Medical Science

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Premenstrual syndrome among female students at King Abdulaziz University: Prevalence, coping behaviors and health related quality of life, cross sectional study

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ABSTRACT

Introduction: Premenstrual syndrome (PMS) is a cause of conflict in women's lives, in the social relationship and the daily living activity. The prevalence of PMS worldwide is 47.8% which varies from one country to another. *Objectives:* To estimate the prevalence of PMS among female University students and to assess the effect of PMS on their health-related quality of life (QOL) and to identify their coping behaviors against PMS. *Methods:* This is Cross-section analytical study applied on KAU female students, Jeddah Saudi Arabia during the year of 2020. *Results:* A total of 602 students were approached. PMS was seen in 50.6% of our sample, among which 24.1% had 'Borderline to mild PMS symptoms, 12.5% had 'Mild to moderate PMS' symptoms, 8.5% had 'Moderate to Severe PMS' symptoms, 4.3%, and 1.2% had 'Severe PMS' and the 'Disabling PMS' symptoms respectively according to the ACOG criteria. Regarding the quality of life, our results revealed that the PMS group had significantly lower scores than the non-PMS group for physical and mental health-related quality of life. The most common methods used as copying behavior are hot water bottle and hot bath. *Conclusion:* The results of our study unveiled a relatively high prevalence of PMS syndrome and a significant negative effect of PMS on the QOL.

Keywords: Premenstrual, Quality of life, University Students, Saudi Arabia

DISCOVERY
SCIENTIFIC SOCIETY

1. INTRODUCTION

Premenstrual syndrome (PMS) is a cause of conflict in women's lives, family and social relationships, and daily living activity (Rezaee et al., 2015) and has

long been an issue of great interest in a wide range of fields. PMS is defined by the presence of a variety of symptoms that are divided into two categories: affective and somatic symptoms, which occur in a cyclical form in the days preceding menstruation and affect women's daily lives (Reid & Yen, 1981). The prevalence of PMS is 47.8% worldwide (Geta et al., 2020) and varies from country to country. Recently, a study on Princess Nourah Bint Abdul Rahman University in Riyadh, Saudi Arabia, showed that the prevalence rate of PMS is 47.1% (Majeed-Saidan et al., 2020). It is clinically diagnosed when certain symptoms occur during the secretory phase of the menstrual cycle and interfere with daily life, according to the criteria published by the American College of Obstetrics and Gynecology (ACOG) (Kraemer & Kraemer, 1998).

The PMS is linked to many of risk factors such as hormonal imbalances, vitamin deficiencies, stress, smoking, certain dietary habits, and physical inactivity (Dawood, 2006). People with these risk factors usually tend to use various coping strategies such as participating in physical activities, eating sweets, taking painkillers, relaxing, doing cheerful things, taking walks, and drinking water and herbal tea (Özmermer & Koruk, 2019). Coping can be defined as " behavioral and cognitive efforts to manage specific internal and/or external demands that are appraised as exceeding or taxing the resources of the person" (Kowal et al., 2020). Most women suffer from somatic and affective symptoms that can affect their quality of life (QOL) (Karpagavalli & Raz, 2020). The World Health Organization (WHO) introduced quality of life as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns" (The WHOQOL Group, 1994). This can be measured by various instruments, one of which is SF –12 (Gandek et al., 1998).

The increasing prevalence of PMS and the diversity of its diagnostic criteria point to the need to investigate what impact PMS may have on the QOL, social and academic aspects of women of child bearing age. Recently, considerable literature has emerged on PMS, but none has addressed the experiences of female students at King Abdulaziz University (KAU). The objectives of this study were to estimate the prevalence of PMS, to identify it is effect of QOL of life, and assess the coping behaviors among female university students.

2. METHODS

Study design

This was a cross-sectional analytical study conducting on female university students in Jeddah, Saudi Arabia during the year of 2020. Sample size, comprising female students from all colleges of King Abdulaziz University except pregnant students, it was calculated using the open epi sample size calculation facility with a confidence level of 95% and a margin of error of 5%.

Data collection tools

Questionnaire was distributed in an electronic form using the survey Monkey. The questionnaire including cover sheet explaining the study's purpose, it was distributed during June 2020. The survey consisted of four sections: (1) Sociodemographic data, (2) the PMS Evaluation Questionnaire (PEQ), (3) the Brief Health Status Questionnaire 12 (SF -12), and (4) the Premenstrual Change Management Questionnaire (PMS-Cope). Before data collection a pilot study was conducted to optimize the wording of some questions.

