Menstrual Cycle Irregularity and Examination Stress Among Female Medical Students at King Abdulaziz University, Jeddah, Saudi Arabia

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Abstract

Background: Menstrual irregularity is defined as any differences in the frequency, irregularity of onset, duration of flow, or volume of blood from the regular menstrual cycle. It is an important medical issue that many medical students suffer from. The goal of this study was to determine how examination stress affected the regular menstrual cycle and investigated the most common types of irregularities among female medical students at King Abdulaziz University in Jeddah, Saudi Arabia.

Methods: A cross-sectional study was conducted among medical students between September and October 2021 at King Abdulaziz University in Jeddah, Saudi Arabia. A total of 457 female students aged 18–30 years were selected through stratified random sampling. A validated online questionnaire collected data about demographics, menstrual irregularities during exams, type of irregularities, menstrual history, family history of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation, and absenteeism. The chi-squared test (χ^2) was used to analyze the associations between variables.

Results: A total of 48.2% of participants had menstrual irregularities during exams. The most common irregularity was dysmenorrhea (70.9%), followed by a lengthened cycle (45.6%), and heavy bleeding (41.9%). A total of 93% of medical students suffered from premenstrual symptoms and 60.4% used medication to relieve menstrual irregularities, with herbal medication and home remedies, and 44.4% of the students missed classes due to menstrual irregularities.

Conclusion: A total of 48.2% of participants had menstrual irregularities during exams. The most common irregularity was dysmenorrhea (70.9%), followed by a lengthened cycle (45.6%), and heavy bleeding (41.9%). A total of 93% of medical students suffered from premenstrual symptoms and 60.4% used medication to relieve menstrual irregularities, with herbal medication and home remedies, and 44.4% of the students missed classes due to menstrual irregularities.

Introduction

The menstrual cycle is the most important measure of female reproductive health.(1, 2) It is a normal physiological process where the uterus eliminates the endometrium (innermost lining layer) and allows a regulated loss of endometrial tissue, mucus, and blood through the vagina every month.(3) Menstruation lasts 2 to 6 days and occurs between every 21 and 35 days (counting from the start of one cycle to the start of the next cycle), but this can vary from month to month depending on the woman.(4)

Menstrual cycle irregularity is one of the most common reasons for women to see gynecologists and family physicians.(5) The menstrual cycle is considered to be irregular if there are any changes in frequency and irregularity of onset, duration of flow, and volume of blood from the regular menstrual cycle.(6) It can have significant implications for women's health and can lead to major health consequences, such as cardiovascular disease, infertility, type 2 diabetes, and osteoporosis.(7–12)

There are many risk factors of an irregular menstrual cycle. A study conducted in Korea on 4,788 women found that irregular menstruation is strongly associated with important factors, such as body mass index (BMI), perceived level of stress, and smoking status.(13) Also, some evidence suggests that the risk of an irregular menstrual cycle tends to increase with mental health problems, such as anxiety and depression. (14)

Another study in 2020 found that females who use nicotine are at five-times higher risk of an irregular menstrual cycle. Other factors include marriage, having a cesarean section, and using contraception.(5) A 2019 study found that the prevalence of irregular menstruation is 11.83%, however, women with longer working hours have double the risk for irregular menstruation compared with women working shorter hours.(11)

In recent years, nutrition and lifestyle have been linked to menstrual disorders. This has been primarily attributed to the effects of specific meals and practices on vascular irrigation or the amount of estrogens and prostaglandins—the hormones that regulate the menstrual cycle.(15–19). A study conducted in India found that irregular menstruation is the third most common menstrual disorder among Indian medical students, accounting for 29% of the total. Exam stress also increases the likelihood of menstrual irregularities and dysmenorrhea.(20) An irregular menstrual cycle was most common among Lebanese nursing students (80.7%).(21) A study completed in Dammam, Saudi Arabia, found that 91% of female students studying health sciences had menstrual disorders, including irregular menstrual cycle (27%).(22) A study in Jeddah, Saudi Arabia, among medical students at King Abdulaziz University, found that that 60.9% of students suffered from dysmenorrhea (23), and a study in Riyadh, Saudi Arabia, among female medical students in King Saud University found the prevalence of primary dysmenorrhea was 80.1%.(24)

