



Original Article

Premenstrual Symptoms and Cycle Regularity: A Cross-sectional Study among Iraqi University Students during the COVID-19 Pandemic

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ABSTRACT

Evidence suggests that the stressor factors faced by women of childbearing age during the COVID-19 pandemic are related to changes in menstrual cycles. The present study was conducted to explore the premenstrual symptoms (PMS), menstrual regularity, and their negative impact on academic performance and interpersonal relationships among Iraqi female university students during the COVID-19 pandemic. A cross-sectional study was conducted on 1270 Iraqi university students in Baghdad, Iraq. An online questionnaire was created to collect data about the menstrual cycle, PMS, and academic performance during the COVID 19 pandemic.

The majority of the participants (76.6%) reported PMS. Depressed mood (69.6%) and flatulence (56.1%) were the most commonly reported PMS. The majority of participants (36.9%) suffered from moderate PMS. Moreover, (26.3%) and (18.3%) of the respondents reported worsening PMS and exacerbating menstrual pain, respectively. Among the respondents, (8.5%) reported a change in menstrual cycle length, and (50%) mentioned the lack of concentration. The study found that PMS was significantly ($P < 0.005$) associated with the students' age, age of menarche, and dysmenorrhea. Furthermore, PMS was highly significantly ($P < 0.001$) associated with poor academic performance, poor interpersonal relationships, and COVID-19 infection. The findings of the present study reveal that during the COVID-19 pandemic, PMS was significantly increased in Iraqi university students and was associated with poorer academic performance and interpersonal relationships.

GRAPHICAL ABSTRACT



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Introduction

Since the beginning of the COVID-19 pandemic, the global research community has intensified its efforts to understand the coronavirus (COVID-19) that has spread rapidly across the world, leading to an urgent public health concern [1]. One of the significant effects of this pandemic on health is the reproductive health. According to several reports and blogs, women have experienced changes in their menstrual cycle, including regularity, frequency, duration, an increase, and worsen dysmenorrhea and PMS [2,3].

The PMS prevalence among adolescent girls in Iraq was estimated to be (75.5%) [4]. However, PMS is a common problem among women all over the world [5]. Studies from several countries indicate that highly educated women are more likely to experience PMS symptoms [6]. It is worth noting that approximately (5%) of reproductive-age women have severe symptoms that interfere with their socio-personal relationships, professional career, and other productive activities [7]. Moreover, PMS may be associated with poor academic performance, such as poor grades or absenteeism [8].

It was anticipated that the strict isolation policies and disruptions in starting universities and schools across the country during the spread of the pandemic would affect the mental health of the university students [9–13]. In addition, COVID-19-related mental health issues, such as social isolation, loss of relatives, and increased stress and anxiety, made the academic lives of the adolescents more difficult [14]. Furthermore, there is growing concern about the impact of the COVID-19 pandemic and the social and economic consequences of lockdown on gender-based violence. According to several reports, the COVID-19 outbreak has increased domestic violence against women [15]. Each of which significantly affects the hypothalamic-pituitary-gonadal axis in the long run. The glucocorticoid stress hormone rises in response to stress and inhibits gonadotropin-releasing hormones. This, in turn, may affect ovulation timing and menstrual cycle regularities [3]. Furthermore, women who were affected by COVID-19 or had family members who were affected reported that their quality of

life had deteriorated in the previous 12 months. [1].

In light of these findings, the current study aims to ascertain the extent to which menstrual regularity and PMS affect academic performance and interpersonal relationships among Iraqi university students who were subjected to the prolonged stress of the COVID-19 pandemic and closure period.

Materials and Methods

A cross-sectional study was conducted among 1270 Iraqi university students in Baghdad, Iraq. The participants included in this study were not using oral contraceptives or antidepressants, were not pregnant or nursing, and had no psychiatric, gynecological, or chronic conditions. The ethical approval for this study was obtained from the Ethics Committee of the College of Medicine, Al-Iraqia University, Baghdad, Iraq (CM/SA/53). A web-based survey was designed to collect self-reported data on the socio-demographics, medical history, menstrual characteristics, menstrual pain, the ACOG criteria, PMS, and academic performance of Iraqi female university students during the pandemic. All participants received a full explanation of the study before giving their informed consent. Data collection took place for three weeks (22 February to 15 March, 2021) to determine the extent of the impact of menstrual regularity and PMS on academic performance among the participants during the epidemic and closure period.

PMS was diagnosed according to the ACOG diagnostic criteria. PMS severity was determined by how the daily lives of the participants were affected by PMS. The symptoms are classified as mild if there is no restricted daily activity, moderate if there are significant limitations in daily activities, and severe if participants have failed to complete their tasks without being interrupted [16-17].

