

Research Article

## Moderate to Severe Premenstrual Syndrome and Contributing Factors among University Students in Palestine

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### Abstract

#### Background

Premenstrual syndrome (PMS) is a cyclic occurring disorder that affects young and middle-aged women mainly. It characterized by group of physical, cognitive, emotional and behavioural symptoms that interfere with daily living activities. PMS is common worldwide, but there is no published research about it in Palestine. The aim of this study is to assess the prevalence of premenstrual syndrome and the degree of its severity among the medical students at An-Najah National University, Palestine

#### Methods

A cross-sectional study using a self-administered questionnaire was conducted to collect data from 260 female students. American Congress of Obstetricians and Gynecologists (ACOG) criteria and Shortened Premenstrual Assessment Form (SPAF) were used to measure PMS prevalence and severity of premenstrual symptoms.

#### Results

The prevalence of PMS was 71.9%. The most frequently reported complaints were: lower back pain (57.7%), followed by feeling bloated (51.9%) and feeling under stress (50%). Significant relationships were found between the severity of premenstrual symptoms and academic class (rank), regular coffee intake, duration of menstrual cycle and absence from lectures and rotations.

#### Conclusion

Premenstrual syndrome is common among female medical students and has negative effect in their academic performance and attendance and should be taken into consideration by university officials. We highly recommend increasing the awareness of PMS among university students and staff and communicating the results with university officials in order to make attendance policy more flexible to adapt this high prevalent problem among female students.

**Keywords:** Premenstrual Syndrome; Medical Science Students; An-Najah National University

## Introduction

Premenstrual syndrome (PMS) is a cyclic occurring disorder that affects young and middle-aged women mainly, and characterized by group of physical, cognitive, emotional and behavioral symptoms that consistently occur during the luteal phase of the menstrual cycle. [1,2]. It is characterized by the presence of affective and somatic symptoms that occurs during the five days before menses for at least three menstrual cycles in a row.

Many symptoms may be associated with PMS including emotional fluctuations, irritation, anxiety, bloating, sleep disorders, increase in appetite, and sensitivity and pain in the breasts [3-7]. Premenstrual dysphoric disorder (PMDD) is the extreme, predominantly psychological, end of the PMS spectrum [1]. There are no specific physical examination findings or lab tests specific to the diagnosis of PMS [8].

PMS is quite prevalent among the women of reproductive age group, especially among the young age groups. Although reports on the prevalence of PMS are different from study to study, most of studies conducted in the neighboring countries showed it to range from 50-80%; a considerable proportion of it is moderate to severe form [9- 13].

Several researches have investigated the impact of PMS. Women who met the criteria for this disorder showed significantly higher work, school or college absenteeism and impairment in their productivity and household activities [2,9]. Students affected with PMS complain of inability to sleep, prolonged rest need, fatigue and inability to study. Missed meals, lectures and social commitments are also common complains [9]. Furthermore, as symptoms severity increased, the healthcare utilization increased, including emergency room visits, outpatient visits, radiology services and laboratories [2,14]. In general, it is concluded that PMS affects the life quality of the affected females.

Many risk factors for PMS were discussed in the literatures, among those factors were age, obesity, overall health, stress, anxiety and depression<sup>[15]</sup>. Obese women with body mass index  $\geq 30$  and those with higher level of perceived stress scores are at higher risk for developing PMS [15]. Women with other health problems are at increased risk for PMS, and current mood and anxiety disorders or history of mood or anxiety disorders are common in women with PMS [15].

Searching the literature showed no published data about the burden of this problem in Palestine, in term of its magnitude, severity, distribution and risk factors. Therefore, we aimed to investigate the prevalence of PMS among female students of The School of Medicine and Health Sciences at An-Najah National University (ANNU) and to explore its effects on the students' performance and absenteeism.

## Methodology

### *Study Design and Setting*

A cross – sectional study was conducted at ANNU, the largest provider of higher education in Palestine, including students from all areas of the West Bank territories and a wide variety of socioeconomic identifiers. The study population included the students of the faculty of medicine and health sciences; the largest faculty in the university.

