

Menstrual Pattern and Menstrual Problems among Female Students in King Khalid University, Abha City, Kingdom of Saudi Arabia

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ABSTRACT

Background: Dysmenorrhea (menstrual pain) is the most common gynecological problem worldwide. Although in literature obesity has been considered as one of the determinants for dysmenorrhea, much work has not been done to study this association.

Objectives: To estimate the prevalence of dysmenorrhea and obesity as well as to investigate the relationship between them among college's students, King Khalid University, Abha, Saudi Arabia.

Subjects and Methods: A cross sectional study was conducted at female colleges, King Khalid University, Abha. It included a representative sample of 233 female college students. Multistage random sampling technique was applied. A self-administered questionnaire was used to collect data.

Results: Out of 233 female college students invited to participate in the study, 212 responded. Thus, a response rate of 91% has been achieved. Their age ranged between 18 and 30 years with a mean age of 22.2 ± 2.1 years. Regular menses were reported by 61.3% of the students. Blood clots with menstrual bleeding were reported by 39.6% of the sample. College absenteeism because of menstrual cycles was reported by almost two-thirds of them (63.2%), however, it was in some cycles in most of cases (53.8%). The most common reason for college absenteeism was severe menstrual pain (79.9%). The prevalence of dysmenorrhea among college students was 88.7%. It was mild in 41.7% of cases and severe in 23.5% of them. Most of those reported dysmenorrhea took sedatives (76.6%), mostly Panadol (48.6%) and Brufen

(45.1%). 27.4% and 11.8% of the female college students were overweight or obese, respectively whereas 10.8% of them were underweight. Although 40% of obese students had moderate dysmenorrhea and 24% had severe dysmenorrhea compared to 26.4% and 19.8% of normal subjects, respectively, however, the association between body mass index and dysmenorrhea was not statistically significant ($p=0.205$).

Conclusion: Dysmenorrhea is highly prevalent among female college students, King Khalid University, Abha city. The association between body mass index and dysmenorrhea was not significant.

Keywords: Dysmenorrhea, College Students, Body Mass Index, Menstrual.

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INTRODUCTION

The onset of menstruation (i.e., menarche) is a seminal event signifying the progress of puberty. Menarche usually occurs during the earlier time of the second decade of life and ends with menopause, typically in the fifth decade of life.¹

Dysmenorrhea refers to a cyclical lower abdominal or pelvic pain which may radiate to the back or to the thighs, occurring during menstruation. The actual word dysmenorrhea is derived from the Greek words, "dys" meaning difficult, "meno" meaning month, and "rrhea" meaning flow.²

Dysmenorrhea (menstrual pain) is the most common gynecological problem worldwide.^{3,4} In the US, two and a half million females in their reproductive age, experienced menstrual

symptoms resulting in visits to health care providers, missed school/work, or bed rest.⁵

The prevalence of dysmenorrhea (menstrual pain) has been estimated to be 72% in Swedish women⁶, 85% in Naples⁷, 42% in Columbia, 45% in Thailand, 21% in Turkey, 68% in Chile⁸, 33% in India⁹, 28% among Mayan rural society¹⁰ and 51% in Singapore.¹¹ According to the latest studies, 10% of females experienced an absence from work for one to three days per month because of menstrual pain and were not capable to carry out their normal daily activities.¹² Menstrual pain is the most important cause of student absence from school and college.¹³ Dysmenorrhea was a significant problem, with 83.2% of respondents reporting various

degrees of dysmenorrhea. Among these girls, 38.1% classified their pain as mild, 50.4% as moderate, and 11.6% as severe with chronological increase.¹⁴ The following risk factors have been associated with more severe episodes of dysmenorrhea: earlier age at menarche; long menstrual periods; heavy menstrual flow; smoking and positive family history, obesity and alcohol consumption.^{15,16} Physical activity and the duration of the menstrual cycle do not appear to be associated with increased menstrual pain.¹⁷ Obesity is becoming a worldwide problem affecting all levels of society and is being described as a global epidemic.¹⁸ In Saudi Arabia, obesity is becoming one of the most important public health problems.¹⁹ In a recent study conducted among female students at Dammam University, a prevalence of 35% for severe dysmenorrhea has been reported.²⁰

