



Premenstrual Symptoms and Dysmenorrhea Associated with Daily Routine Activities among Female Undergraduate Medical Students

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Authors' contributions

This work was carried out in collaboration between all authors. Author HHKS designed the study, managed literature search, performed data analysis and wrote the initial draft of the manuscript. Authors NNT, HL, KLP and MNNH managed literature search, data collection and advised for initial draft of the manuscript. Author SM wrote final draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Menstrual cycle is the physiological changes that occur in female for the purpose of sexual reproduction. Premenstrual symptoms and dysmenorrhea are common problems related to menstruation among female which consequently effect their social and daily activities.

Objectives: To determine the prevalence of menstrual disturbances and factors which influence menstrual disturbances, and the effect of menstrual disturbances on the students' daily routine activities

Methods: This cross-sectional study was conducted in private medical college in Melaka, Malaysia from March to December 2015. A total of 292 female undergraduate students provided informed consent and participated in this study. Self-administered questionnaire was distributed and the students were asked to complete a questionnaire which consisted of demographic data, detailed menstrual history, BMI, fast food diet habit and exercise. Menstrual symptoms during menstruation

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at last menstrual period (LMP) including dysmenorrhea, premenstrual symptoms and treatment seeking behavior were asked. Dysmenorrhea was assessed using numeric pain scale of score 0 to 10 in which 0 means no pain and 10 means the worst pain. We also assessed the disturbance of their daily activities due to the menstrual symptoms and irritability using Born-Steiner Irritability Scale. Univariate logistic regression analysis was used. Odds ratio together with 95% confidence interval were calculated.

Results: A total of 292 female undergraduate students participated in this study and response rate was 83.43%. Among female students, 69.5% had dysmenorrhea during LMP with median pain intensity of 5 (IQR 4.0 – 7.0) and 84.9% had premenstrual symptoms. The daily routine activities were affected in 52.7% of participants. Among them, 77.3% needed prolonged rest, 42.9% could not study, 29.9% missed social activities and 22.1% missed some or whole day classes. Regarding self-rated irritability, 65.8% had mild irritability and 20.5% had moderate irritability in LMP. The female students who had dysmenorrhea were significantly more likely to be affected in their daily routines activities with odds ratio 2.68 (95% CI 1.60 – 4.49). Similarly, the female students who had premenstrual symptoms were significantly more likely to be affected in their daily routines activities with odds ratio 2.47 (95% CI 1.26 – 4.83).

Conclusion: The prevalence of dysmenorrhea and premenstrual symptoms were high among female medical students. It was found that school absence, inability to study, and missed social and daily activities were related to these symptoms.

Keywords: Premenstrual symptoms; dysmenorrhea; daily routine activities; female undergraduate; medical students.

1. INTRODUCTION

Menstrual cycle is the physiological changes that occur in female for the purposes of sexual reproduction. Even though menstruation is a physiological process in woman's life, many studies have shown that there are number of women who suffers from menses-associated health problems such as premenstrual syndrome (PMS), dysmenorrhea and irregular cycle which consequently affect their quality of life [1-5]. PMS is a recurrent luteal phase condition [6] which starts during the second half of the menstrual cycle (14 days or more after the first day of last menstrual period) and usually resolves 1-2 days after menstrual period starts [7]. PMS is characterized by physical changes such as fatigue, breast tenderness, peripheral edema, backache as well as psychological changes including irritability, anxiety, depression and mood swing [8-13]. Various factors are responsible for genesis of the syndrome, for example, due to increase in progesterone level after ovulation, changes in serotonergic and GABAergic activity [14], as well as life style factors such as habits of doing exercise [15], diet [16,17], BMI [18] and stress [19,20]. Dysmenorrhea, which is defined as a painful menstrual period usually begins when the bleeding starts and lasts for 48-32 hours. Increased activity of the hormone prostaglandin, which is produced in the uterus, is thought to play a role in this condition [21]. The prevalence of dysmenorrhea and premenstrual syndrome

varied largely among women as it was ranged from 1.7% to 97% and 12% to 98% respectively [22,23]. Among adolescent, previous studies of systematic review revealed that the prevalence of dysmenorrhea with some pain was approximately 18% to 88% and 3% to 20% reported severe pain [24]. In Malaysia, 69.4% of adolescent school girls suffered with dysmenorrhea [25]. Premenstrual syndrome and dysmenorrhea cause a significant disturbance during reproductive years in women. Even though the symptoms are not life threatening, the symptoms will interrupt their social activity and effect their quality of life especially during adolescent period [26]. Pain during menstruation usually can cause prolonged bed rest, inability to sleep, missed meal, missed social and sport activities [27,28]. Moreover dysmenorrhea can lead to college absenteeism [29,30], affect student's concentration in class [31] which is associated with poor academic performance [32]. Even though the research on dysmenorrhea has been done in Malaysia [25,33], the effect of menstrual disturbances on daily routine and academic activities among medical students has scarcely been reported. Hence, we conducted this study to determine the prevalence of menstrual disturbances such as premenstrual syndrome and dysmenorrhea, the factors which influence these symptoms, and the effect of menstrual disturbance on the students' daily routine activities among female undergraduate medical students.

