

# Prevalence and Determinant of Premenstrual Dysphoric Disorder among Secondary School Female Students, Makkah Al-Mokarramah, Saudi Arabia

Sara Saleh Aljebali<sup>1,\*</sup>, Layla Alofi<sup>2</sup>

<sup>1</sup>Family Medicine Joint Program, Makkah, Kingdom of Saudi Arabia

<sup>2</sup>Family Medicine consultant at Alkakiyyah primary healthcare center, Ministry of Health, Makkah, Kingdom of Saudi Arabia

\*Corresponding author: [dr-sara-sj@hotmail.com](mailto:dr-sara-sj@hotmail.com)

Received October 05, 2020; Revised November 06, 2020; Accepted November 12, 2020

**Abstract Background:** Premenstrual dysphoric disorder (PMDD) is characterized by psychological and physiological function impairment and can pose threat on adolescents' academic performance and well-being. **Objectives:** This study aimed to determine the prevalence and determinants of PMDD among secondary school female students at Al-Iskan sector, Makkah Al-Mukarramah. **Methods:** A cross-sectional study involving 246 secondary school female students in Makkah Al-Mukarramah. A self-administered questionnaire was used for data collection. Variables such as demographic characteristics and PMDD were determined. **Results:** A total of 246 respondents participated in the study. Their age ranged from 16 to 21 years with an average of 17.0±0.9, Saudi national (82.1%), single (98.8%), and have no children (99.6%). In terms of educational attainment, about 37.4% of the respondents are in primary level, followed by 35.4% in the tertiary level, and 27.2% in the secondary level. In terms of individual symptoms experienced by the respondents before menstrual cycle, more than 4 in every 5 participants have suffered from mood swings or nervousness (82.5%) and from lethargy (80.1%). In addition, more than half of females interviewed have suffered too much or too little sleep (74.8%), a change in appetite increase or decrease (69.9%), muscle and joint pain (67.1%), difficulty in concentration and lack of effectiveness and productivity at work (65.0%), low indifference to the usual activities (58.9%), depression (58.5%), headaches (54.5%), from a sense of bloating in the abdomen (52.4%), and aggression (51.2%). Based on the findings of this study, about 40.7% of the participants were found to experienced irregular menstrual cycles. Age was found to be statistically significant associated with regularity of menstrual cycles. In terms of educational level, chi-square test revealed significant statistical association between educational level and premenstrual dysphoric disorder symptoms, such as lethargy, too much or too little sleep, and breast pain or swelling. Lastly, significant association was found between menstrual cycle and change in appetite. **Conclusions:** PMDD is characterized by substantial weakening of the ability to function socially or occupationally for a week prior to menstruation. It can be expressed through a combination of emotional, physical, and lifestyle symptoms. As such, management and treatment of PMDD must be made in accordance to the severity, types of symptoms, patient's age, and preferences.

**Keywords:** premenstrual dysphoric disorder, prevalence, determinants, students, Saudi Arabia

**Cite This Article:** Sara Saleh Aljebali, and Layla Alofi, "Prevalence and Determinant of Premenstrual Dysphoric Disorder among Secondary School Female Students, Makkah Al-Mokarramah, Saudi Arabia." *American Journal of Medical Sciences and Medicine*, vol. 8, no. 6 (2020): 208-216. doi: 10.12691/ajmsm-8-6-2.

## 1. Introduction

Premenstrual dysphoric disorder (PMDD) is the severe form of premenstrual syndrome (PMS) wherein about 3-8% of women in reproductive age have been diagnosed. It begins on puberty stage and can last until menopausal stage. PMDD symptoms are commonly experienced on the luteal phase of the menstrual cycle and can continue until the third day of menstruation. It is characterized by variations in psychological symptoms, ranging from mood swings to feelings of irritability and anxiety, to physical

pain in breasts, abdomen, and muscles [1]. A recent study on the prevalence of PMS among 270 Indian medical students was conducted by Akbari and others [2], a self-evaluation questionnaire was prepared which covered inquiries on sociodemographic factors and PMS-related questions. This study found out that 3 in every 10 participants have experience PMS, with most of those respondents having a mild form of PMS.

The presence of PMS was found to be significantly associated with body mass index (BMI), age of menarche, and residence. PMS and PMDD and its relationship with scholastic performance was examined in 858 university students in Jordan using a prospective-correlation design.

In this study, day-to-day record of signs of PMDD and PMS were gathered, together with the student's account on their involvement and motivation. The study found that about 92.3% experienced PMS whereas the remaining 7.7% suffered from PMDD. Symptoms of PMDD was found to have detrimental effect on overall scholastic performance and self-determination of the students involved in this study [3].

Another Indian research on the incidence of PMS and PMDD was conducted among college students using a premenstrual symptom screening tool (PSST) with Structured Clinical Interview for DSM-IV-TR defined PMDD (SCID-PMDD). Out of the 489 respondents interviewed, the prevalence of PMS was evident in 18.4% of the students. About 14.7% of the participants had moderate to severe PMS whereas 3.7% of females exhibited PMDD in accordance to DSM-IVTR. Prevalent symptoms of PMS and PMDD include anger or irritability, decrease interest in work, diminished school/work efficiency and productivity, and lack of energy [4].