Although the aetiology and pathophysiology of primary dysmenorrhea is not well known yet, there is a strong evidence that primary dysmenorrhea is due to increased concentration of prostaglandins especially PGF₂ alpha which is a potent myometrial stimulant and vasoconstrictor.²¹ In overweight and obese females, there is increase in biosynthesis of prostaglandins that increase the severity of dysmenorrhea.²² Hence, use of prostaglandin synthesis inhibitors gives some pain relief. Many other drugs like non-steroidal anti-inflammatory drugs (NSAIDs), herbal, dietary therapies, yoga, and meditation are being used to reduce the symptoms of dysmenorrhea. Participation in regular physical activity is another way which decreases the symptoms of dysmenorrhea.²² The study aimed to investigate the prevalence of dysmenorrhea and other menstrual problems and its relation to obesity among female University students.

SUBJECTS AND METHODS

A cross sectional design was followed at female colleges, King Khalid University, Abha city, which lies in Assir Province of Saudi Arabia on the slopes of the Sarawat Mountains (Al-Sarawat Mountains). King Khalid University includes 5 colleges for females in Abha city (Administration and home economics, science, education and Arts, health sciences and community) including 8659 students.

The minimum sample size for this study has been decided according to Swinscow and Cohen.²³

As follows:

$$n = (Z)^2 \times P \times Q / D^2$$

Where:

n: Calculated sample size

Z: The z-value for the selected level of confidence = 1.96.

P: Estimated prevalence of dysmenorrhea was 75% = 0.75 [26]

$$Q: (1 - P) = (1 - 0.75) = 0.25$$

D: The maximum acceptable error [precision level] = 5% = 0.05

$$n = (1.96)^2 \times 0.75 \times 0.25 / (0.05)^2$$

$$= 3.84 \times 0.1875 / 0.0025 = 288$$

Thus, the estimated sample size was 288 female college students, King Khalid University, Abha city.

Multistage random sampling technique was applied. In the first stage, One college was randomly selected out of the 5 by simple random sampling technique. It was college of Education and Arts. College of Education and Arts has 7 departments (Islamic studies, Preschool, Arabic, psychology, English, History, and geography). In the second stage, four departments were chosen randomly by simple random technique. They were departments of Islamic

studies, English, Arabic and history. The sample of the study was distributed over the four departments proportional to total students of each department. In the third stage, simple random technique was applied to select students from each department through list obtained from college administration. It was equally distributed amongst the four academic grades.

Self-administered questionnaire was used to collect data. It includes socio-demographic data of the participants (age, division, academic level, marital status and nationality), health status data, menstrual information using the Menstrual Disorder of Teenagers Questionnaire. The questionnaire is divided into five parts²⁴: Information about usual periods, associated symptoms with menstruation during previous 12 months, effect of the periods affect on lifestyle, habits with the period and family history and finally body mass index measurement of the students.

In the present study, dysmenorrhea was defined as having painful menstruation during the previous six months and the degree of pain was categorized as mild, moderate and severe based on the quartiles of the pain scale (below 1st: mild; 2nd-3rd: moderate; above 3rd: severe).

The researcher distributed the self-administered questionnaires to the target population by direct contact with them. The researcher was available to clarify any issue and the questionnaires were collected soon after encounter. The data were verified by hand then coded and entered to a personal computer. A pilot was conducted on 20 students to determine the level of understanding, any language or phrase difficulties, comprehension and length of time to complete the questionnaire. As a feedback, the language of the questionnaire was readable and easy to comprehend as well as an average of 12 minutes was needed to complete the questionnaire. They were not included into the main study.

Before interviewing, informed consent was asked from all samples then; all participants had the right not to participate in the study or to withdraw from the measurements prior to completion. An official permission from Joint Program of Family Medicine to conduct the research was obtained. Approval by research and ethical committee at Abha City was taken.