2. MATERIALS AND METHODS

This cross-sectional study was conducted in private medical college in Melaka, Malaysia from March to December 2015. We calculated the sample size using the formula for estimating population proportion with 95% confidence level, precision 5% and 74.6% prevalence of PMS among adolescent girl in Malaysia [25]. The minimum number of 304 female undergraduate students was needed. We used purposive sampling method and approached 350 female undergraduate students. We included female students who were willing to participate and provided written informed consent. Female students who have psychiatric disorder, severe illnesses and gynaecological diseases such as fibroid, endometriosis, and pelvic inflammatory diseases were excluded. A total of 292 female undergraduate students participated in this study. We collected the data by giving briefing to the students. Self-administered questionnaire was distributed and the students were asked to complete a questionnaire that was divided into six parts. Part 1 consisted of demographic data of the students while part 2 consisted of detailed menstrual history. In part 3, height and weight of the students were asked to calculate the BMI with other risk factors such as habit of eating fast food at least once a week, exercise at least one day of 30-45 minutes duration per week and any chronic diseases. In part 4, their menstrual symptoms during menstruation including dysmenorrhea and premenstrual symptoms at last menstrual period (LMP) were asked. Dysmenorrhea was assessed using numeric pain scale. In this study, participants were asked to quantify their pain from score 0 to 10 in which 0 means no pain and 10 means the worst pain. In part 5, the treatment seeking behavior to relieve the symptoms especially the pain were asked. In part 6, we assessed the disturbance of their daily activities due to the menstrual symptoms and irritability using self-rating irritability scale. The Born-Steiner Irritability Scale [34] consists of 14 questions representing the core aspect of irritability. Students marked the box beside each item that best described how they were feeling during menstrual period. The response options were scored as follows: 0 was not at all, 1 was some of the time, 2 was often and 3 was most of the time. A scale total of 42 points was divided into three subcategories: 1-14 was mild irritability, 15-28 was moderate irritability, and 29-42 was severe irritability. We checked face and content validity of the questionnaire with experts. Data were processed using Microsoft Excel. In

order to analyze data, SPSS software was used. Data were summarized using frequency, percentage, mean, standard deviation, range and IQR (interquartile range). Univariate logistic regression analysis was used to calculate odds ratio together with 95% confidence interval. Level of significance was set at 0.05. This study was approved by Research Committee, Melaka Manipal Medical College. The purpose and summary of the research project were explained to the participants. We made sure the participants understood and we provided participant information sheet and gave ample time to read. When the participants raised concern, we explained until they were satisfied. After that, participants were asked to give informed consent and signed a consent form before the study started. Participation was strictly voluntary and all the participants understood that they are free to participate or withdrawal any time throughout the study. Besides that, we maintained confidentiality of the data.

3. RESULTS

A total of 292 female undergraduate students participated in this study and response rate was 83.43%. Table 1 shows the socio-demographic characteristics of the students. Mean age (SD) of the students was 23.13 (1.435). 41.8% were Malay, 34.2% were Chinese and 24% were Indian. Among the students, 48.3% were usually eating fast food and 51.7% were doing exercise regularly.

Menstrual characteristics are shown in Table 2. Among the participants, 69.5% had dysmenorrhea during LMP with median pain intensity of 5 (IQR 4.0 – 7.0). 84.9% had premenstrual symptoms such as backache, fatigue, breast heaviness, abdominal bloating, bloated feeling, headache, skin disorder, nausea and vomiting, and loss of appetite (shown in Fig. 1).

Among the participants who had dysmenorrhea, 50.7% needed treatment to relieve pain in LMP and analgesics was most commonly used (85.4%) (Table 3).