Sociodemographic data

All participants were asked about their age, nationality, marital status, number of children, and use of OCP, smoking status, and diagnosed psychiatric disorders.

The PMS Evaluation Questionnaire (PEQ) (Shaheen et al., 2016) was used to assess PMS symptoms for confirming the diagnosis and measuring symptom severity. It includes 18 questions to be answered prospectively for 2 consecutive menstrual cycles. The questions include the following symptoms: Irritability, Mood Swings, Nervous Tension, Anxiety, and Weight Gain, swelling of extremities, Breast Tenderness, Increased Appetite, craving for sweets, headache, fatigue, palpitations, dizziness or fainting, depression, forgetfulness, crying, confusion, insomnia.

Then the symptoms were rated on a scale of 0 to 4. If a particular symptom did not occur, rated as (0); Mild symptoms, rated as (1); Moderate but tolerable symptoms, rated as (2); Severe and significant symptoms rated as (3); Partial or total disability scored as (4).

Then the score was calculated using the following equation:

Total Column 2 - total column 1 = the PMS score. After the score is determined, it is ranked based on the following scores:

(No PMS) if the score is between 0 and 1.

(Borderline to mild PMS) if the score is between 12 and 18

(Mild to moderate PMS), if the score is between 19 and 25

(Moderate to severe PMS), if the score is between 25 and 35

(Severe PMS), if the score is between 35 and 45

(Debilitating PMS), if the score is ≥45

The Short-Form Health Survey 12 (SF -12) (Gandek et al., 1998) was used to assess health-related quality of life. The questionnaire is composed of physical and psychological subscales (PCS and MCS) and contains 12 items and 8 dimensions: One item for (social functioning, vitality, general health, and physical pain,) and two items for (physical functioning, physical role, emotional role, and mental health) with a possible score between 0 and 100.

Before we started calculating the SF -12 subscale scores, we reversed the coding for the four negative items (Q1, Q8, Q9, and Q10). Then we calculate the mean of each subscale item. After that we added the mean of the two subscales to calculate the overall SF-12 score. A higher SF-12 score indicates a good quality of life.

The Premenstrual Change Coping Inventory (PMS-Cope) questionnaire (Kaiser et al., 2018) consists of 17 items with two factors. The first factor is "seeking positive affect-inducing activities". It includes seven items assessing strategies such as sports, keeping one busy with enjoyable activities, and taking time for hobbies. The second factor is "seeking support". It includes five items assessing strategies about the complaints and sympathy from other people.

Recoding of the items

Yes: recorded as a value of one

No: recorded as a value of zero

Ethical approval

Approval for this study was granted by the KAU hospital research ethical committee (REC) of the unit of biomedical ethics located at the Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia (reference no. 700-19). The first page of the questionnaire contained the permission to participate in the study, which the questionnaire approached only after the participants had given their consent. In addition, confidentiality was preserved in which a participant's email addresses and their names and other contact information were not required.

3. RESULTS

This study aimed to determine the prevalence of PMS and assess coping strategies and QOL among female students at KAU. A total of 602 students were approached. The sociodemographic characteristics of the participants are presented in (Table 1). The participants' average age was 21.69 ± 1.39 years, 95.3% had a Saudi nationality, 53.2% were medical students, 59.3% were in the 1st, 2nd, and 3rd academic years. Most of the participants 97.2% were single, 75.1% had a regular menstrual cycle. Only 2.2% of students used oral contraceptives, 7.6% were smokers and 10.8% reported having a psychiatric illness.

Table 1 Distribution of the participants according to their characters, having children, regularity of menstrual cycle, use of oral contraceptive pills and smoking status (No.=602)

Variable	No. (%)
Age	21.69 ± 1.39
Nationality	
Saudi	5.3)
Non-Saudi	282 (46.8
College	
Medical	3.2)
Non-medical	282 (46.8)
Academic year	
Junior (1, 2,3)	9.3)
Senior (4,5,6)	245 (40.7)
Marital status	
Single	7.2)
Married	(1.5)

Divorced	8 (1.3)
Having children	
Yes	10 (1.7)
No	592 (98.3)
Regularity of menstrual cycle	
Regular	452 (75.1)
Irregular	150 (24.9)
Oral contraceptive pills use	
Yes	13 (2.2)
No	589 (97.8)
Smoking status	
Smoker	46 (7.6)
Non-smoker	556 (92.4)
Having psychiatric illness	
Yes	65 (10.8)
No	537 (89.2)