PMDD is experienced by women, regardless of race, civil status, and religion, from adolescence until menopausal stage. Although several PMDD-related studies have sparked interest of medical practitioners around the world, there is limited researches that cater the prevalence of PMS and its impact on adolescents. In addition, no study have been focused on addressing PMDD on female adolescents in Makkah Al-Mukarramah, therefore, this study was carried out to determine the prevalence of premenstrual dysphoric disorder among secondary school Female students at Al-Iskan sector, Makkah Al-Mokarramah as well as to determine the most common symptoms associated with premenstrual dysphoric disorder and identify PMDD determinants among them.

## 2. Methods

### 2.1. Place of Study

This study was conducted in Makkah Al-Mukarramah, which is in the western region of Saudi Arabia. Secondary schools in Makkah Al-Mukarramah are divided into: private and public schools.

### 2.2. Study Design

Cross-sectional analytic study.

### 2.3. Study Population

This study was carried out on secondary school female students at Al-Iskan sector (including two schools; 49 secondary school and third complex Quran memorization) in Makkah Al-Mukarramah in 2018. All those students who were present during the study period constituted the target population.

### 2.4. Inclusion Criteria

- All menstruating female students in secondary school at Al-Iskan sector in Makkah Al-Mukarramah.
- Both Saudi and Non-Saudi students.

### 2.5. Exclusion Criteria

- Pregnant female students.
- Female students with history of psychiatric illnesses such as depression.
- Female students who are using hormonal contraceptive pills.
- Female students with irregular menstrual cycle.

### 2.6. Sampling

#### 2.6.1. Sample Size

The total population comprised of 784 female students, with a 36.6% prevalence of the study problem of the premenstrual dysphoric disorder [5]. At a confidence level of 95% and tolerable error of 5%, the calculated sample size according to the sample size calculator RAOSOFT was determined to be 246 female students. The sample was equally distributed on involved schools (123 students from each school).

#### 2.6.2. Sampling Technique

The researcher followed a simple random sampling technique to choose the study participants from the list of secondary school female students at Al-Iskan sector (49 secondary school and third complex Quran memorization), with each female student given a code number.

### 2.7. Data Collection

#### 2.7.1. Data Collection Tool

The researcher used a self-constructed questionnaire which was validated by two consultants. The study questionnaire was designed in the Arabic language. It consists of three sections: (1) socio-demographic data information about participants, such as age, marital status, nationality, grade; (2) questions about obstetrical history, including regularity of menstrual cycles, (3) history of depression; and (4) questions about PMDD according to DSMV criteria (mood swings, irritability, being depressed, being anxious, decreased interest in usual activity, subjective sense of difficulty in concentrating, lack of energy, thought of harming herself, unhappy that she has been overeating or having specific food craving, breast tenderness or swelling, joint or muscle pain, difficult sleeping).

#### 2.7.2. Data Collection Technique

The researcher made schedule in order to visit the two secondary school female students at Al-Iskan sector in different days. She went to the school director then asked about the free time for distributing the questionnaire papers to the student. After that, the researcher went to each class, introduced herself to students, then distributed the questionnaire during free time as well as explained the purpose of this research. The researcher took permission to sit in the waiting room and the students were given ten minutes to answer the questionnaire. After that, the researcher went back to each class, collected the answered questionnaire, and thanked all the participants for their participation. The researcher used the same method to the third complex Quran memorization secondary school.

## 2.8. Study Variables

### 2.8.1. Dependent Variables

The dependent variables include the presence of PMDD and its common symptoms among secondary school female students at Al-Iskan sector in Makkah Al-Mukarramah.

### 2.8.2. Independent Variables

The independent variables include the sociodemographic factors such as age, nationality, marital status, and grade as well as presence of chronic health problems such as diabetes, and hypertension among secondary school female students at Al-Iskan sector in Makkah Al-Mukarramah.

## 3.9. Data entry and Analysis

- The data was verified by hand, then coded and entered into the researcher's personal computer.
- Statistical product and services solutions program SPSS version 24 was used for data entry, cleaning and analysis.
- P-values < 0.05 was considered as "statistically significant"

## 3.10. Pilot Study/Pretesting

A pilot study was conducted on 10% of the sample size (25 secondary school female students) to test if the study questionnaire was understandable, acceptable, and determine the time consumed for data filling.

## 3.11. Ethical Considerations

- Research committee approval was obtained.
- All necessary official approvals were fulfilled from the Joint Program of Family Medicine and Community Medicine in Makkah Al-Mukarramah.
- An approval from Ministry of Education and directors of Secondary school female students was obtained
- An individual written consent to participate in the study was obtained prior to data collection from the parents of secondary school female students.
- All data was kept confidential and was not used except for the purpose of the scientific research.
- By the end of data collection, the researcher acknowledged the supervisor, facilitator and participants in this study.

## 3.12. Budget

The research was self- funded.

## 3. Results

Out of the 246 prospective respondents, all of them responded in the survey, thereby giving a 100% response rate. Likewise, all the items in the questionnaire were completely answered.

## 3.1. Characteristics of the Respondents

### 3.1.1. Demographic Characteristics

Demographic characteristics of the sample population (N=246) are shown in Table 1. The age of the participants ranged from 16 to 21 years old with an average of  $17.00 \pm 0.90$ . Among the 246 female participants, majority were Saudi national (82.1%), single (98.8%), and have no children (99.6%). In terms of educational attainment, about 37.4% of the respondents are in first grade, followed by 35.4% in the third grade, and 27.2% in the second grade.