Menstrual issues have a detrimental influence on women's quality of life, resulting in a variety of constraints, absenteeism, and a poor influence on academic performance.(25–27) Although menstrual cycle irregularity is a major public health issue among females, little research has been undertaken on this critical issue among medical students in Jeddah. This study aimed to determine how examination stress affects the menstrual cycle among female medical students in King Abdulaziz University, Jeddah, Saudi Arabia.

Methods

3.1. Study design and setting

A cross-sectional study was completed at King Abdulaziz University in Jeddah, Saudi Arabia between September and October 2021.

3.2. Study participants

Female medical students (n = 457) at King Abdelaziz university participated in the study. Participants were all female medical students, in their second to sixth years. The exclusion criteria included any

female with chronic illness, gynecological diseases, or breastfeeding that might affect their period.

3.3. Sample size determination

Each class had an average of 286 of female students. A minimum recruitment rate of 30% of the total students was desired, and there were seven classes. The sample size calculated was a minimum of 450 students using a confidence interval of 95% and a margin of error of 5%.

3.4. Data collection

An online questionnaire was used to collect the following data: demographic, academic year, age at menarche, menstrual irregularities during exams, type of irregularities, menstrual history, family history, premenstrual symptoms, medication use, medical and consultation, and missing classes due to menstrual irregularities. Participants were asked about medication used to relieve menstrual irregularities, and type of medications was clarified as follows: allopathic, herbal medication (e.g., cinnamon, ginger, peppermint, etc.) and home remedies (e.g., hot bath, chicken soup, milk, honey, etc). The questionnaire was adopted from a study by Natt, Khalid, and Sial (28) and modified for the purpose of this study.

3.5. Research ethics

This study was approved by King Abdulaziz University Hospital (KAUH), biomedical ethical committee (Ref No. 384 – 21). All study participants were notified about the research objectives, and informed consent was obtained.

3.6. Statistical analysis

Microsoft Excel 2016 was used for data entry, and SPSS version 26 was used to analyze the data. To assess the relationship between variables, qualitative data was expressed as numbers and percentages, and the chi-squared test (χ^2) was used. Quantitative data were expressed means and standard deviations (mean $\pm$ SD), and non-parametric variables were tested using the Mann-Whitney (U) test. A p-value of 0.05 was considered statistically significant.

Results

Table 1 shows that 96% of studied students had an age ranging from 18–24 years; 98.2% were single, and 28.7% were fourth-year students. Figure 1 illustrates that 217 (48.2%) of participants had menstrual irregularities during exams. Table 2 shows that the most common menstrual irregularity during exams was dysmenorrhea (70.9%), followed by normal cycle lengthened (45.6%), and heavier than normal bleed (41.9%). Of these, 93% suffered from premenstrual symptoms, and 60.4% used medication to relieve menstrual irregularities—both herbal medication and home remedies, and 82.4% reported the effectiveness of these. Family history of menstrual irregularities was present among 43.8% of students with menstrual irregularities during exams, and only 26.8% reported seeking medical help from a clinician. Of these, 76% discussed this problem with a family member or a friend, and 44.4% missed classes due to menstrual irregularities. A non-significant relationship was found between menstrual

irregularities during exams and students' demographics, academic year, or age at menarche ($p > 0.05$) (Table 3). A non-significant relationship was found between students' age and type of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation, or missing classes due to menstrual irregularities ($p > 0.05$) (Table 4). A non-significant relationship was found between academic year and type of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation, or missing classes due to menstrual irregularities ($p > 0.05$) (Table 5). Oligomenorrhea, a heavier than normal bleed, a longer normal cycle, and missing classes due to menstrual irregularities were significantly higher among single students ($p < 0.05$) (Table 6). However, a non-significant relationship was found between students' marital status and amenorrhea, dysmenorrhea, shortening of the normal cycle, premenstrual symptoms, medication use, and medical or family consultation ($p > 0.05$).