Data Analysis: The data were collected and verified by hand then coded before computerized data entry. The statistical Package for Social Sciences (SPSS), version 25 was used for data analysis. Descriptive statistics (e.g. number, percentage, mean, range, standard deviation) and analytic statistics (Chi-square test " χ^2 ") were applied. P-values ≤ 0.05 was considered as statistically significant. The researcher explained the purpose to all respondents. This pre measurement education is an important part. Confidentiality and privacy were guaranteed for all participants.

RESULTS

Out of 288 female college students (College of Education and Arts) invited to participate in the study, 212 responded. Thus, a response rate of 73.6% has been achieved.

Table 1 summarizes the personal information of the responded female college students. Their age ranged between 18 and 30 years with a mean age of 22.2±2.1 years. More than one-third of them (35.2%) were recruited from Islamic studies department. There were almost equally distributed between the four academic grades. Vast majority of them (98.1%) were Saudis and almost two-thirds of them (67.6%) were singles.

Table 2 presents the detailed menstrual history for the respondents. Regular menses were reported by 61.3% of the students. For those reported regular cycles, a cycle duration ranging from 21 to 35 days among 96.9% of them. Blood clots with menstrual bleeding were reported by 39.6% of the sample. College absenteeism because of menstrual cycles was reported by almost two-thirds of them (63.2%), however, it was in some

cycles in most of cases (53.8%). Absent days exceeded two in 12.7% of those reported college absenteeism while it was only one was among 56% of them.

The most common reason for college absenteeism was severe menstrual pain (79.9%), followed by severe bleeding (26.9%) whereas anorexia and vomiting were responsible for college absenteeism in 17.9% and 12.7% of cases, respectively.

Table 1: Personal information of the participants

Personal information		Frequency	Percentage
Age (years)	≤22	123	58.0
	>22	89	42.0
Range			18-30
Mean±SD			22.2±2.1
Department	Arabic	60	28.2
	English	43	20.2
	Islamic studies	75	35.2
	History	35	16.4
	First	53	24.9
Academic grades	Second	54	25.4
	Third	49	23.0
	Fourth	57	26.8
	Saudi	208	98.1
Nationality	Non-Saudi	4	1.9
	Married	69	32.4
Marital status	Single	144	67.6

Table 2: Menstrual history of the participants (n=212).

		Number	Percentage
Regularity of the cycle during the past 12 months	Regular	130	61.3
	Irregular	70	33.0
	Don't know	12	5.7
Cycle duration in days*	21-28	103	79.2
	29-35	23	17.7
	>35	4	3.1
	Blood clots	Yes	84
	No	128	60.4
College absenteeism	Yes, every cycle	20	9.4
	Yes, some cycles	114	53.8
	No	78	36.8
Number of college absent days because of menstrual cycles	One	75	56.0
	Two	42	31.3
	>two	17	12.7

