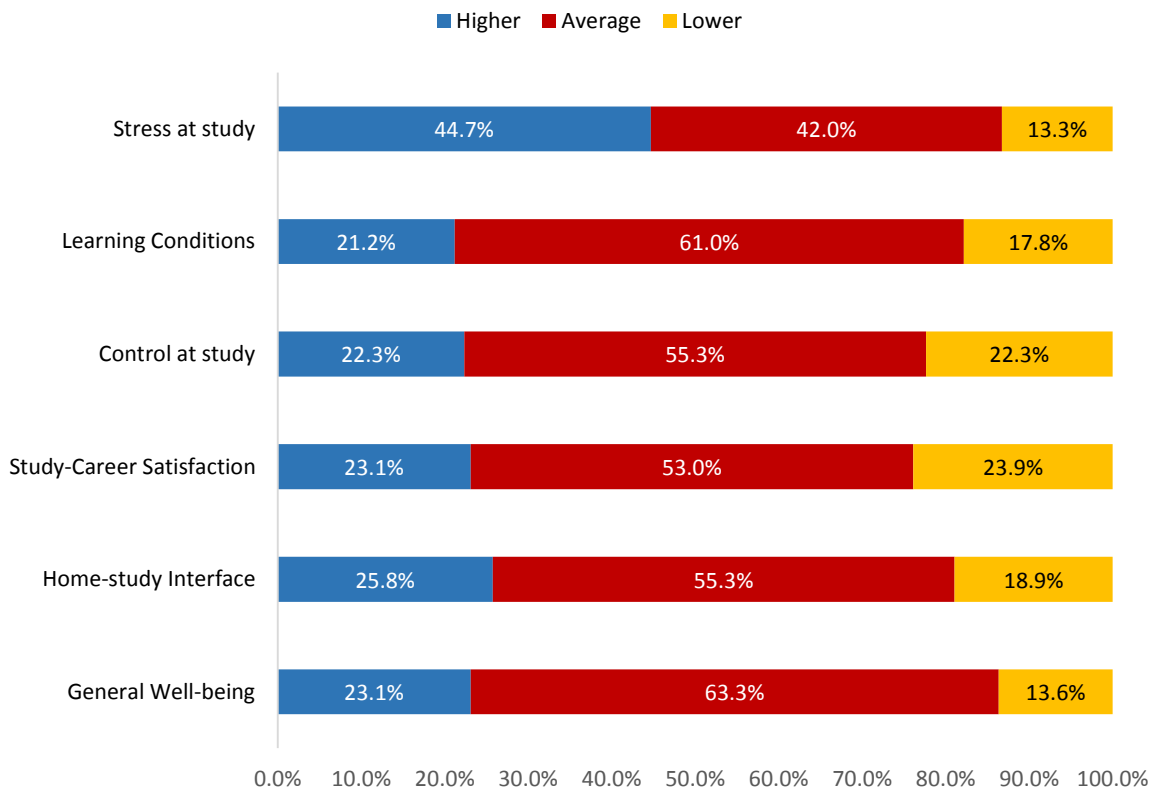

Figure 2: Learning-related QoL subscales by percentage among female medical students at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia.

Table 1: Sociodemographic and family characteristics of female medical students at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia (n=264).

Personal and family data		**No.**	**%**
Age in years	18-19	31	11.7%
	20-21	80	30.3%
	22-23	123	46.6%
	24+	30	11.4%
Study year	1	38	14.4%
	2	48	18.2%
	3	38	14.4%
	4	27	10.2%
	5	113	42.8%
Study phase	Pre-clinical	124	47.0%
	Clinical	140	53.0%
Where your resident	House-apart	25	9.5%
	Student house	38	14.4%
	With my family	201	76.1%
Personality type	Emotional	76	28.8%
	Introverted	69	26.1%
	Extraverted	58	22.0%
	Rational-strict	48	18.2%
	Aggressive-angry	13	4.9%
Mother's education	Primary / below	29	11.0%
	Secondary	32	12.1%
	High school	203	76.9%
Father's education	Primary / below	27	10.2%
	Secondary	28	10.6%
	High school	209	79.2%
Mother Employment	Not employed	143	54.2%
	Employed	121	45.8%
Father Employment	Not employed	51	19.3%
	Employed	213	80.7%
Family income Saudi Riyal (SAR) Per month	< 5000 SAR	20	7.6%
	5000-10000 SAR	63	23.9%
	> 10000 SAR	181	68.6%
Smoking	Yes	9	3.4%
	No	255	96.6%
Overweight/obese	Yes	56	21.2%
	No	208	78.8%
Regular physical exercise	Yes	81	30.7%
	No	183	69.3%
Grade Point Average (GPA)	< 2	6	2.3%
	2-3	14	5.3%
	3-4	36	13.6%
	4-5	208	78.8%

Table 2: Sociodemographic and family characteristics of female medical students with PMS.