Overall, 50.6% of our sample experienced symptoms suggestive of PMS according to ACOG criteria, among which 24.1% had 'Borderline to mild PMS symptoms, 12.5% had 'Mild to moderate PMS' symptoms, 8.5% had 'Moderate to Severe PMS'symptoms, 4.3% and 1.2% had 'Severe PMS' and the 'Disabling PMS' symptoms respectively (Figure 1).
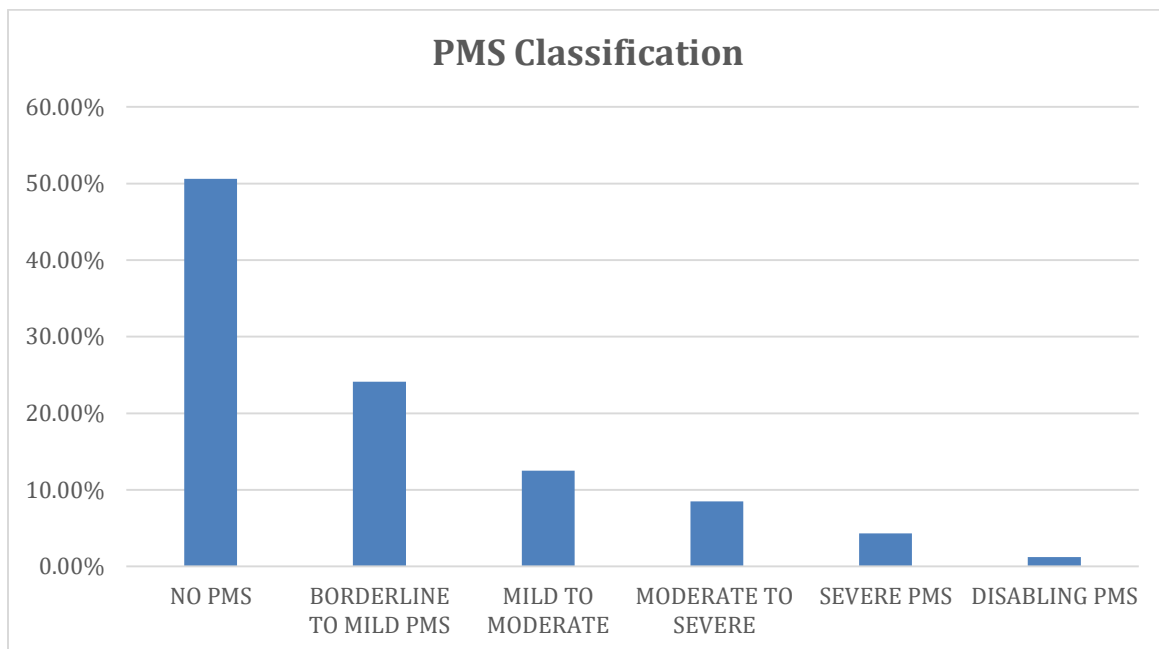

Figure 1 PMS symptoms severity among female students of King Abdulaziz University, May-September 2020.

By using bivariate analysis, PMS has been discovered to besignificantly associated with nationality, marital status, contraceptive pills, and participants having psychiatric illness. On the other hand, no statistically significant relationship was found between occurrences of PMS and participants age, college, academic year, having children, regularity of menstrual cycle and smoking (p=> 0.05).

Multiple logistic regressions were performed to adjust for confounding factors. The model explained 4.9% (Nagelkerke R^2) of the variance in PMS and correctly classified 55.0% of cases. Non-Saudi female students were 2.5 times more likely to exhibit PMS symptoms than Saudi OR (95% CI) 2.5 (1.1 - 5.8). The students who have psychiatric illness are 2.5 times more likely to develop PMS than others OR (95% CI) 2.5 (1.4 - 4.4). When analyzing the effect of marital status, the married students are 5 times more likely to experience PMS symptoms than single students OR (95% CI) 5.0 (1.4 - 17.6) (Table 2).

Table 2 Multiple logistic regression on Presence of PMS.

Multiple logistic regression				
Presence of PMS				
	B	Wald	P- value	OR (95% CI)
Nationality				
(Saudi/Non-saudi)	.929	4.765	.029	2.5 (1.1 - 5.8)
Psychiatric illness				
(No/Yes)	.924	10.503	.001	2.5 (1.4 - 4.4)
Marital status				
(Single/Non-single)	1.614	6.310	.012	5.0 (1.4 - 17.6)

A multiple linear regression was conducting to predict SF12 score based on PMS, nationality, psychiatric illness. PMS, nationality, and psychiatric illness were found to be significant predictors of SF-12 scores. PMS and psychiatric illness exhibits negative effect on SF12 score PMS with Beta (95% CI), -.19 (-.06 to -.14); while psychiatric illness Beta (95% CI), -.10 (-.47 to -3.15) (Table 3).