### *Sample Size and Sampling Technique*

Sample size was determined by single proportion for finite population with confidence level of 95%, margin of error (d) of 5%, and the prevalence (p) of 80% [10], and considering 10% non-response rate to be 285. Students reported having gynecological diseases within the last year, or having chronic physical or psychological illnesses were Excluded.

A systematic random sampling technique was used for distributing the questionnaire to individual participants. While visiting each class; permission was taken first from the lecturer and, before disseminating the questionnaire, a brief description about the study and its objectives was given to participants; and then students were selected randomly by starting with the student sitting on the first desk and then every 3<sup>rd</sup> student.

### *Study Outcomes*

The main outcome variables for this study was the PMS which is defined and diagnosed as presence of at least one of the following affective and somatic symptoms, that occurs during the five days before menses for at least three menstrual cycles in a row. Affective symptoms are: anger with possible outbursts, anxiety, confusion, depression, irritability and social withdrawal [16]. Somatic symptoms are: abdominal bloating, breast tenderness, headache, and swelling of extremities [16]. These symptoms must remit within four days of menses onset, not recur until at least day 13 of the subsequent cycle, and not due to any medications including hormones. Symptoms should also interfere with some of woman's normal activities [16].

Other studied variables were students' demographic and background variables such as academic level, residency, marital status, smoking status (cigarette or water-pipe smoking), regular coffee intake and Body mass index. Additionally, gynecological characteristics were studied such as age of menarche, regularity of menstrual cycle, frequency of menstrual cycle and intensity of menstrual cycle.

### *Measurement Tool*

A self administered questionnaire, modified from a Jordanian study by Hamaideh et al. [10], was used to collect the data. It

was divided into 2 sections;

- Part I about demographic and gynecological characteristics, like academic program, marital status, smoking status, regular coffee intake, performing physical activities, daily sleeping hours, absence from lectures and rotations due to premenstrual symptoms, weight and height, age at menarche and regularity, frequency, duration and intensity of menstrual cycle.
- Part II, about PMS which was measured based on the Diagnostic Criteria adopted by the American Congress of Obstetricians and Gynecologists (ACOG). The participants were asked to indicate if they experience any one of symptoms present in the ACOG criteria during the last three previous menstrual cycles.
- The severity of premenstrual symptoms was evaluated using the Shortened Premenstrual Assessment Form (SPAF) [17] which is composed of ten items that are 1) Pain, tenderness, enlargement or swelling of breasts; 2) Feeling unable to cope or overwhelmed by ordinary demands; 3) Feeling under stress; 4) Outburst of irritability or bad temper; 5) Feeling sad or blue; 6) Backaches, joint and muscle pain, or joint stiffness; 7) Weight gain; 8) Relatively steady abdominal heaviness, discomfort or pain; 9) Edema, swelling, puffiness, or water retention; 10) Feeling bloated. The participants had been asked to rate the severity of changes in symptoms on scale of 1-6 (1=no changes at all to 6=extreme change) during the premenstrual period. Score >30 indicates moderate or severe PMS symptoms. The Arabic version of SPAF by Hamaideh et al. showed high reliability (Cronbach's alpha 0.88) [10].

To ensure its validity and reliability, the measurement tool was reviewed by experts in the field, and then pre-tested on a convenient sample of 20 students to highlight problems associated with it and assess the time needed to complete. Cronbach's alpha was computed for the SPAF and found to be 0.85. Student participants in the pilot study were excluded from the original study.

### Data Entry and Analysis

The completeness and accuracy of the collected data were checked and were corrected on daily basis before being filled. Data were coded and edited properly by the second investigator prior to data entry. The data entry and statistical analysis were performed using the Statistical Package for Social Sciences (SPSS) version 17. Descriptive statistics were used to summarize the socio-demographic and clinical characteristics of the study participants. Summary tables, graphs and charts were used for descriptive purpose.