The relationship between BMI, exercise, habits of eating fast food, taking evening primrose oil and dysmenorrhea and premenstrual symptoms are shown in Tables 4 and 5 respectively. There was significant association between eating fast food and premenstrual symptoms as the students who had fast food were significantly more likely to

have premenstrual symptoms with odds ratio 2.25 (95% CI 1.14 – 4.45). However, there was no significant association between eating fast food and dysmenorrhea. There were no significant relationship between BMI, regular exercise, taking evening primrose oil and dysmenorrhea and premenstrual symptoms.

Table 1. Socio-demographic characteristics of female undergraduate students (n = 292)

Variables	N (%)
Age (years)	
Mean±SD	23.13±1.435
(Range)	(18 – 26)
Ethnicity	
Malay	122 (41.8)
Chinese	100 (34.2)
Indian	70 (24.0)
Residence	
Hostel	222 (76.0)
Stay with friends	61 (20.9)
Stay with family	9 (3.1)
Body Mass Index	
(Mean±SD)	21.66±3.69
(Range)	(14.76 – 50.07)
Eating fast food	
Yes	141 (48.3)
No	151 (51.7)
Regular exercise	
Yes	151 (51.7)
No	141 (48.3)

Table 6 shows the daily routine activities affected and self-rated irritability during LMP. The daily routine activities were affected in 52.7% of participants. 42.9% could not study, 29.9% missed social activities and 22.1% missed some or whole day classes. Regarding self-rated irritability, 65.8% had mild irritability and 20.5% had moderate irritability in LMP.

Table 7 shows that there were significant association between dysmenorrhea, premenstrual symptoms and daily routines activities among female students. The female students who had dysmenorrhea were significantly more likely to be affected in their daily routines activities with odds ratio 2.68 (95% CI 1.60 – 4.49). Similarly, the female students who had premenstrual symptoms were significantly more likely to be affected in their daily routines activities with odds ratio 2.47 (95% CI 1.26 – 4.83).

Table 2. Menstrual characteristics of female undergraduate students (n = 292)

Variables	N (%)
Age of menarche (years)	
(Mean±SD)	12.16±1.11
(Range)	(8 – 15)
Regularity of menstruation	
Regular	254 (87.0)
Irregular	38 (13.0)
Flow of bleeding in LMP (days)	
(Mean±SD)	5.9±1.81
(Range)	(2 – 16)
Dysmenorrhea	
Yes	203 (69.5)
No	89 (30.5)
Pain intensity (n = 203)	
Median (IQR)	5.0 (4.0 – 7.0)
Menstrual abnormalities^a	
Menorrhagia	80 (27.4)
Oligomenorrhea	24 (8.2)
Premenstrual symptoms	
Yes	248 (84.9)
No	44 (15.1)
Taking evening primrose oil regularly	
Yes	28 (9.6)
No	264 (90.4)

^a Multiple response answer

4. DISCUSSION

A cross-sectional study was carried out among female undergraduate students to determine the prevalence and determinants of menstrual disturbances, and the effect of menstrual disturbances on the student's daily routine activities. Menstruation is a natural process in women; many women experience menses-associated health problems like cycle irregularity, premenstrual syndromes and dysmenorrhea which consequently affect their quality of life has been studied in numerous researches [1-5]. Previous systematic review revealed that the prevalence of dysmenorrhea was 1.7% to 97% [22] and pooled prevalence of premenstrual syndrome was 47.8% in women of reproductive age [23]. Dysmenorrhea is considered as the most common gynaecological symptoms among adolescent with a prevalence of 69.9% [21,35] and in Malaysia, 69.4% of adolescent school girl suffered with dysmenorrhea and 74.6% had PMS [25]. Similar to previous findings, we found that

69.5% of the female students had dysmenorrhea at LMP and 84.9% had premenstrual symptoms such as backache, fatigue, breast heaviness, abdominal bloating, bloated feeling, headache, skin disorder, nausea and vomiting and loss of appetite. Though the exact cause of premenstrual syndrome is not known, alterations in brain hormone levels may play a role. Women with premenstrual syndrome may also respond differently to these hormones, however, this is yet to be proven. There is a possibility of premenstrual syndrome be related to biological, social, cultural and psychological factors [7]. There are several factors affecting premenstrual syndrome such as increase in progesterone level after ovulation, changes in serotonergic and GABAergic activity [14], and life style factors including exercise habit [15], diet [16,17], BMI [18] and stress [19,20]. We found that there was significant association between eating fast food at least once a week and premenstrual symptoms but not with dysmenorrhea. Among adolescents, premenstrual symptom is prevalent and that lifestyle and nutritional/metabolic factors may play a role in this disorder. There is a positive relationship between premenstrual symptoms and higher intake of egg yolk and alcohol, poorer sleep quality and a higher serum cholesterol level was found in previous study