Statistical analysis

SPSS software version [22] of IBM was used for statistical analysis. Descriptive statistics, such as mean, SD, and percentage were estimated. The Chi-square test and the independent-sample t-

test were used to assess qualitative data. A p-value of ≤ 0.05 is considered statistically significant.

Results and Discussion

To the best of our knowledge, this is the first study to evaluate menstrual regularity and PMS and their relevance to academic performance and interpersonal relationships in Iraqi university

students following the prolonged stress from the COVID-19 pandemic and closure period.

The demographic characteristics and menstrual cycle changes of the (1,270) participants are indicated in (Table 1). The majority of participants (78.7%) reported having regular menstrual cycles, while (51.2%) reported having dysmenorrhea, and almost (56.5%) reported having a COVID-19 infection.

Table 1: Demographic and other characteristics of the participants

Characteristic	N=1270	%
Age (years), mean \pm (SD)*	(23.7 \pm 4.29)	
Marital status %		
- Married	358	28.2%
- Not married	912	71.8%
BMI** (kg/m ²), mean \pm (SD)	(23.9 \pm 4.0)	
Menarche age (years), mean \pm (SD)	(12.10 \pm 0.7)	
Dysmenorrhea %	651	51.2%
Menstruation %		
- Regular	1000	78.7%
- Irregular	270	21.2%
Premenstrual symptoms (PMS)***	973	76.6%
PMS severity		
- Non	297	23.4%
- Mild	309	24.3%
- Moderate	469	36.9%
- Severe	195	15.3%
Students or at least one of their family members had suffered COVID-19 infection		
- Yes	718	56.5%
- No	552	43.4%

*SD: Standard deviation; **BMI: Body mass index; ***(PMS): Premenstrual symptoms

Each participant (100%) had at least one PMS. According to the results of the present study, more than two-thirds (76.6%) of students had PMS who were identified with ACOG diagnostic criteria. However, the PMS prevalence in this study is higher than that reported in Saudi Arabian (64.9%) [6], Egyptian (68.8%) [18], and Turkish (50.3%) university students. [19]. The higher prevalence of PMS in this study could be attributed to increased stress caused by the global spread of pandemics, health issues, community bans, and increased awareness among Iraqi university students as a result of the rapid development and modernization of society. This disparity may also be due to PMS-related factors such as hormonal, genetic, environmental,

and sociocultural factors, as well as the dietary habits of the university students.

Premenstrual syndrome is characterized by various physical, emotional, and behavioral symptoms [17]. According to the current study, the PMS symptoms that were more frequently reported by female university students were depressive mood, anger, irritability, bloating, and breast tenderness (Table 2). This frequency order was almost similar to that reported in previous studies [18-21]. Most female students suffered from moderate PMS (36.9%). Meanwhile, a small percentage of them experienced mild and severe PMS. This frequency order was almost similar to that reported in previous studies [19-23]. These similarities may be explained by the participants'

being of the same age group and status as university students.

Table2: The PMS frequencies by the severity level

Premenstrual symptoms	N (%)	Severity of symptoms		
		Mild	Moderate	Severe
SOMATIC SYMPTOMS				
Abdominal bloating	713 (56.1%)	455 (35.8%)	188 (14.8%)	70 (5.5%)
Brest tenderness	662 (52.1%)	328 (25.8%)	260 (20.5%)	74 (5.8%)
Acne	660 (51.9%)	357 (28.1%)	234 (18.4%)	69 (5.4%)
Dysmenorrhea	651 (51.2%)	410 (32.3%)	167 (13.1%)	74 (5.8%)
Headache	442 (34.8%)	273 (21.5%)	130 (10.2%)	39 (3.1%)
Sleep disturbances	347 (27.3%)	89 (7.0%)	89 (7.0%)	169 (13.3%)
Swelling extremities	117 (9.2%)	64 (5.0%)	22 (1.7%)	31 (2.4%)
AFFECTIVE SYMPTOMS				
Depressed mood	885 (69.6%)	313 (24.6%)	365 (28.7%)	207 (16.3%)
Angry outbursts	778 (61.2%)	266 (20.9%)	305 (24.0%)	207 (16.3%)
Irritability	731 (57.5%)	170 (13.4%)	349 (27.5%)	212 (16.7%)
Stress exacerbates PMS	388 (30.55%)	169 (13.3%)	96 (7.6%)	123 (9.7%)
Disturb normal routine activities	380 (29.9%)	298 (23.4%)	46 (3.6%)	36 (2.8%)
Social withdrawal	357 (28.1%)	100 (7.9%)	183 (14.4%)	74 (5.8%)
Missed school, social, or work due to PMS or dysmenorrhea	188 (14.8%)	111 (8.7%)	41 (3.2)	36 (2.8%)
Confusion	83 (6.5%)	27 (2.1%)	25 (2.0%)	31 (2.4%)

(PMS): Premenstrual symptoms

Approximately (32.8%) of participants reported changes in PMS, (18.3%) reported exacerbation of menstrual pain, and (8.5%) reported changes in menstrual cycle length. As indicated in Table 3, (35.1%) of participants reported difficulties in academic performance during the pandemic. The detrimental effects of PMS on academic performance and interpersonal relationships are presented in Tables 4 and 5.