Significant differences in severity of symptoms were tested using the Chi-squared test and *t*-test as appropriate with the sig-

nificance level set at 0.05. All variables with a p-value of <0.1 in the univariate analysis were subject to multivariate logistic regression analysis model to assess the predictor variable(s). The study was conducted after getting approval from the ANNU institutional review board (IRB) and taking permission from the University administration. Anonymity of the participants and confidentiality of the collected data were assured.

### Results

A total of 260 students agreed to participate and filled the questionnaire. The majority of participating students were single (96.9%). Most of them were non-smokers (95.4%), and 27.3% were regular coffee drinkers. More than half of the participants (63.8%) indicated that they sleep on average 7-9 h per day (mean = 7.18, SD = 1.3) (Table 1).

**Table 1.** Characteristics of the Study Participants.

| Variable                     | Frequency (%) |
|------------------------------|---------------|
| <i>Academic program</i>      |               |
| Medicine                     | 62 (23.8%)    |
| Pharmacy                     | 158 (60.8%)   |
| Nursing and midwifery        | 40 (15.4%)    |
| <i>Academic year</i>         |               |
| 1 - 3                        | 136 (52.3%)   |
| 4 - 6                        | 124 (47.7%)   |
| <i>Marital status</i>        |               |
| Single                       | 252 (96.9%)   |
| Married                      | 8 (3.1%)      |
| <i>Body mass index</i>       |               |
| < 18.50 (underweight)        | 30 (11.5%)    |
| 18.- 24.9 (normal range)     | 200 (76.9%)   |
| 25 - 29.9 (overweight)       | 27 (10.4%)    |
| ≥ 30 (obese)                 | 03 (1.2%)     |
| <i>Smoking status</i>        |               |
| Yes                          | 12 (4.6%)     |
| No                           | 248 (95.4%)   |
| <i>Regular coffee intake</i> |               |
| Yes                          | 71 (27.3%)    |
| No                           | 189 (72.7%)   |
| <i>Physically activities</i> |               |
| Yes                          | 72 (27.7%)    |
| No                           | 188 (72.3%)   |

Most of the participants (81.2%) had a regular menstrual cy-

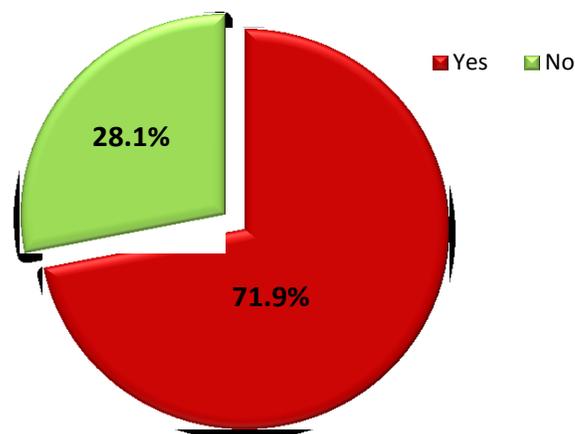
cle, and the majority of them (88.8%) had menstrual cycle duration of 20 to 31 days. About 65.4% reported that their menstruation last <6 days and 83.5% of them had menstrual cycle of moderate intensity. Of the total sample, only 2 (0.2%) had been pregnant at least one time, and only 3 participants (1.2%) used oral contraceptives pills. Approximately 43% of the participants had a sick leave or absent from lecture or clinical training because of premenstrual symptoms (Table 2).

**Table 2.** Gynecological Characteristics of the Study Participants.

| Variable                                | Frequency (%) |
|---|---------------|
| <i>Age of menarche</i>                  |               |
| ≤11 years                               | 20 (7.7%)     |
| 12 – 13 years                           | 147 (56.5%)   |
| ≥14 years                               | 93 (35.8%)    |
| <i>Menstrual cycle</i>                  |               |
| Regular                                 | 211 (81.2%)   |
| Irregular                               | 49 (18.8%)    |
| <i>Frequency of the menstrual cycle</i> |               |
| Less than 20 days                       | 10 (3.8%)     |
| 20 – 31 days                            | 231 (88.8%)   |
| More than 31 days                       | 19 (7.3%)     |
| <i>Duration of the menstrual cycle</i>  |               |
| < 6 days                                | 170 (65.4%)   |
| ≥ 6 days                                | 90 (34.6%)    |
| <i>Intensity of the menstrual cycle</i> |               |
| Light                                   | 24 (9.2%)     |
| Moderate                                | 217 (83.5%)   |
| Heavy                                   | 19 (7.3%)     |
| <i>Absence from classes</i>             |               |
| Usually or Always                       | 27 (10.4%)    |
| Sometimes                               | 84 (32.3%)    |
| Never                                   | 149 (57.3%)   |