Table 3 Multiple linear regression on QOL

Multiple linear regression		
QOL		
	P- value	Beta (95% CI)
PMS	.000	-.19 (-.06 to -.14)
Nationality	.000	0.17 (6.46 - 2.51)
Psychiatric illness	.008	-.10 (-.47 to -3.15)

Table 4 showed that the most common methods used as copying behavior are hot water bottle and hot bath followed by occupying themself by the thing they enjoy. The least reported copying behavior were theuse of evening primrose oil, light therapy, homeopathy followed by meeting their friends.

Table 4 Relationship between presence of PMS symptoms and participants copying behavior

Variable	Frequency	Percentage
occupy myself with things I enjoy.	202	66.4%
purposefully induce positive feelings.	157	51.6%
make time for my hobbies	130	42.8%
get in motion	159	52.3%
use hot water bottle and hot bath	232	76.3%
meet friends	58	19.1%
talk with friends about my symptoms.	149	49.0%
purposely look for advice and support from other people.	114	37.5%
talk to my partner or a close friend about my complaints.	147	48.4%
seek comfort and understanding from others.	125	41.1%
exchange views with other women concerned.	101	33.2%
increasingly look for information about my physical complaints.	118	38.8%
look for new treatment options.	128	42.1%
Use of evening primrose oil, light therapy, homeopathy.	50	16.4%
take medication for my physical complaints.	164	53.9%
avoid certain food	160	52.6%

4. DISCUSSION

This study was conducted on 602 medical and non-medical female students at King Abdul-Aziz University (KAU) to estimate the prevalence of Premenstrual Syndrome (PMS) among these students and identify their coping behaviors against PMS. In addition, determine the impact of PMS on their health-related quality of life.

The prevalence of PMS among female students at King Abdulaziz University

In the first section of our study, we used the American College of Obstetrics and Gynecology (ACOG) diagnostic criteria to assess PMS prevalence. 50.5% of participants reported suffering from PMS, the majority of whom (24.1%) suffered from borderline to mild symptoms. The prevalence of PMS in our study is comparable to a 2020 study among female students from medical science and non-medical science colleges in Riyadh, Saudi Arabia, in which PMS prevalence ranged from 8% to 59.4% (Majeed-Saidan et al., 2020). This study finding is also consistent with a 2019 study conducted among female students at Qom University of Medical Sciences, Iran, in which the prevalence of PMS ranged from 13.2% to 49.8% (Seyed Tabaee et al., 2019). Other studies in Lebanon and Ethiopia showed a similarly high prevalence of PMS (Admike et al., 2020; Costanian et al., 2018) confirming our findings. A lower prevalence rate of PMS 31.1% was found in a study by Rumana Akbari et al., (2017) in Karnataka, South India. Another study in Iran reported that a small percentage of participants suffered from PMS (Farrokh-Eslamlou et al., 2015); this inconsistency could be due to their small sample size and the different scales used for PMS assessment.

The impact of premenstrual syndrome on their health-related quality of life

In the second section, we assessed the participants' quality of life using the SF -12 questionnaires. We found that there was the severity of PMS symptoms and quality of life. Our results revealed that the PMS group had lower scores on physical and mental health-related quality of life than the non-PMS group with a statistical significance of (P <0.001).

Several other similar studies carried out in different regions of the world reported the same findings, confirming ours. One of these was conducted in 2020 among Pakistani women who come from a resource-poor area in Karachi. The study showed negative attitudes towards menstruation. 11.2% of the women believed that menstruation was a punishment from God. Lack of health awareness and the spread of false information lead to poor attitudes towards medical advice and therapy (Abbas et al., 2020). Also another study was conducted by Karpagavalli & Raz (2020) in Chennai among university students of a nursing school in India. 68.8% of them were suffering from PMS. Short Form 36 was used to determine the QOL and it was found that PMS was linked to low quality of life in all domains. Furthermore, in a 2015 study conducted on Iranian female medical students, Farrokh-Eslamlou et al., (2015) demonstrated that overall quality of life, particularly in the psychological and social domains of the Persian version of the WHOQOL-BREF questionnaire, was low over half of the participants. Another study was conducted on Indonesian nursing students from Health Science University "Karya Husada Semarang", Central Java, Indonesia. All scores in physiological, social relationships, and environment were lower in the female students with PMS. Quality of life was impaired with the increasing severity of dysmenorrhoea (Kustriyanti & Rahayu, 2020).