**Table 1. Sociodemographic characteristics of female participants**

Demographics	N	Min	Max	Mean	SD
Age	246	16	21	17.00	.9
		Count		%	
Total		246		100.0	
Nationality	Saudi	202		82.1	
	Non-Saudi	44		17.9	
School grade	First	92		37.4	
	Second	67		27.2	
	Third	87		35.4	
Marital status	Single	243		98.8	
	Married	2		.8	
	Divorced	1		.4	
Children	"1-2 kids"	1		.4	
	None	245		99.6	

### 3.1.2. Health and Menstrual Characteristics

**Table 2. Health and menstrual characteristics of the participants**

Variables	Count	%		
Total	246	100		
Do you currently use birth control pills?	Yes	0	0.0	
	No	246	100	
Have you ever been diagnosed with one of the following diseases:	Hypertension	Yes	20	8.1
		No	226	91.9
	Diabetes	Yes	25	10.2
		No	221	89.8
Do the previous symptoms occur before the menstrual cycle?	one to two weeks	214	87.0	
	three to four weeks	32	13.0	
	Yes	131	53.3	
Do the previous symptoms disappear after the descent of the menstrual cycle?	No	115	46.7	
	Yes	131	53.3	
Do the above symptoms affect academic achievement or your relationship with others or your work?	No	115	46.7	
	"2 to 3 every month"	186	75.6	
How many monthly cycles have you noticed the appearance of the above symptom?	None	60	24.4	

As shown in Table 2, all of the participants do not use birth control pills. In terms of health characteristics, a great majority of the respondents have never been diagnosed with hypertension (91.9%), and diabetes (89.8%). With regards to symptoms of premenstrual dysphoric disorder, 87.0% of the female participants have experienced previous symptoms one to two weeks prior to menstrual cycle, more than half (53.3%) have mentioned that previous symptoms have disappeared after descent of

menstrual cycle, and about 3 in every 4 females have noticed the appearance of those symptoms for 2-3 times every month. More than half (53.3%) of the participants have responded that these symptoms have affected their academic performance and their relationship with other people.

In terms of individual symptoms experienced by the respondents before menstrual cycle, more than 4 in every 5 participants have suffered mood swings or nervousness (82.5) and lethargy (80.1%). In addition, more than half of females interviewed have suffered too much or too little sleep (74.8%), a change in appetite increase or decrease (69.9%), muscle and joint pain (67.1%), difficulty in concentration and lack of effectiveness and productivity at work (65.0%), low level of usual activities (58.9%), depression (58.5%), from headaches (54.5%), a sense of bloating in the abdomen (52.4%), and aggression (51.2%) while, breast pain or swelling was reported by 45.9% of the respondents and weight gain was mentioned by 28.0% of them.

**Table 3. PMDD symptoms experienced by the participants**

Variables	Count	%
Total	246	100
Do you suffer from lethargy or fatigue before menstruation?	197	80.1
Do you suffer from a change in appetite increase or decrease before menstruation?	172	69.9
Do you suffer from too much or too little sleep before menstruation?	184	74.8
Do you suffer from pain in the breasts or swelling before the menstrual period?	113	45.9
Do you suffer from pain in muscles and joints before menstruation?	165	67.1
Do you suffer from weight gain before menstruation?	69	28.0
Do you suffer from a sense of bloating in the abdomen before the menstrual period?	129	52.4
Do you suffer from headaches before the menstrual period	134	54.5
Do you suffer from difficulty in concentration and lack of effectiveness and productivity at work before menstruation?	160	65.0
Do you suffer from mood swings or nervousness before menstruation?	203	82.5
Do you suffer from aggression before the menstrual period?	126	51.2
Do you suffer from depression before menstruation?	144	58.5
Do you suffer from low indifference to the usual activities before menstruation?	145	58.9

### 3.2. Prevalence of Premenstrual Dysphoric Disorder

#### 3.2.1. Premenstrual Dysphoric Disorder Characteristics based on Age

In this study, correlation test revealed that there is no relationship between age and premenstrual dysphoric disorder symptoms, such as lethargy, change in appetite, too much or too little sleep, breast pain, muscle and joint pain, weight gain, bloating in abdomen, headache, difficulty in concentration and lack of effectiveness and productivity at work, mood swings or nervousness, aggression, depression and low indifference to the usual activities.