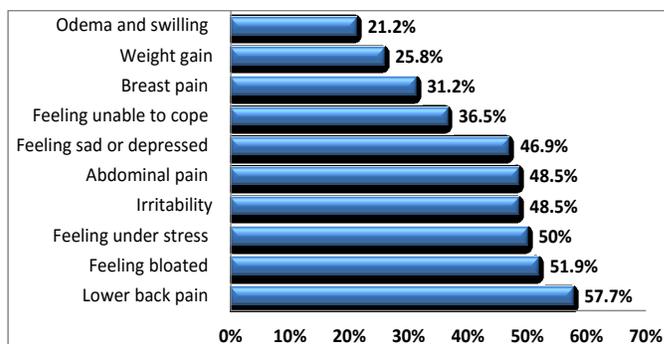
### Prevalence of PMS

The prevalence of PMS among the studied group was 71.9%, (Figure 1).



**Figure 1.** The prevalence of PMS among participants.

Severity of premenstrual symptoms was measured by SPAF, where 51% of the students showed moderate to severe symptoms. The most frequently reported complaints were lower back pain (57.7%), followed by feeling bloated (51.9%) and feeling under stress (50%) (Figure 2).



**Figure 2.** Frequency of Premenstrual Symptoms among Study Participants.

Univariate analysis showed that severe PMS is significantly associated with academic class, regular coffee intake, duration of menstrual cycle and absence from classes (Table 3).

### Predictors of Severe Premenstrual Symptoms

Logistic regression analysis was applied to all variables with p-value <0.1 in univariate analysis. Predictors of severity of premenstrual symptoms were academic class, regular coffee intake, duration of menstrual period, Perception of health in general and Absence from lectures and rotations due to premenstrual symptoms (Table 4).