* For regular cycles

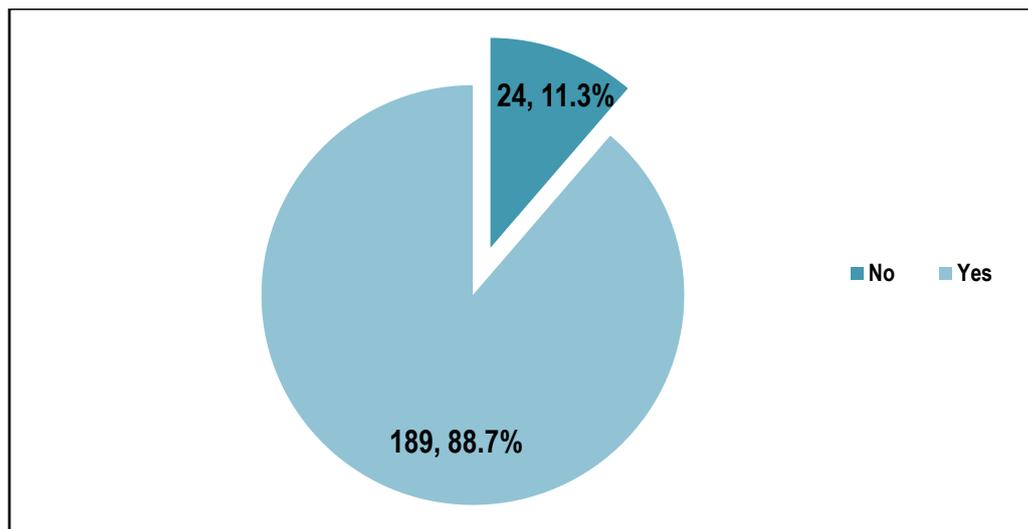


Figure 1: Prevalence of dysmenorrhea among college students, King Khalid University, Abha

Figure 1 shows that the prevalence of dysmenorrhea among college students was 88.7%. It was mild in 41.7% of cases and severe in 23.5% of them. Most of those reported dysmenorrhea took analgesics (76.6%), mostly Panadol (48.6%) and Brufen (45.1%), followed by Aspirin (10.4%).

About 28.6% and 26.7% of students of the departments of history and Islamic studies had severe dysmenorrhea compared to 18.6% and 20% of those of departments of English and Arabic, respectively. These differences were statistically significant, $p=0.001$. Also students showed a gradual increase in the rate of severe dysmenorrhea with increasing in their academic grade (ranged between 17% among students of grade one to 36.8% of those of grade four). This linear association was statistically significant, 0.009. Students' age, nationality and marital status were not significantly associated with dysmenorrhea and its severity.

Results revealed that 27.4% and 11.8% of the female college students were overweight or obese, respectively whereas 10.8% of them were underweight. The association between body mass index and dysmenorrhea was not statistically significant ($p=0.558$).

It is concluded from **table 3** that:

-The most frequent symptoms reported only before the cycle were bloating (39.6%), anorexia (21.2%), appetite change (18.9%) and low back pain (14.6%).

-The most common reported symptoms during the cycle were low back pain (57.1%), appetite change (39.2%), pelvic pain (35.4%), depression (34.4%), and headache (32.5%).

-The commonest symptoms reported any time during the month were headache (8%), drowsiness (6.6%) and indigestion (6.1%).

When students were asked to rate, on a 0-10 scale, the impact posed by menstrual cycles on some of selected life activities, an overall median value of 3 was reported for attending colleges and 4 for relationship with friends and husbands as well as sports and exercise and 5 for completing college work, social activities and relationship with family indicating mild impact on these life activities. The frequency of menstrual interference with life activities was summarized in figure 4 as 50.9% of the students claimed that their menstrual cycles interfere with their life activities in all cycles whereas 34.4% and 14.6% of them claimed

that the interference occur in most or some cycles, respectively. When they were asked to rate, on a 0-10 scale, the impact posed by different menstrual symptoms on the life, the highest impact was observed with changing mood (median=8), followed by exhaustion and sickness and tiredness (median=6), pain and severe bleeding (median=5).

The frequency of these symptoms was described in figure 5 as 24.5% of the students claimed that these symptoms occur every cycle whereas 43.9% and 31.6% of them claimed that they occur in most or some cycles, respectively.

Table 4 summarized the school girls' perception of their menstrual cycles. From the table, we can conclude that

-Most of the female university students expressed bad behavior during the period (78.8%) and felt moody and unable to overcome difficulties during period time (73.6%)

- Almost two-thirds of them cited that their periods are normal every month (64.6%), were crying during their period (62.3%) and talk with their friends about their period (61.3%).

-More than half of them had pain killer during the period (59.9%) and tried to withdraw or disappear during period (59.4%)

-Almost one third of the female university student's talk with their family or specialist physician about their period (53.4%), believed that their period has no effect on their mood (33.5%).

-Almost one-quarter of the students talk to a general practitioner about their period (25.9%) and did ultrasonography to know the cause of pain (24.5%) whereas exactly one-quarter of them took tablets to regulate their periods.