**Table 4. Relationship between PMDD and age characteristics**

Variables	Total	Age	p-value
Do you suffer from lethargy or fatigue before menstruation?	Yes	197	16.99 ± 0.9
	No	49	17.02 ± 0.8
Do you suffer from a change in appetite increase or decrease before menstruation?	Yes	172	17.02 ± 1.0
	No	74	16.93 ± 0.8
Do you suffer from too much or too little sleep before menstruation?	Yes	184	16.95 ± 1.0
	No	62	17.15 ± 0.8
Do you suffer from pain in the breasts or swelling before the menstrual period?	Yes	113	17.08 ± 1.0
	No	133	16.92 ± 0.8
Do you suffer from pain in muscles and joints before menstruation?	Yes	165	16.96 ± 0.9
	No	81	17.06 ± 0.8
Do you suffer from weight gain before menstruation?	Yes	69	17.09 ± 0.9
	No	177	16.96 ± 0.9
Do you suffer from a sense of bloating in the abdomen before the menstrual period?	Yes	129	16.95 ± 1.0
	No	117	17.05 ± 0.8
Do you suffer from headaches before the menstrual period	Yes	134	17.01 ± 1.0
	No	112	16.98 ± 0.8
Do you suffer from difficulty in concentration and lack of effectiveness and productivity at work before menstruation?	Yes	160	17.04 ± 1.0
	No	86	16.91 ± 0.8
Do you suffer from mood swings or nervousness before menstruation?	Yes	203	16.99 ± 0.9
	No	43	17.02 ± 0.8
Do you suffer from aggression before the menstrual period?	Yes	126	16.93 ± 0.9
	No	120	17.07 ± 0.9
Do you suffer from depression before menstruation?	Yes	144	17.01 ± 1.0
	No	102	16.97 ± 0.8
Do you suffer from low indifference to the usual activities before menstruation?	Yes	145	16.99 ± 1.0
	No	101	17.01 ± 0.8

#### 3.2.2. Premenstrual Dysphoric Disorder Characteristics based on Nationality

Likewise, correlation test revealed no relationship between nationality and premenstrual dysphoric disorder symptoms, such as lethargy, change in appetite, too much or too little sleep, breast pain, muscle and joint pain, weight gain, bloating in abdomen, headache, difficulty in concentration and lack of effectiveness and productivity at work, mood swings or nervousness, aggression, depression and low indifference to the usual activities. (Table 5)

#### 3.2.4. Premenstrual Dysphoric Disorder Characteristics based on School Level

In terms of school grade, chi-square test revealed significant statistical association between school grade and premenstrual dysphoric disorder symptoms, such as lethargy, too much or too little sleep, and breast pain or swelling. On the other hand, other premenstrual dysphoric disorder characteristics such as, change in appetite, muscle and joint pain, weight gain, bloating in abdomen, headache, difficulty in concentration and lack of

effectiveness and productivity at work, mood swings or nervousness, aggression, depression and low level of the usual activities have no significant relationship with school grade. (Table 6 and Figure 1 - Figure 3)

**Table 5. Relationship between PMDD and nationality**

Variables		Total	Nationality		p-value
			Saudi	Non-Saudi	
Do you suffer from lethargy or fatigue before menstruation?	Yes	197	159(78.7%)	38(86.4%)	0.250
	No	49	43(21.3%)	6(13.6%)	
Do you suffer from a change in appetite increase or decrease before menstruation?	Yes	172	137(67.8%)	35(79.5%)	0.124
	No	74	65(32.2%)	9(20.5%)	
Do you suffer from too much or too little sleep before menstruation?	Yes	184	148(73.3%)	36(81.8%)	0.236
	No	62	54(26.7%)	8(18.2%)	
Do you suffer from pain in the breasts or swelling before the menstrual period?	Yes	113	97(48.0%)	16(36.4%)	0.160
	No	133	105(52.0%)	28(63.6%)	
Do you suffer from pain in muscles and joints before menstruation?	Yes	165	138(68.3%)	27(61.4%)	0.374
	No	81	64(31.7%)	17(38.6%)	
Do you suffer from weight gain before menstruation?	Yes	69	57(28.2%)	12(27.3%)	0.899
	No	177	145(71.8%)	32(72.7%)	
Do you suffer from a sense of bloating in the abdomen before the menstrual period?	Yes	129	103(51.0%)	26(59.1%)	0.330
	No	117	99(49.0%)	18(40.9%)	
Do you suffer from headaches before the menstrual period	Yes	134	111(55.0%)	23(52.3%)	0.747
	No	112	91(45.0%)	21(47.7%)	
Do you suffer from difficulty in concentration and lack of effectiveness and productivity at work before menstruation?	Yes	160	127(62.9%)	33(75.0%)	0.126
	No	86	75(37.1%)	11(25.0%)	
Do you suffer from mood swings or nervousness before menstruation?	Yes	203	167(82.7%)	36(81.8%)	0.892
	No	43	35(17.3%)	8(18.2%)	
Do you suffer from aggression before the menstrual period?	Yes	126	98(48.5%)	28(63.6%)	0.069
	No	120	104(51.5%)	16(36.4%)	
Do you suffer from depression before menstruation?	Yes	144	116(57.4%)	28(63.6%)	0.449
	No	102	86(42.6%)	16(36.4%)	
Do you suffer from low indifference to the usual activities before menstruation?	Yes	145	117(57.9%)	28(63.6%)	0.485
	No	101	85(42.1%)	16(36.4%)	