**Table 3.** Background and Clinical Characteristics in relation to Severity of Premenstrual Symptoms.

| Variables                       | Mild                 | Mod - Severe         | p- value          |
|---------------------------------|----------------------|----------------------|-------------------|
| Collage program                 |                      |                      |                   |
| Medicine                        | 34 (54.8%)           | 28 (45.2%)           | 0.06 <sup>®</sup> |
| Pharmacy                        | 74 (46.8%)           | 84 (53.2%)           |                   |
| Nursing and midwifery           | 27 (67.5%)           | 13 (32.5%)           |                   |
| Academic class                  |                      |                      |                   |
| 1 - 3                           | 80 (58.8%)           | 56 (41.2%)           | 0.03 <sup>®</sup> |
| 4 - 6                           | 55 (44.4%)           | 69 (55.6%)           |                   |
| Smoking status                  |                      |                      |                   |
| No                              | 130 (52.4%)          | 118 (47.6%)          | 0.47 <sup>®</sup> |
| Yes                             | 5 (41.7%)            | 7 (58.3%)            |                   |
| Regular coffee intake           |                      |                      |                   |
| No                              | 107 (56.6%)          | 82 (43.4%)           | 0.01 <sup>®</sup> |
| Yes                             | 28 (39.4%)           | 43 (60.6%)           |                   |
| Physical activity               |                      |                      |                   |
| No                              | 91 (48.4%)           | 97 (51.6%)           | 0.07 <sup>®</sup> |
| Yes                             | 44 (61.1%)           | 28 (38.9%)           |                   |
| BMI (Mean ±SD)                  | 21.61 (21.1 - 22.12) | 21.83(21.38 - 22.28) | 0.54*             |
| Daily sleeping hours (Mean ±SD) | 7.31 (7.1 - 7.52)    | 7.05 (6.81 - 7.29)   | 0.1*              |
| Age of menarche                 |                      |                      |                   |
| ≤11 years                       | 11 (55%)             | 9 (45%)              | 0.18 <sup>®</sup> |
| 12 - 13 years                   | 69 (46.9%)           | 78 (53.1%)           |                   |
| ≥14 years                       | 55 (59.1%)           | 38 (40.9%)           |                   |
| Regularity of menstrual cycle   |                      |                      |                   |
| Irregular                       | 22 (45.8%)           | 26 (54.2%)           | 0.35 <sup>®</sup> |
| Regular                         | 113 (53.3%)          | 99 (46.7%)           |                   |
| Frequency of menstrual cycle    |                      |                      |                   |
| Less than 22 days               | 4 (40%)              | 6 (60%)              | 0.27 <sup>®</sup> |
| From 20 - 31 days               | 124 (53.7%)          | 107 (46.3%)          |                   |
| More than 31 days               | 7 (36.8%)            | 12 (63.2%)           |                   |
| Duration of menstrual cycle     |                      |                      |                   |
| Less than 6 days                | 98 (57.6%)           | 72 (42.4%)           | 0.01 <sup>®</sup> |
| 6 days and more                 | 37 (41.1%)           | 53 (58.9%)           |                   |
| Intensity of menstrual cycle    |                      |                      |                   |
| Light                           | 15 (62.5%)           | 9 (37.5%)            | 0.40 <sup>®</sup> |
| Moderate                        | 112 (51.6%)          | 105 (48.4%)          |                   |
| Heavy                           | 8 (42.1%)            | 11 (57.9%)           |                   |
| Perception of health in general |                      |                      |                   |
| Excellent                       | 48 (57.8%)           | 35 (42.2%)           | 0.08 <sup>®</sup> |
| Very good                       | 76 (52.4%)           | 69 (47.6%)           |                   |
| Good                            | 11 (34.4%)           | 21 (65.6%)           |                   |
| Absence from classes            |                      |                      |                   |
| Never                           | 92 (61.7%)           | 57 (38.3%)           | 0.01 <sup>®</sup> |
| Some times                      | 30 (35.7%)           | 54 (64.3%)           |                   |
| Usually or Always               | 13 (48.1%)           | 14 (51.9%)           |                   |

<sup>®</sup>Chi-squared test \* independent T-test

**Table 4.** Multivariable Analysis of Characteristics Associated with the Severity of Premenstrual symptoms.

| Variables  | Odd ratio | CI #       | p- value |
|--|-----------|------------|----------|
| <i>Collage program</i><br>Medicine *                     |           |            |          |
| Pharm. D and pharmacy                                    | 1.361     | 0.71 - 2.6 | 0.36     |
| Nursing and midwifery                                    | .511      | 0.2 - 1.3  | 0.17     |
| <i>Academic class</i><br>1 - 3 *                         |           |            |          |
| 4 - 6  | 2.047     | 1.2 - 3.6  | 0.01     |
| <i>Income level</i><br>Excellent *                       |           |            |          |
| Very good  | 1.48      | 0.63 - 3.5 | 0.38     |
| Good or Acceptable                                       | 0.99      | 0.4 - 2.5  | 0.90     |
| <i>Regular coffee intake</i><br>No *                     |           |            |          |
| Yes  | 2.11      | 1.14 - 3.9 | 0.02     |
| <i>Physically active</i><br>No                           |           |            |          |
| Yes*   | 1.44      | 0.76 - 2.7 | 0.26     |
| <i>Duration of menstrual cycle</i><br>Less than 6 days * |           |            |          |
| 6 days and more  | 2.10      | 1.17 - 3.8 | 0.01     |
| <i>Perception of health in general</i><br>Excellent*     |           |            |          |
| Very good  | 1.390     | 0.74-2.6   | .311     |
| Good   | 4.517     | 1.6-12.6   | .004     |
| <i>Absence from classes</i><br>Never*                    |           |            |          |
| Some times   | 2.88      | 1.6-5.3    | 0.01     |
| Usually or Always  | 2.05      | .81-5.2    | 0.13     |