Factors		Total		Premenstrual Syndrome (PMS)				p-value
				PMS		No PMS		
		No.	%	No.	%	No.	%	
Age in years	18-19	31	11.7%	10	32.3%	21	67.7%	.654
	20-21	80	30.3%	24	30.0%	56	70.0%	
	22-23	123	46.6%	46	37.4%	77	62.6%	
	24+	30	11.4%	12	40.0%	18	60.0%	
Study phase	Pre-clinical	124	47.0%	36	29.0%	88	71.0%	.047*
	Clinical	140	53.0%	56	40.0%	84	60.0%	
Where you stay	House-apart	25	9.5%	6	24.0%	19	76.0%	.403
	Student house	38	14.4%	12	31.6%	26	68.4%	
	With my family	201	76.1%	74	36.8%	127	63.2%	
Personality type	Aggressive-angry	13	4.9%	2	15.4%	11	84.6%	.049*
	Emotional	76	28.8%	28	36.8%	48	63.2%	
	Extraverted	58	22.0%	15	25.9%	43	74.1%	
	Introverted	69	26.1%	30	43.5%	39	56.5%	
	Rational-strict	48	18.2%	17	35.4%	31	64.6%	
Mother's education	Primary / below	29	11.0%	11	37.9%	18	62.1%	.673
	Secondary	32	12.1%	9	28.1%	23	71.9%	
	High school	203	76.9%	72	35.5%	131	64.5%	
Father's education	Primary / below	27	10.2%	6	22.2%	21	77.8%	.347
	Secondary	28	10.6%	10	35.7%	18	64.3%	
	High school	209	79.2%	76	36.4%	133	63.6%	
Mother employment	Not employed	143	54.2%	53	37.1%	90	62.9%	.412
	Employed	121	45.8%	39	32.2%	82	67.8%	
Father employment	Not employed	51	19.3%	15	29.4%	36	70.6%	.364
	Employed	213	80.7%	77	36.2%	136	63.8%	
Family income Saudi Riyal (SAR) Per month	< 5000 SAR	20	7.6%	9	45.0%	11	55.0%	.152
	5000-10000 SAR	63	23.9%	16	25.4%	47	74.6%	
	> 10000 SAR	181	68.6%	67	37.0%	114	63.0%	
Smoking	Yes	9	3.4%	4	44.4%	5	55.6%	.539^
	No	255	96.6%	88	34.5%	167	65.5%	
Overweight/obese	Yes	56	21.2%	23	41.1%	33	58.9%	.271
	No	208	78.8%	69	33.2%	139	66.8%	
Regular physical exercise	Yes	81	30.7%	30	37.0%	51	63.0%	.620
	No	183	69.3%	62	33.9%	121	66.1%	

*P: Pearson X^2 test, ^: Exact probability test, * P < 0.05 (significant)*

Table 3: Symptoms related to PMS. Evaluation of PMS and QoL among study students.

Symptoms	Total		Premenstrual Syndrome (PMS)				p-value
			PMS		No PMS		
	No.	%	No.	%	No.	%	
Depressive effect							.001*^
Yes	189	71.6%	92	100.0%	97	56.4%	
No	75	28.4%	0	0.0%	75	43.6%	
Anxiety							.001*^
Yes	182	68.9%	92	100.0%	90	52.3%	
No	82	31.1%	0	0.0%	82	47.7%	
Fatigue							.001*^
Yes	201	76.1%	92	100.0%	109	63.4%	
No	63	23.9%	0	0.0%	63	36.6%	
Irritability							.001*^
Yes	177	67.0%	92	100.0%	85	49.4%	
No	87	33.0%	0	0.0%	87	50.6%	
Depressive thought							.001*^
Yes	170	64.4%	92	100.0%	78	45.3%	
No	94	35.6%	0	0.0%	94	54.7%	
Pain							.008*
Yes	192	72.7%	76	82.6%	116	67.4%	
No	72	27.3%	16	17.4%	56	32.6%	
Appetite change							.001*
Yes	179	67.8%	75	81.5%	104	60.5%	
No	85	32.2%	17	18.5%	68	39.5%	
Sleep change							.001*
Yes	139	52.7%	68	73.9%	71	41.3%	
No	125	47.3%	24	26.1%	101	58.7%	
Abdominal bloating							.025*
Yes	190	72.0%	74	80.4%	116	67.4%	
No	74	28.0%	18	19.6%	56	32.6%	
Painful or tender breasts							.001*
Yes	168	63.6%	77	83.7%	91	52.9%	
No	96	36.4%	15	16.3%	81	47.1%	
Rapid mood changes							.001*^
Yes	223	84.5%	90	97.8%	133	77.3%	
No	41	15.5%	2	2.2%	39	22.7%	

*P: Pearson X^2 test, ^: Exact probability test, * P < 0.05 (significant)*

Table 4: PMS and QoL Among female medical students at College of Medicine, King Faisal University, Al Ahsa, Saudi Arabia.