[10]. Moreover, this study showed that there were no significant relationship between BMI, regular exercise at least one day per week of duration 30-45 minutes and dysmenorrhea and premenstrual symptoms. This is because the majority of our participants were categorized as normal weight, and the prevalence of dysmenorrhea and premenstrual symptoms were high among participants regardless of regular exercise. However, previous research showed that maintaining a healthy BMI [18] and regular exercise [36] was important for fewer premenstrual symptoms. In addition, evening primrose oil was used commonly among women to reduce premenstrual symptoms though there was no firm conclusion about its efficacy for treatment of premenstrual symptoms [36]. In our study, 9.6% of the female students had evening primrose oil regularly and there was no significant association between taking evening primrose oil and dysmenorrhea and premenstrual symptoms. During the reproductive period, menstrual disorders were one of the most commonly reported gynaecologic morbidities and women seek treatment for this [24]. Our study showed 50.7% of the participants seek treatment for dysmenorrhea to relieve pain where 85.4% commonly used paracetamol and aspirin.

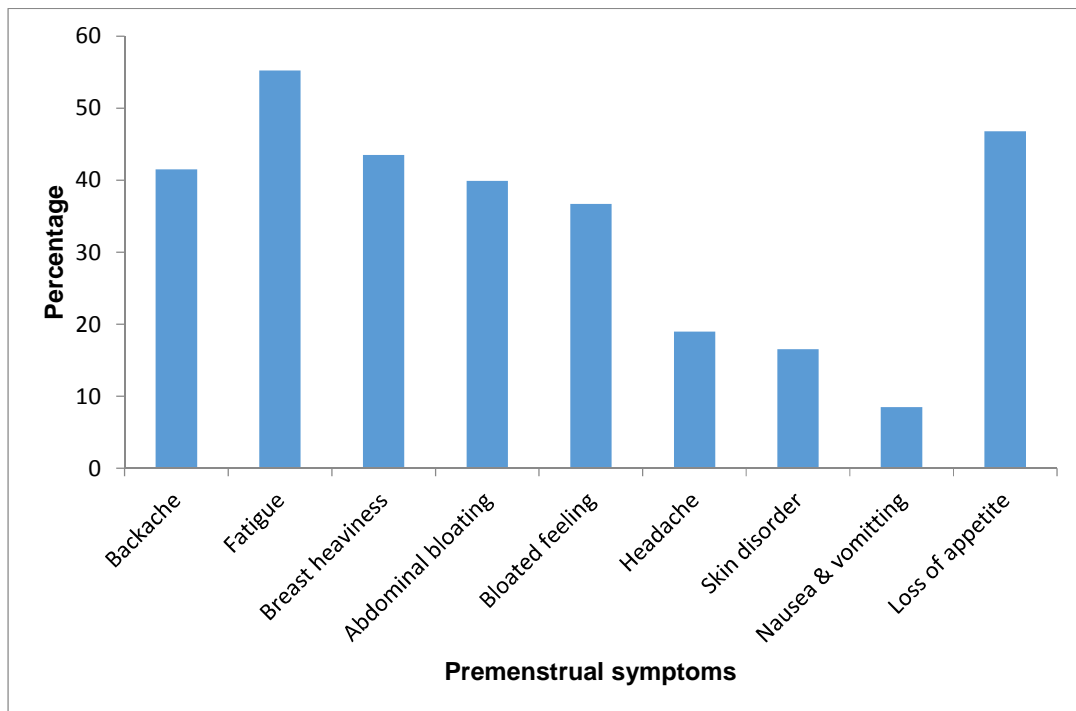


Fig. 1. Premenstrual symptoms among female undergraduate students (n = 248)

Table 3. Treatment seeking behavior to relieve menstrual pain among female undergraduate students with dysmenorrhea (n = 203)

Variables	N (%)
Treatment to relieve pain in LMP	
Yes	103 (50.7)
No	100 (49.3)
Treatment type^a (n = 103)	
Analgesics	88 (85.4)
Hot pad	30 (29.1)
Traditional medicine	11 (10.7)

^aMultiple response answer

Even though dysmenorrhea and premenstrual syndrome are not life threatening, these can cause significant disturbance during reproduction [26]. Among adolescents, 3% to 20% of them

suffered pain which was associated with absence in school or work [24,29,30], prolonged bed rest, inability to sleep and study, missed meal, social and sport activities [27,28], and missed daily activities [24]. Our study showed that the female students who had dysmenorrhea or premenstrual symptoms were significantly more likely to be affected in their daily routines activities, 42.9% of female students had inability to study and 22.1% missed some or whole day of academic classes. Previous study also found that dysmenorrhea were related to school absence [33] and academic activities such as class participation, class concentration and test performance among female students [37]. Since the high prevalence of premenstrual symptoms was associated with the level of discomfort felt by the women and declined in health-related quality of life [23,27], this problem among reproductive age women should not be ignored.