\*Reference group

#Confidence interval

## Discussion

This is, to our knowledge, the first study to assess PMS and related factors in Palestine. The prevalence of PMS was 71.9%, congruent with the result of most studies in the region that ranged from 67% to 80.2%. For example, Anandha S. et al. and Sharma et al. found that the prevalence of PMS was 67% [9,18]. On the other hand, PMS prevalence was 69.2%, 72.1%, 78.5% and 80.2% in Jordan, Saudi Arabia and Turkey respectively [10,11,13]. The medical science students are all the time in academic stress, which may explain this high prevalence of PMS.

The severity and frequency of premenstrual symptoms were different from one study to another. The most frequently reported premenstrual symptoms in our study were mixture

of physical and psychological complaints such as: lower back pain (57.7%), feeling bloated (51.9%), feeling under stress (50%), irritability (48.5%), abdominal pain (48.5%) and feeling sad or depressed (46.9%). This may be explained by the complex nature of PMS that involve both physical and psychological aspects [1,2]. Our findings were close to that found in Jordan like 61.4% for back pain, 52.4% for abdominal pain, 49.2% for irritability and 46.9% for feeling overwhelmed [10]. These results may be due to common socio-cultural contexts between Jordanian and Palestinian communities.

Severity of premenstrual symptoms in the current study increase with academic class of the participants and clinical year students have more severe symptoms than basic year

ones. This may be due to the fact that senior students are in more academic stress and are involved in clinical rotations in different hospitals and clinics which require more physical and mental effort. This finding agreed with the Kuwaiti's study which found that severity of premenstrual syndrome was positively correlated with students level of training [12].

Coffee consumption was considered a behavioral risk factor for premenstrual syndrome, and this may be explained by the fact that caffeine is a stimulant and increase stress, emotional liability and irritability [6]. In our study it was found that severity of premenstrual symptoms was significantly associated with more coffee consumption. Additionally, Pinar et al. [13] showed that the frequency of PMS is higher in those who consume more coffee.

In our study, we found that severity of premenstrual symptoms was higher in students with longer duration of menstrual cycle. A similar result reported by Deuster et al [6], and Hamaideh et al [10]. Longer duration of the period exposes girls for painful and tiring experience for a longer time, and this may be reflected as a learned behavior of fear, anxiety and somatic symptoms before next periods, as the girl is expecting a bad experience to come soon.

We found significant association between the severity of premenstrual symptoms and student's absence from lectures and clinical rotations. This finding was matching with the results of many studies conducted in different population; like the Jordanian nursing students [10], the Kuwaiti's students [12], and the Indian medical college students<sup>(9)</sup>. This association is expected as PMS causes both physical and emotional stress to the student and decreases their concentration, so they tend to miss their classes at this period.

Some limitations of this study warrant consideration. Firstly, this study was specific to students at the faculty of Medicine and Health Sciences at ANNU which may limit its generalizability. Secondly, using a self administered questionnaire to study such sensitive topic makes it liable to information bias as some students might not want to disclose their personal problems, although we tried our best to ensure the privacy of the participants. In addition, using a prospective study design to be able to log of symptoms by the participants could be the ideal methods; however, this was impossible as a matter of budget constraint, because this study was conducted without financial support from any source.

### Conclusion and Recommendations

Premenstrual syndrome is common among female medical and health science students with prevalence of 71.9%. The most frequently reported complaints were lower back pain, followed by feeling bloated and feeling under stress. Severe PMS have negative effect in students academic and social performance

and attendance which may lead to poor quality of life. Higher academic class, regular coffee intake, longer duration of menstrual period found to predict the occurrence of severe PMS.

Results from this study suggest that health and educational officials at the university should pay attention to the problem and provide appropriate, physical and emotional support as well as giving more attention to psychological methods as counseling or behavioral therapy for students with PMS. We highly recommend increasing the awareness of PMS symptoms and coping strategies among university students and staff and to make attendance policy more flexible to adapt this high prevalent problem among female students.

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