-Only 19.8% took to their teachers about their menstrual periods and 15.6% did blood investigations to know the cause of pain.

More than one-third of the female university students were aware of endometriosis (40.4%) and polycystic ovary syndrome (39%) whereas almost one-third of them (33.8%) were aware of pelvic inflammatory disease. (Figure 2)

Almost two-thirds of the female university student's participated in the study reported family history (among their mothers and/or sisters) of menstrual problems (64.3%) and dysmenorrhea (62.4%) whereas family history of pelvic inflammatory disease and polycystic ovary syndrome were reported by 15% and 13.6% of them, respectively. Family history of endometriosis was mentioned by 7% of the participants as shown in figure 3.

Table 3: Menstrual symptoms during the last 12months among female secondary students, Abha

	Never N (%)	Only before cycle N (%)	During cycle N (%)	Any time during the month N (%)	All times N (%)	Sometimes N (%)
Anorexia	98 (46.2)	45 (21.2)	37 (17.5)	3 (1.4)	6 (2.8)	23 (10.8)
vomiting	135 (63.7)	28 (13.2)	26 (12.3)	0 (0.0)	2 (0.9)	21 (9.9)
Bloating	34 (16.0)	84 (39.6)	43 (20.3)	10 (4.7)	18 (8.5)	23 (10.8)
Constipation or diarrhea or both	124 (58.5)	13 (6.1)	38 (17.9)	5 (2.4)	5 (2.4)	27 (12.7)
indigestion	116 (54.7)	13 (6.1)	45 (21.2)	13 (6.1)	2 (0.9)	23 (10.8)
Appetite change	46 (21.7)	40 (18.9)	83 (39.2)	4 (1.9)	15 (7.1)	24 (11.3)
Leg pain	101 (47.6)	20 (9.4)	53 (25.0)	4 (1.9)	8 (3.8)	26 (12.3)
Pelvic pain	83 (39.2)	15 (7.1)	75 (35.4)	3 (1.4)	6 (2.8)	30 (14.2)
Low back pain	30 (14.2)	31 (14.6)	121 (57.1)	2 (0.9)	12 (5.7)	16 (7.5)
pain during or after urination	149 (70.3)	7 (3.3)	22 (10.4)	9 (4.2)	0 (0.0)	25 (11.8)
Headache	50 (23.6)	20 (9.4)	69 (32.5)	17 (8.0)	10 (4.7)	46 (21.7)
Vaginal itching	135 (63.7)	15 (7.1)	25 (11.8)	9 (4.2)	2 (0.9)	26 (12.3)
Drowsiness or coma	91 (42.9)	13 (6.1)	55 (25.9)	14 (6.6)	4 (1.9)	35 (16.5)
Depression	59 (27.8)	29 (13.7)	73 (34.4)	7 (3.3)	16 (7.5)	28 (13.2)

Table 4: Female college students` perception of their menstrual cycles

	Students` response		
	Yes	No	Don` t know
	N (%)	N (%)	N (%)
My periods are normal every month	137 (64.6)	35 (16.5)	40 (18.9)
I` m taking tables to regulate my periods	53 (25.0)	132 (62.3)	27 (12.7)
I` m taking pain-killer for my periods	127 (59.9)	59 (27.8)	26 (12.3)
I did blood investigations to know the cause of pain	33 (15.6)	144 (67.9)	35 (16.5)
I did ultrasonography to know the cause of pain	52 (24.5)	137 (64.6)	23 (10.8)
I` m taking with my friends about my period	130 (61.3)	67 (31.6)	15 (7.1)
I` m taking with my family about my period	75 (35.4)	114 (53.8)	23 (10.8)
I` m taking with my teacher about my period	42 (19.8)	153 (72.2)	17 (8.0)
I talk to a general practitioner about my period	55 (25.9)	138 (65.1)	19 (9.0)
I talk to a specialist physician about my period	75 (35.4)	114 (53.8)	23 (10.8)
I` m expressing bad behavior during my period	167 (78.8)	31 (14.6)	14 (6.6)
I` m crying during my period	132 (62.3)	64 (30.2)	16 (7.5)
I` m feeling moody and unable to overcome difficulties during my period time	156 (73.6)	45 (21.2)	11 (5.2)
Often, I` m trying to withdraw or disappear during period	126 (59.4)	64 (30.2)	22 (10.4)
My period has no effect on my mood	71 (33.5)	129 (60.8)	12 (5.7)