**Table 6. Relationship between PMDD and school grade**

Variables		Total	School grade			p-value
			First	Second	Third	
Do you suffer from lethargy or fatigue before menstruation?	Yes	197	78(84.8%)	46(68.7%)	73(83.9%)	0.023 <sup>a</sup>
	No	49	14(15.2%)	21(31.3%)	14(16.1%)	
Do you suffer from a change in appetite increase or decrease before menstruation?	Yes	172	66(71.7%)	40(59.7%)	66(75.9%)	0.085
	No	74	26(28.3%)	27(40.3%)	21(24.1%)	
Do you suffer from too much or too little sleep before menstruation?	Yes	184	78(84.8%)	42(62.7%)	64(73.6%)	0.006 <sup>a</sup>
	No	62	14(15.2%)	25(37.3%)	23(26.4%)	
Do you suffer from pain in the breasts or swelling before the menstrual period?	Yes	113	43(46.7%)	21(31.3%)	49(56.3%)	0.008 <sup>a</sup>
	No	133	49(53.3%)	46(68.7%)	38(43.7%)	
Do you suffer from pain in muscles and joints before menstruation?	Yes	165	67(72.8%)	40(59.7%)	58(66.7%)	0.219
	No	81	25(27.2%)	27(40.3%)	29(33.3%)	
Do you suffer from weight gain before menstruation?	Yes	69	21(22.8%)	23(34.3%)	25(28.7%)	0.276
	No	177	71(77.2%)	44(65.7%)	62(71.3%)	
Do you suffer from a sense of bloating in the abdomen before the menstrual period?	Yes	129	55(59.8%)	31(46.3%)	43(49.4%)	0.189
	No	117	37(40.2%)	36(53.7%)	44(50.6%)	
Do you suffer from headaches before the menstrual period	Yes	134	54(58.7%)	30(44.8%)	50(57.5%)	0.172
	No	112	38(41.3%)	37(55.2%)	37(42.5%)	
Do you suffer from difficulty in concentration and lack of effectiveness and productivity at work before menstruation?	Yes	160	61(66.3%)	36(53.7%)	63(72.4%)	0.052
	No	86	31(33.7%)	31(46.3%)	24(27.6%)	
Do you suffer from mood swings or nervousness before menstruation?	Yes	203	80(87.0%)	49(73.1%)	74(85.1%)	0.057
	No	43	12(13.0%)	18(26.9%)	13(14.9%)	
Do you suffer from aggression before the menstrual period?	Yes	126	52(56.5%)	36(53.7%)	38(43.7%)	0.203
	No	120	40(43.5%)	31(46.3%)	49(56.3%)	
Do you suffer from depression before menstruation?	Yes	144	57(62.0%)	33(49.3%)	54(62.1%)	0.195
	No	102	35(38.0%)	34(50.7%)	33(37.9%)	
Do you suffer from low indifference to the usual activities before menstruation?	Yes	145	57(62.0%)	36(53.7%)	52(59.8%)	0.571
	No	101	35(38.0%)	31(46.3%)	35(40.2%)	

<sup>a</sup>-significant using Chi-Square Test @<0.05 level.