Table 4. Relationship between BMI, exercise, fast food habit, evening primrose oil and dysmenorrhea

Variables	Dysmenorrhea		Odds ratio (95% CI)	P value
	Yes N (%)	No N (%)		
Eating fast food				
Yes	94 (66.7)	47 (33.2)	0.77 (0.47 – 1.27)	0.31
No	109 (72.2)	42 (27.8)	1 (Reference)	
Regular exercise				
Yes	106 (70.2)	45 (29.8)	1.07 (0.65 – 1.76)	0.79
No	97 (68.8)	44 (31.2)	1 (Reference)	
Taking evening primrose oil				
Yes	20 (71.3)	8 (28.6)	1.11 (0.47 – 2.62)	0.82
No	183 (69.3)	81 (30.7)	1 (Reference)	
Body Mass Index			0.99 (0.93 – 1.07)	0.90

P value <0.05 is significant

Table 5. Relationship between BMI, exercise, habits of eating fast food, evening primrose oil and premenstrual symptoms

Variables	Premenstrual symptoms		Odds ratio (95% CI)	P value
	Yes N (%)	No N (%)		
Eating fast food				
Yes	127 (90.1)	14 (9.9)	2.25 (1.14 – 4.45)	0.02
No	121 (80.1)	30 (19.9)	1 (Reference)	
Regular exercise				
Yes	126 (83.4)	25 (16.6)	0.79 (0.41 – 1.49)	0.46
No	122 (86.5)	19 (13.5)	1 (Reference)	
Taking evening primrose oil				
Yes	22 (78.6)	6 (21.4)	0.62 (0.24 – 1.62)	0.33
No	226 (85.6)	38 (14.4)	1 (Reference)	
Body Mass Index			1.01 (0.92 – 1.10)	0.85

P value <0.05 is significant

Table 6. Daily routines affected and self-rated irritability in LMP (n = 292)

Variables	N (%)
During LMP, are your daily routine activities affected?	
Yes	154 (52.7)
No	138 (47.3)
Daily routines affected in LMP^a (n = 154)	
Inability to study	66 (42.9)
Decreased time for exercise	58 (37.7)
Missed social activities	46 (29.9)
Missed some or whole day classes	34 (22.1)
Missed meal	28 (18.2)
Inability to sleep	24 (15.6)
Irritability during LMP	
No irritability	29 (9.9)
Mild irritability	192 (65.8)
Moderate irritability	60 (20.5)
Severe irritability	11 (3.8)

^aMultiple responses answer**Table 7. The effect of dysmenorrhea and premenstrual symptoms on daily routine activities in LMP**

Variables	Daily routines activities affected		Odds ratio (95% CI)	P value
	Yes N (%)	No N (%)		
Dysmenorrhea				
Yes	122	81	2.68 (1.60 – 4.49)	<0.001
No	32	57	1 (Reference)	
Premenstrual symptoms				
Yes	139	109	2.47 (1.26 – 4.83)	0.008
No	15	29	1 (Reference)	

P value <0.05 is significant

Our study has some limitations. We excluded the female students known to have fibroid, endometriosis and pelvic inflammatory diseases, but we did not examine the participants for the causes of secondary dysmenorrhea. As we asked dysmenorrhea and premenstrual symptoms at LMP, recall bias might be present. This study was conducted among female students in private medical college, therefore the findings might not be generalizable. This study was cross-sectional study, hence, we could neither observe the changes over time or inference of causality.

5. CONCLUSION

Dysmenorrhea and premenstrual symptoms are common cause of physical and psychological distress, and the prevalence was high among female medical students. These symptoms were related to school absence, inability to study, and missed their social and daily activities among female medical students. Therefore this problem

should not be neglected and school based counselling should be considered to increase awareness, advice and educate them for different options for managing dysmenorrhea and premenstrual symptoms.

CONSENT

All authors have declared that written informed consent was obtained from all the participants.

ETHICAL APPROVAL

Approval to conduct the study was obtained from Research Committee, Melaka-Manipal Medical College (MMMM).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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