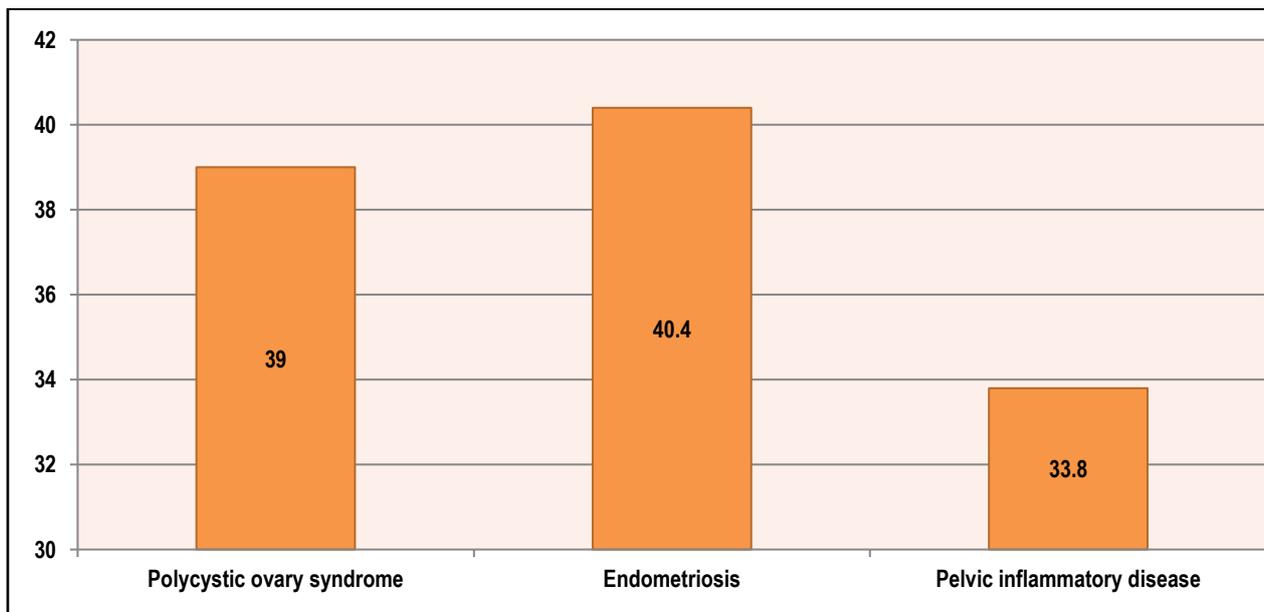


Fig 2: Awareness of female University students about common gynecological health problem associated with menstrual cycles.