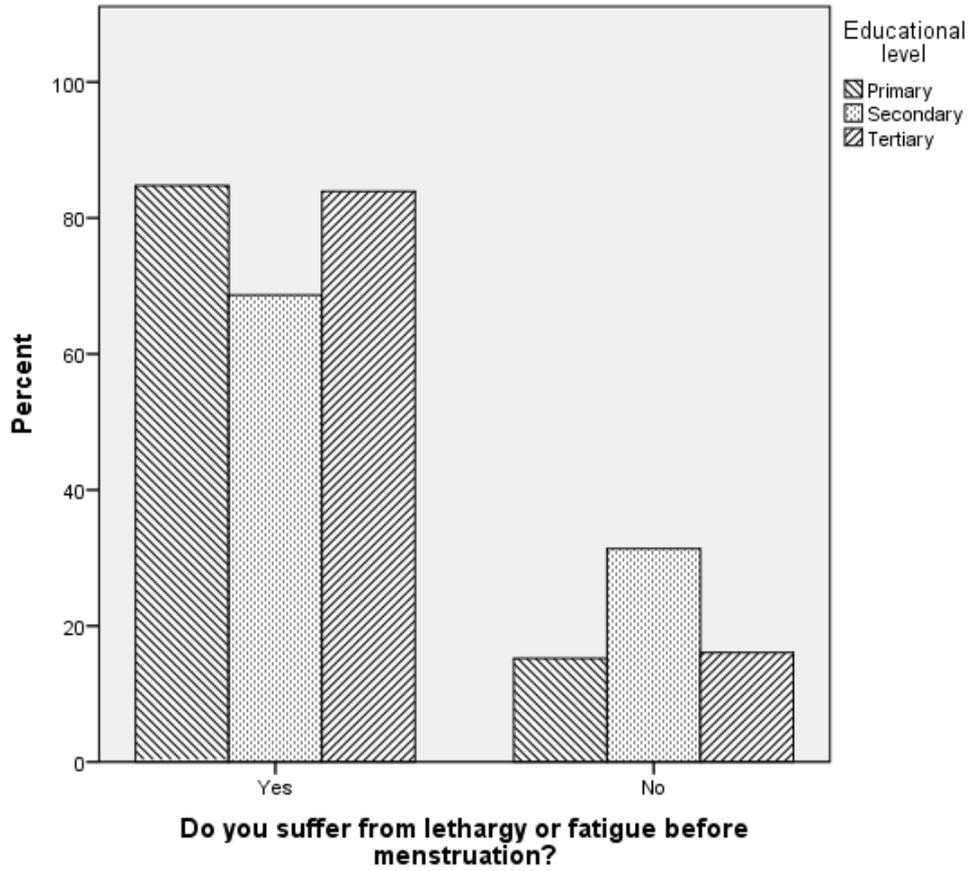


Figure 1. Relationship between lethargy and fatigue with school grade

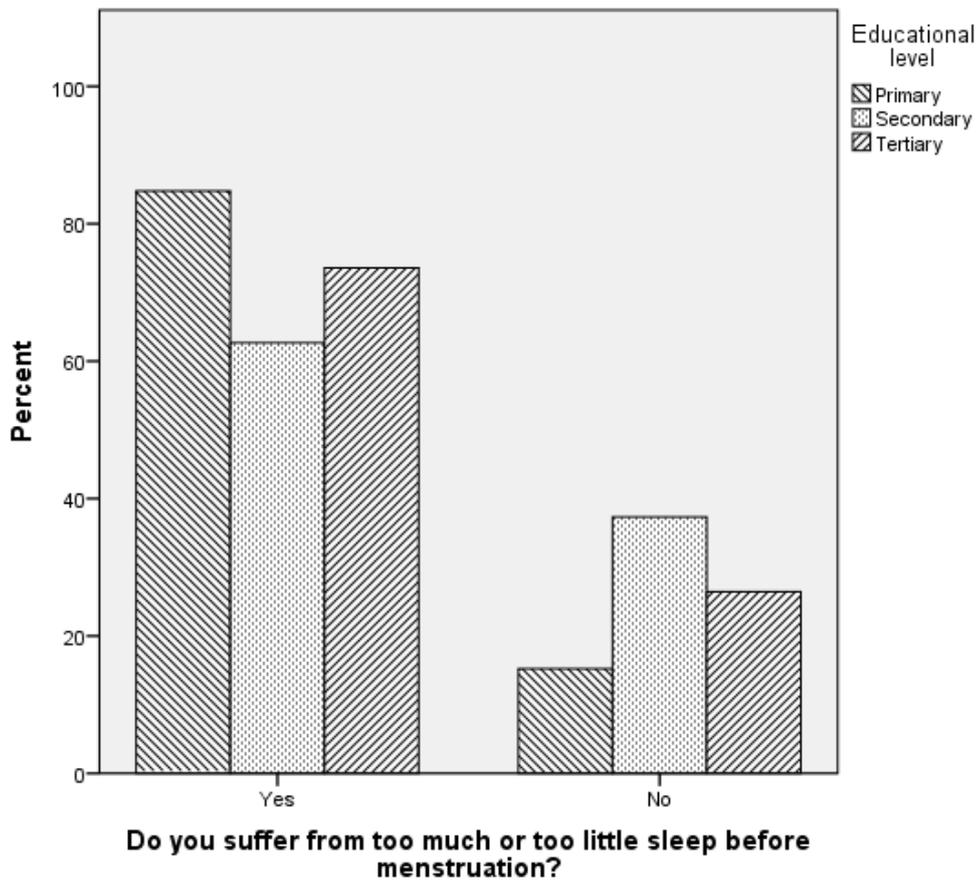


Figure 2. Relationship between amount of sleep with school grade

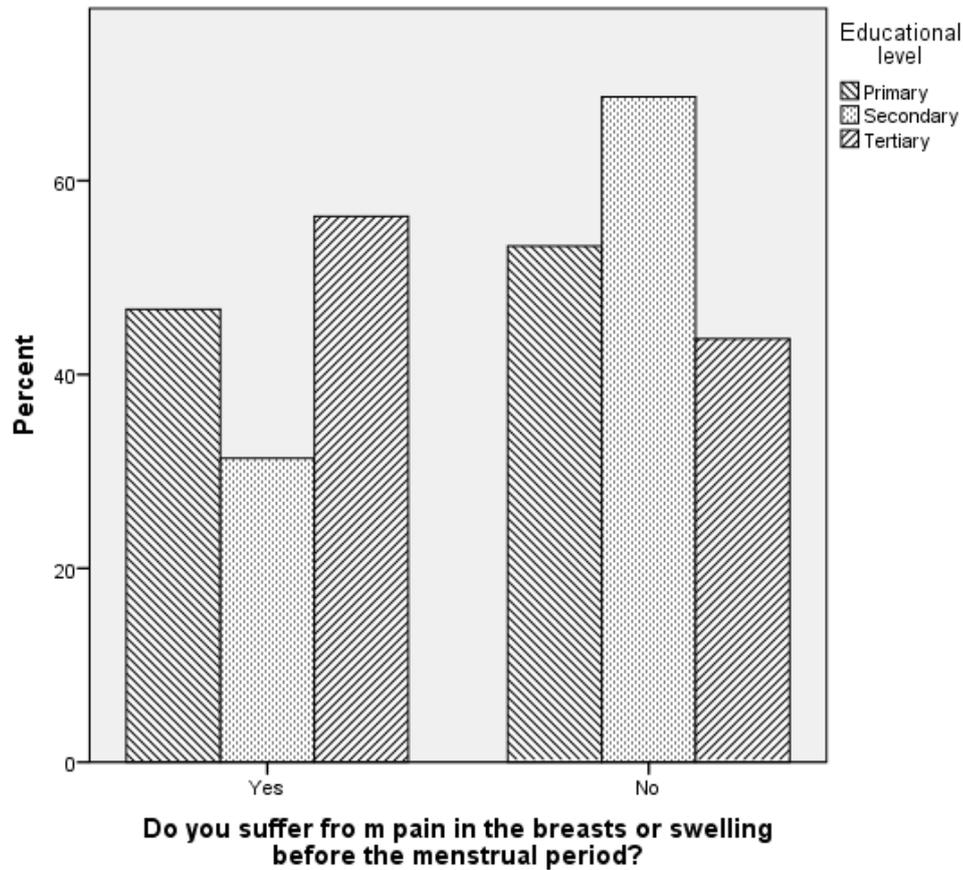


Figure 3. Relationship between breast pain and swelling with school grade

#### 4. Discussion

PMS is generally defined as any assemblage of psychological and physical symptoms that recur habitually in the luteal phase of the menstrual cycle and cause distress and diminished focus on performing daily activities [6]. Although PMDD is as a severe form of PMS, additional characteristics include significant decline in social and occupational functions for a week prior to menstruation [7]. It is exhibited through a combination of emotional, physical, and lifestyle symptoms [8]. Out of most women with PMS, less than 1 in every 10 females are diagnosed with PMDD [9].

This study was meant to evaluate the PMDD prevalence among secondary school female students in Makkah Al Mukharramah. A total of 246 students responded to the study and found that 40.7% are experiencing irregular menstrual cycles prior to data collection. Jember and others reported the prevalence of PMS in Ethiopian students at about 72.8% and irregular menstrual cycles was found to be one of its common factors. In addition, PMDD was found to be common in 1 in every 4 students and is highly correlated with irregular menstrual cycles [10]. This result coincided with the prevalence of depression in the general population. In a study conducted by Padhy and others [11]. Out of 118 participants, about 1 in every 10 respondents were diagnosed with PMDD and less than half of the sample were indicated to have suffered from major depression. The researchers also mentioned the presence of significant correlation between diagnosis of depression and severity of PMS symptoms and presence of PMDD.

More than half (53.3%) of the participants have responded that these symptoms have affected their academic performance and their relationship with other people. In a comparative study by Allihab i [5], the researcher found out that literature students suffer more from PMS in comparison with medical students and these consequently caused them to have low academic performance, have difficulty in performing routine chores, and have low tendency to self-care. Another study had mentioned that lower academic performance was found to be more common for those with PMS [12].

Moreover, the result in this study is slightly higher than the study conducted by Balaha and other [13] wherein almost 50% of the participants suffered from difficulty in concentration during class. Furthermore, about 92.3% of Jordanian university students experienced PMS whereas the remaining 7.7% suffered from PMDD. As such, PMDD-related symptoms were found to have detrimental effect on overall scholastic performance and self-determination of the students involved in this study [3]. Lastly, 3.7% of females who suffered from PMDD showed symptoms including anger or irritability, decrease interest in work, diminished school/work efficiency and productivity, and lack of energy [4].