From these results, we conclude that PMS symptoms are strongly correlated with health-related quality of life. Most of our sample were medical students and over half of them had no PMS symptoms. This could be because of the fact that a medical background increases awareness and understanding of PMS as a medical problem that requires self-care and seeking help to improve symptoms. This explanation matches that observed in a Pakistani study conducted among people of low socioeconomic status. It showed that low levels of education and misunderstandings about the nature of women lead them to miss the opportunity to seek medical advice and treatment, which negatively affects their symptoms and QOL 30).

Coping behaviors against PMS

In the third section of our study, we used the Premenstrual Change Coping Inventory (PMS-Cope) questionnaire to assess the coping strategies of our participants. Interestingly, our result is statistically significant for only dealing with PMS by talking to friends about the symptoms (p<0.05). The analysis did not show any significant differences between the presence of PMS symptoms and other coping strategies.

It is difficult to explain these results, but it might be related to the predominance of mild symptoms among our participants hence, no coping behaviors were needed. However, there is another possible explanation, it could conceivably be hypothesized that "talking with friends" can be an outcome of PMS rather than a method to deal with the symptoms. These findings refute previous results listed in the literature; one of them was a Turkish study that reported participants who had PMS symptoms coped with their symptoms by using various methods such as using analgesics, eating sweets, or being active (Özmermer & Koruk, 2019). The

efficacy of numerous methods to cope with PMS was demonstrated by multiple studies. Some studies in the literature reported that sleeping, diet changes, exercises, yoga were also used to relieve PMS symptoms (Shah & Christian, 2020). A possible explanation for their results might be that all these strategies are easy to use; they can be used by women from different social classes.

Furthermore, nor prescriptions are needed neither side effects were noticed. Contrary to expectations, a Korean study stated that most of their participants were coping with their symptoms by sleeping (Cha & Nam, 2016). Another study in Pakistan completely agreed with this finding (Mahesh et al., 2011) whereas, other studies focused on different types of herbs. For instance, the benefit of Iranian herbal medicine in relieving PMS symptoms was proved by a previous systematic review done by Nahid (Maleki-Saghooni et al., 2018). Khalesi et al., (2019) also found that using Chamomile is effective in relieving PMS symptoms. Additional types of herbs such as cinnamon, green, and mint teas were used by the participants in a study done in Alsharjah (Hashim et al., 2019). Although, it is known that using herbs and traditional remedies are common among Arabic women, the fact that when women struggle with their symptoms they tend to seek a solution at hand, Iranian herbal medicine, and other herbs are not available in each home. The forementioned explanation could reveal our discrepancy with the previous papers.

Published studies suggest that dietary changes have a relieving effect on PMS (Hashim et al., 2019). Özmermer & Koruk (2019) reported the same findings. Other studies discussed using hot water bottles, massaging the abdomen and the waist, resting or being alone as coping strategies were reported by their participants (Cha & Nam, 2016; Kharabah et al., 2021; Özmermer & Koruk, 2019). Also, a clinical trial done in Turkey showed the benefit of using acupressure and yoga in alleviating symptoms. On the other hand, several studies indicated the efficacy of exercise as a coping strategy (Özmermer & Koruk, 2019; Simsek Kucukkelepce et al., 2021; Yi & Bae, 2021; Yilmaz-Akyuz & Aydin-Kartal, 2019).

Limitations

Our study had some limitations that may have affected the results. First, this study was conducted at a single university in one of the western region's citiesof Saudi Arabia; thus, the results cannot represent the whole female Saudi population. Second, interested students are more likely to participate in our research.

5. CONCLUSION

Based on our findings we conclude that the prevalence of PMS among female students at King Abdulaziz University, in general, is high (50.5). Regarding the quality of life, our results revealed that PMS significantly with health related QOL. The PMS and psychiatric illness negatively affect the QOL. The most commonly use coping behavior was using of hot bottle and hot bath.

Recommendations

The introduction of counselling services and campaigns regarding PMS could help in reducing the effect of PMS on QOL. We recommend that a large-scale study using representative sample of Saudi female students.

Conflict of interest

The authors declare that there are no conflicts of interest.

Data and materials availability

All data associated with this study are present in the paper.

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