Quality of Life (QoL)	Total		Premenstrual Syndrome (PMS)				p-value
			PMS		No PMS		
	No.	%	No.	%	No.	%	
General well-being							.374
High	61	23.1%	22	23.9%	39	22.7%	
Average	167	63.3%	54	58.7%	113	65.7%	
Low	36	13.6%	16	17.4%	20	11.6%	
Home-study interface							.235
High	68	25.8%	29	31.5%	39	22.7%	
Average	146	55.3%	45	48.9%	101	58.7%	
Low	50	18.9%	18	19.6%	32	18.6%	
Study-career satisfaction							.049*
High	61	23.1%	26	28.3%	35	20.3%	
Average	140	53.0%	42	45.7%	98	57.0%	
Low	63	23.9%	24	26.1%	39	22.7%	
Control at study							.332
High	59	22.3%	21	22.8%	38	22.1%	
Average	146	55.3%	46	50.0%	100	58.1%	
Low	59	22.3%	25	27.2%	34	19.8%	
Learning conditions							.294
High	56	21.2%	18	19.6%	38	22.1%	
Average	161	61.0%	53	57.6%	108	62.8%	
Low	47	17.8%	21	22.8%	26	15.1%	
Stress at study							.001*
High	118	44.7%	53	57.6%	65	37.8%	
Average	111	42.0%	24	26.1%	87	50.6%	
Low	35	13.3%	15	16.3%	20	11.6%	

*P: Pearson X^2 test, ^: Exact probability test, * P < 0.05 (significant)*

poses an additional need to break the negative loop and necessitate seeking medical consultation and provide control over either both or at least one of the factors, to provide a better quality of life generally and improve learning-QoL specifically [21]. The increased prevalence among students in their clinical years (40%), and statistically significant association with PMS can also be linked to the increased stress levels with the progression of years of study in medical school, as reported in a study in which stress levels elevated gradually over the duration of the training and reached as high as 40% at the completion of the clinical training phase [21, 22]. Nonetheless, among the participants of this study, 43.5% of introverted students had PMS compared to 36.8% of emotional students and 17 (35.4%) of rational-strict students but only 15.4% of Aggressive-angry students (P=.049) [22]. With regards to the symptoms of PMS, similar to Al-Shahrani et al. [13], depressive affect and anxiety, fatigue and irritability, and bloating and painful or tender breasts were all reported to be statistically significant along with the rest of the symptoms reported by the subjects of their study [13]. However, this study's participants had a notable more pronounced presence of psychological manifestations of PMS, reportedly 100% of individuals experiencing depressive effects, anxiety, fatigue, irritability, depressive thought, and 97.8% had rapid mood changes. Whereas other studies did not include such an observation [13, 18]. Although it's challenging to explain such discrepancies, it's safe to suggest that these variations could be attributed to environmental and academic background distinctions. The intense academic and clinical demands could exacerbate or highlight these symptoms, making them more pronounced compared to other groups [23]. Additionally, the medical students' knowledge and understanding of psychological conditions might lead to more self-awareness and reporting of such symptoms, differing from other studies where participants might not recognize or report these symptoms as readily. Moreover, the co-existence of other factors or conditions that participate in the manifestation of psychological effects should be considered to accurately address these effects [24]. A study conducted in Saudi Arabia comprising 2,562 medical students from 20 universities, illustrated high levels of depression symptoms were found among Saudi medical students (83.4%), most of which being females. Also, it found that depression symptoms are found to be significantly associated with college years, living conditions, and smoking status (P<0.05) [24]. This study presents several limitations that may affect the generalizability and interpretation of its findings. The research is confined to a single institution, limiting broader applicability across different cultural and educational contexts. Its reliance on self-reported data through an online questionnaire introduces potential response biases, such as recall and social desirability biases. Moreover, the cross-sectional design precludes establishing causality between PMS and quality of life changes over time. Future research should adopt wider participant pools to more comprehensively explore PMS's impact on female students, enabling targeted support and interventions.

Conclusion

We concluded that 34.8% of female medical students experienced PMS, and there were associations between PMS and factors such as clinical years of study and personality types. Students with PMS had a higher impact on study-career satisfaction and stress levels. Based on these conclusions, recommendations include raising awareness among students about PMS symptoms, and available management strategies. Educational programs can be implemented to provide information and support, conduct further research, implementing healthcare interventions, and conducting longitudinal studies to assess long-term impact.

Conflict of Interest

None

Funding

None

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