This study revealed a significant correlation between menstrual cycle and age. Likewise, there is significant difference between menstrual cycle and change in appetite. Rosignol and Bonnlander [14] revealed that 70% of those with severe PMS score were highly likely to consume 6-8 cups of caffeine-containing soda, whereas 53% of them can consume 2-3 cups of caffeine-containing tea or coffee daily. Another study showed a significant association

between PMS and appetite as those with severe PMS had consumed more sweet-tasting foods [15]. A Turkish study on PMS had discovered that increased PMS scores were significantly associated with diet, particularly with eating carbohydrates and unhealthy foods [16]. On the other hand, a different study stated that almost half of the interviewed female have sought for treatment to combat PMS by consumption of hot beverages like tea and coffee [17].

Significant statistical difference was found between educational level and premenstrual dysphoric disorder symptoms, such as lethargy, too much or too little sleep, and breast pain or swelling. In a different study conducted on Indian college students, common symptoms of PMDD include anger or irritability, decrease interest in work, diminished school/work efficiency and productivity, and lack of energy [4]. Skrzypulec-Plinta and others [18] found out that the potential risk of PMDD was highly likely to decline among women with tertiary education in comparison to those with lower educational levels.

One hundred and thirty-five female nursing students in Nigeria were also interviewed and 42.2% had suffered from PMDD. Common physical and lifestyle-related characteristics of PMDD reported were struggles in concentration, minimal interest in school activities, breast tenderness and swelling, extreme sleepiness, and intrusion in regular activities.

On the other hand, Goweda and others [19] have found out that 67 out of 183 female medical students in Makkah Al-Mukarramah were found to have suffered from PMDD and prevalent symptoms include lethargy, high tendency towards fatigue, lack of energy as well as headache.

Furthermore, this study determined that environmental stressors and emotional distress were found to be risk factors that can be linked to PMDD among secondary school students in Makkah Al-Mukarramah. Upon determination of potential risk factors, a stepwise approach can be suggested to combat PMDD and its related symptoms using treatments deemed suitable for adolescent females.

## 5. Conclusion

Based on the findings of this study, the prevalence of PMDD among secondary school female students in Makkah Al-Mukarramah, Saudi Arabia was determined and 40.7% of the participants were found to experienced irregular menstrual cycles. Age was found to statistically significant with regularity of menstrual cycles. In terms of educational level, chi-square test revealed significant statistical difference between educational level and premenstrual dysphoric disorder symptoms, such as lethargy, too much or too little sleep, and breast pain or swelling. Lastly, significant difference was found between menstrual cycle and change in appetite.