Previous studies have demonstrated that PMS had a negative and significant impact on the quality of life and academic performance of the adolescents. In addition, increased PMS severity leads to poor mental health and vitality [24]. The results of this study found that the negative impacts of PMS on academic performance were

lack of concentration (50%) and work difficulties (42.9%). These findings are consistent with previous research findings that indicated PMS affects female university students and influences their academic performance, social engagement, and their quality of life [25-29]. About (56.5%) of participants had the COVID-19 infection during the pandemic. PMS exacerbation was reported by (26.3%) and worsening menstrual pain was reported by (18.3%) of the participants. These results are consistent with those of the previous studies conducted on women of reproductive age [3,6].

Table3: Changes in PMS and other characteristics during the pandemic

Selected characteristics	Increase	decrease	No changes
Body weight	32.1%	23.1%	44.7%
Menstrual irregularity	8.5%	15%	76.4%
PMS*	26.3%	6.5%	67.1%
Dysmenorrhea	18.3%	8.2%	73.5%
Medication for PMS* relieving	13.5%	13.6%	72.8%
Educational difficulties	35.9%	12.2%	51.8%
Mood changes	63.9%	5.7%	30.3%

*(PMS): Premenstrual symptoms

Table 4: Relationships between the PMS and the demographics of the participants and the other parameters during the pandemic

	PMS (973)	No PMS (297)	Statistic test	df	p-value
Age	24.1±4.3	22.4±4.2	5.884*	1268	.000
Marital status %					
- Married	(22.6%)	(55.2%)	2.819**	1	.053
- Not married	(5.7%)	(19.2%)			
BMI (kg/m ²)	23.9±3.9	23.9±4.3	0.212*	1268	.832
Menarche	12.1±0.8	12.2±0.6	-2.551*	1268	.011
Menstruation %					
- Regular	(60.9%)	(17.8%)	1.621**	1	.117
- Irregular	(15.7%)	(5.6%)			
Dysmenorrhea %	(43.6%)	(7.6%)	88.842**	3	.000
Medication use (analgesics)	(11.0%)	(2.5%)	2.598**	2	.273
COVID-19	(46.6%)	(9.9)	31.414**	1	.000

(PMS): The premenstrual symptoms, * The Independent samples t-test;** The Chi-square test, df: The degree of freedom, (BMI): The body mass index

Table 5: The relationship between PMS and academic performances, and the interpersonal relationship of participants during the pandemic

	PMS * (973)	No PMS (297)	df**	P-value
Academic performances				
Lack of concentrations	521 (41.0%)	115 (9.1%)	1	.000
Difficulty in working	462 (36.4%)	83 (6.5%)	1	.000
Lack of motivations	403 (31.7%)	65 (5.1%)	1	.000
Poor individual work performance	381 (30.0%)	66 (5.2%)	1	.000
Poor collaborative work performance	171 (13.5%)	29 (2.3%)	1	0.001
Absenteeism	138 (10.9%)	16 (1.3%)	1	.000
Interpersonal relationship				
Poor relationships with family	414 (32.6%)	45 (3.5%)	1	.000
Poor interpersonal relationships with friends	267 (21.0%)	21 (1.7%)	1	.000

*(PMS): The premenstrual symptoms, and **(df): The degree of freedom

Interestingly, the present study found a significant ($P < 0.005$) relationship between PMS and the age, menarche age, and dysmenorrhea of the students. Furthermore, PMS is highly significantly ($P < 0.001$) associated with poor academic performance, poor interpersonal relationships, and with COVID-19 infection (Table 5). These observations may be due to stress brought on by COVID-19, significant lifestyle changes, and social interaction, all of which have an impact on stress, mental health, and the hypothalamic-pituitary-genital axis. This, in turn, may affect ovulation timing and irregular periods [1,3,27].

Conclusion

The present study concluded that PMS was significantly increased in Iraqi female college students and was associated with a lower academic performance and poor interpersonal relationships throughout the COVID-19 pandemic. More prospective randomized studies are needed to support such results.

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Authors' contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

The author declared that they have no conflict of interest.

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