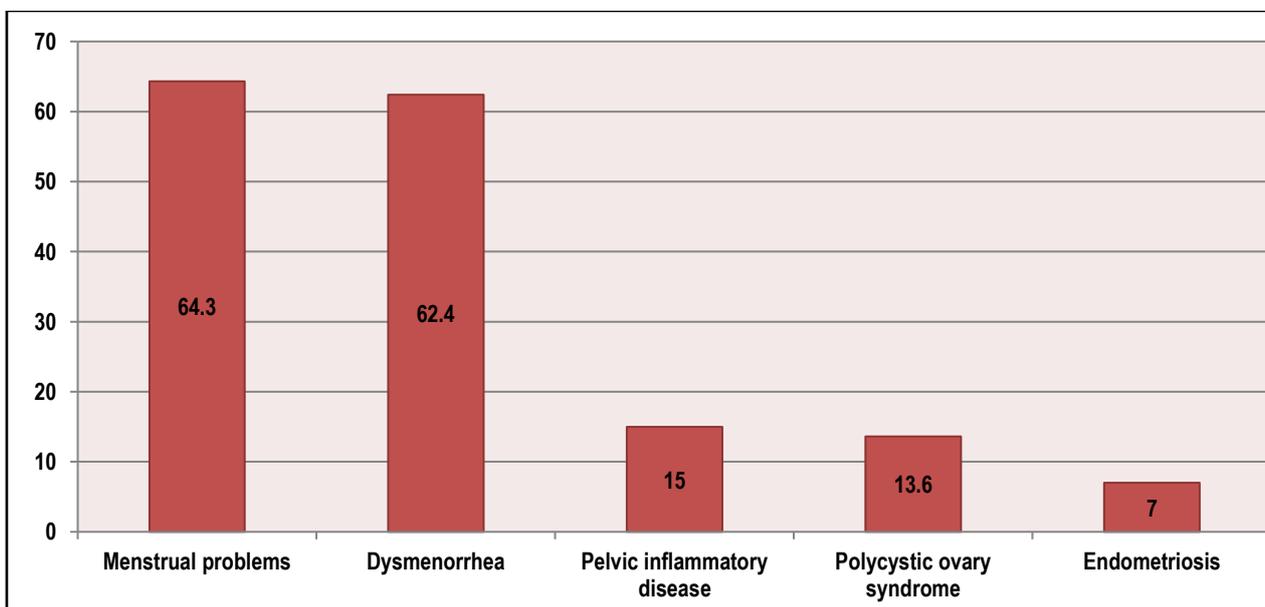


Figure 3: Family history (mother/sister) of menstrual problems among participants.

DISCUSSION

Obesity is the most prevalent, chronic medical condition in the developed, as well as in developing countries and is being described as a global epidemic.¹⁸ In Saudi Arabia, it is becoming one of the most important public health problems.¹⁹ In the present study, 27.4% and 11.8% of the female college students were overweight or obese, respectively whereas 10.8% of them were underweight. In another study carried out in Riyadh, at the Faculty of Elementary Education, Princess Nora University, overweight amounted to 31.4% and obesity was 16.5%.²⁵

In the present study, prevalence of dysmenorrhea among King Khalid University female students in Abha city is 88.7% which indicates its importance as a health problem from public health point of view. This figure is consistent with the commonly reported results that ranged between 70% and 91%.²⁶⁻³³ However, it is lower than that reported in MDOT study (93%).²⁴ Generally speaking, dysmenorrhea is so common that many fail to report it, even when females' daily activities become restricted because they consider pain to be a normal part of the menstrual cycle.³⁴

The pain of primary dysmenorrhea can be mild (does not affect normal activity and requires only minimal analgesic help), moderate (some reduction in regular activity and requires regular use of analgesics), and severe (unable to carry out regular activities and analgesics are typically not helpful).² In the present study we asked students to rate their menstrual pain on a scale ranged between 0 and 10 and based on quartiles, we classified pain as mild, moderate and severe. Mild pain was reported among 41.7% of the students whereas moderate and severe pains were reported by 23.5% for each. In a study conducted by Singh et al.,²⁷ mild dysmenorrhea was reported in 63.29 % of girls, whereas moderate and severe dysmenorrhea were reported in 30.37 % and 6.32 % of girls, respectively. In the study by Nagata et al.³⁰, dysmenorrhea was found to be mild in 40.2 %, moderate in 34.4 % and severe in 8.76 % of cases. Dysmenorrhea was absent in 16.7 % cases.

The main objective of the present study was to investigate the association between body mass index of the female college students and dysmenorrhea. Although obesity has been associated with multiple adverse reproductive health outcomes³⁵, mixed results have been obtained on its relationship with dysmenorrhea.³⁶ An earlier systematic review examined the risk factors predisposing women to chronic pain, including 63 studies on dysmenorrhea.³⁷ It found that BMI < 20 kg/m² was associated with dysmenorrhea, whereas no relationship was demonstrated between BMI > 24 kg/m² and dysmenorrhea.