## 6. Recommendations

Based on findings of the present study, it is highly recommended to increase awareness of PMDD. Availability of management interventions should be taught to minimize the effects and impact of PMDD.

Regular health check and help mechanism in health care facilities should also be known and readily available students, especially adolescents. Practice of activities that reduce PMDD should also be known and encouraged from time to time.

Since study was only conducted in secondary schools within Makkah, it might be as well conducted to other strategic locations for more holistic representation. Information like schedules or set-ups are also worth included in future studies like this.

A closer assessment of PMDD to adolescent females is also suggested to avoid serious consequences caused by PMDD and for immediate proper care and management.

## References

- [1] Hofmeister S, Bodden S. Premenstrual Syndrome and Premenstrual Dysphoric Disorder. *Am Fam Physician*. 2016 Aug 1; 94(3): 236-240.
- [2] Akbari RM, Sudharani M, Kallapuracka SJX, Ramya V, Nagendra Gowda MR, Suryakantha AH. Prevalence of premenstrual syndrome among medical students. *Nat J Community Med*. 2017; 8(6): 292-4.
- [3] Hussein Shehadeh J, Hamdan-Mansour AM. Prevalence and association of premenstrual syndrome and premenstrual dysphoric disorder with academic performance among female university students. *Perspectives in psychiatric care*. 2018; 54(2): 176-84.
- [4] Raval CM, Panchal BN, Tiwari DS, Vala AU, Bhatt RB. Prevalence of premenstrual syndrome and premenstrual dysphoric disorder among college students of Bhavnagar, Gujarat. *Indian journal of psychiatry*. 2016; 58(2): 164-70.
- [5] Allihabi A. Premenstrual syndrome - Prevalence, severity and effect on academic performance: A comparative study between students of medicine and literature. *Womens Health Gyn*. 2019; 6: 301-18.
- [6] Reid RL, Soares CN. remenstrual Dysphoric Disorder: Contemporary Diagnosis and Management. *J Obstet Gynaecol Can*. 2018 Feb; 40(2): 215-223.
- [7] Vigod SN, Ross LE, Steiner M. Understanding and treating premenstrual dysphoric disorder: an update for the women's health practitioner. *Obstetrics and gynecology clinics of North America*. 2009; 36(4): 907-24, xii.
- [8] Andrade C. Premenstrual dysphoric disorder: General overview, treatment strategies, and focus on sertraline for symptom-onset dosing. *Indian journal of psychiatry*. 2016; 58(3) 329-31.
- [9] Braverman PK. Premenstrual syndrome and premenstrual dysphoric disorder. *Journal of pediatric and adolescent gynecology*. 2007; 20(1): 3-12.
- [10] Jember D, Duko B, Mihretie G. Premenstrual dysphoric disorder among female students at Assosa Technical & Vocational Education Training School, Assosa, Ethiopia. *J Psychiatry*. 2017; 20(2).
- [11] Padhy SK, Sarkar S, Beherre PB, Rathi R, Panigrahi M, Patil PS. Relationship of premenstrual syndrome and premenstrual dysphoric disorder with major depression: relevance to clinical practice. *Indian journal of psychological medicine*. 2015; 37(2): 159-64.
- [12] Muhtaseb N, Al-Raddadi A, Albukhari I, Fadil E, Alghamdi N, Fahmie M, et al. Prevalence, severity and impacts of premenstrual syndrome among female medical students at Taibah University in Saudi Arabia. *Int J Acad Sci Res*. 2015; 3(4): 134-42.
- [13] Balaha MH, Amr MA, Saleh Al Moghannum M, Saab Al Muhaidab N. The phenomenology of premenstrual syndrome in female medical students: a cross sectional study. *The Pan African medical journal*. 2010; 5: 4.
- [14] Purdue-Smithe AC, Manson JE, Hankinson SE, Bertone-Johnson ER. A prospective study of caffeine and coffee intake and premenstrual syndrome. *Am J Clin Nutr*. 2016 Aug; 104(2): 499-507.
- [15] Rasheed P, Al-Sowielem LS. Prevalence and predictors of premenstrual syndrome among college-aged women in Saudi Arabia. *Annals of Saudi medicine*. 2003; 23(6): 381-7.

- [16] Oral E, Kirkan T, Yazici E, Cansever M, Aydin N. Premenstrual symptom severity, dysmenorrhea, and school performance in medical students. *J Mood Disord.* 2012; 2(4): 143-52.
- [17] Tolossa FW, Bekele ML. Prevalence, impacts and medical managements of premenstrual syndrome among female students: cross-sectional study in College of Health Sciences, Mekelle University, Mekelle, northern Ethiopia. *BMC women's health.* 2014; 14: 52.
- [18] Skrzypulec-Plinta V, Drosdzol A, Nowosielski K, Plinta R. The complexity of premenstrual dysphoric disorder--risk factors in the population of Polish women. *Reproductive biology and endocrinology: RB&E.* 2010; 8: 141.
- [19] Goweda RA, Alkot MM, Alturkistani FA, Alhajaji RJ, Aljebali SS, Baashr ZA. Prevalence of premenstrual dysphoric disorder among medical students of Umm Al-Qura University, Makkah Al-Mukarramah, Kingdom of Saudi Arabia. *Middle East J Fam Med.* 2016; 14(2): 14-20.



© The Author(s) 2020. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).