In a study conducted by Madhubala and Jyoti in India²⁸, the relation between dysmenorrhea and BMI was found to be highly significant ($p < 0.001$) with increased prevalence of dysmenorrhea in the low BMI group. Their findings were also supported by the study of Hirata et al.³⁸, who found the frequency of dysmenorrhea to be greatest in the underweight group. Similarly, the study by Tangchai et al.³⁹ found low BMI to be significantly associated with dysmenorrhea.

On the other hand, significant heterogeneity was detected among the studies on the association of dysmenorrhea and BMI > 24 kg/m². A more recent review including mainly community-based cross-sectional studies yielded inconsistent results on the association between BMI and dysmenorrhea, with a large Japanese study revealing a positive association between them

and the other smaller studies failed to show any association.⁴⁰ Also, in the study by Harlow et al.⁴¹, being overweight was an important factor for dysmenorrhea and doubled the odds of having a long pain episode. In the present study, although 40% of obese students had moderate dysmenorrhea and 24% had severe dysmenorrhea compared to 26.4% and 19.8% of normal subjects, respectively, however, the association between body mass index and dysmenorrhea was not statistically significant.

The MDOT study has shown a change in the use of NSAIDs for pain relief within the last decade.²⁴ In 1999, Hillen et al.²⁶ reported 53% using simple analgesics and 42% using NSAIDs, in this study, 48.6 and 45.1% of our subjects used Panadol and Brufen, respectively. This study did not investigate effectiveness of pain medication as well as we did not examine whether pain medication was used in therapeutic doses or not.

In the present study almost a quarter of students took to general practitioner and almost one-third took to specialist physician regarding their menstrual cycle. It is documented that a careful history is important in evaluating dysmenorrhea, seeking to distinguish primary from secondary dysmenorrhea or other non-gynecological causes.⁴² Laboratory testing and imaging are not usually needed for those with what appears to be mild to moderate primary dysmenorrhea that responds to basic medical management.⁴² In the current study almost a quarter of the students claimed that they did ultrasonography to know the cause of pain and 15.6% did blood investigations for the same reason.

The problem of absenteeism from college is apparent in this study as 63.2% of the participants reported college absenteeism, 9.4% of them reported that every cycle. Moreover, 44% of those reported college absenteeism had at least two absent days. Dysmenorrhea was the commonest cause of this absenteeism. In other studies of young women, rates of absenteeism ranged from 34% to 50%.⁴³⁻⁴⁶

The finding that students in certain departments of the same college and those of higher academic grades reported higher significant rate of severe dysmenorrhea than others is very interesting and require in-depth further investigation. However, this could be attributed to stress exist in some departments or among those of higher academic degrees as it was documented that dysmenorrhea may be, at least in part, related to lifestyle stress, according to researchers.^{47,48}

Dysmenorrhea itself is not a life threatening condition. However, it has a profoundly negative impact on women' day to day life.⁴⁹ In accordance with that, students in the present study reported moderate interference of menstrual cycles with their social activities, relationship with family, friends and husband as well as on practice of sports and exercise.

Among limitations of the study was the inclusion of only college students from one institution, so the results cannot be generalized to all females nationwide. In addition, an important limitation of all cross-sectional studies is that they can suggest associations, but not prove causality. Finally, the self-reported nature of the study tool is subjected to recall and misclassification bias.

In conclusion, dysmenorrhea is highly prevalent among female college students, King Khalid University, Abha city. College absenteeism mainly due to painful cycles was reported by almost two thirds of them, however mostly reported in some and not every cycle. Most of them took sedatives mainly Panadol and Brufen for their painful cycles. Although obese students had

higher prevalence of moderate and severe dysmenorrhea than normal subjects, the association between body mass index and dysmenorrhea was not significant. Health care workers need to be aware of the cause of dysmenorrhea and factors associated with its severity to enable them to prescribe appropriate pain relieving medications.

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