Table 1.

Distribution of participants according to their demographic data, academic year and age at menarche (N = 450)

Variable	No. (%)
Age	
18–24	432 (96)
25–30	18 (4)
Marital status	
Divorced	2 (0.4)
Married	6 (1.3)
Single	442 (98.2)
Academic year	
2 nd	117 (26)
3 rd	73 (16.2)
4 th	129 (28.7)
5 th	72 (16)
6 th	59 (13.1)
Age at menarche (mean $\pm$ SD)	12.79 $\pm$ 1.55

Table 2.

Distribution of participants with menstrual irregularities during exams according to menstrual history (N = 217)

Variable	No. (%)
Type of menstrual irregularities (N = 217)	
Amenorrhea: absence of menstrual periods	86 (39.6)
Oligomenorrhea: infrequent menstrual periods (fewer than six to eight periods per year).	56 (25.8)
Dysmenorrhea: painful menstruation	
Heavy bleed than normal bleed	
Normal cycle lengthened	154 (70.9)
Normal cycle shortened	91 (41.9)
	99 (45.6)
	73 (33.6)
Do you suffer from premenstrual symptoms? (Such as mood swings, tender breasts, food cravings, fatigue, irritability, and depression before your period): (N = 217)	
No	
Yes	15 (7)
	202 (93)
Do you use medication to relieve menstrual irregularities? (N = 217)	
No	86 (39.6)
Yes	131 (60.4)
If yes, which of the following medication do you need? (N = 131)	
Allopathic	
Allopathic and herbal medication	22 (16.7)
Allopathic, herbal medication and home remedies	16 (12.2)
Allopathic and home remedies	16 (12.2)
Herbal medication	5 (3.8)
Herbal medication and home remedies	
Home remedies	

	25 (19)
	35 (26.7)
	13 (2.2)
Do you think that this medication is effective? (N = 131)	
No	23 (17.6)
Yes	108 (82.4)
Is there a family history of menstrual irregularities? (N = 127)	
No	122 (56.2)
Yes	95 (43.8)
Did you seek any medical help from any clinician?	
No	159 (73.2)
Yes	58 (26.8)
Did you discuss this problem with a family member or a friend?	
No	52 (24)
Yes	165 (76)
Did you miss classes when you had menstrual irregularities?	
No	99 (45.6)
Sometimes	92 (42.3)
Yes	26 (12.1)

Table 3.

Relationship between menstrual irregularities during exams and students' demographics, academic year and age at menarche

Variable	Menstrual irregularities		χ^2	p-value
	No.	Yes		
	No. (%)	No. (%)		
Age				
18 –24	223 (51.6)	209 (48.4)	0.1	0.743
25 –30	10 (55.6)	8 (44.4)		
Marital status				
Divorced	0 (0.0)	2 (100)	5.19	0.074
Married	1 (16.7)	5 (83.3)		
Single	232 (52.5)	210 (47.5)		
Academic year				
2 nd	58 (49.6)	59 (50.4)	2.34	0.673
3 rd	36 (49.3)	37 (50.7)		
4 th	73 (56.6)	56 (43.4)		
5 th	34 (47.2)	38 (53.8)		
6 th	32 (54.2)	27 (45.8)		
Age at menarche (mean $\pm$ SD)	12.86 $\pm$ 1.49	12.72 $\pm$ 1.61	0.77*	0.436

* = U test

Table 4.

Relationship between students' age and type of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation and missing classes due to menstrual irregularities

Variable	Age (years)		χ ²	p-value
	18–24	25–30		
	No. (%)	No. (%)		
Type pf menstrual irregularities (N = 217)				
Amenorrhea: absence of menstrual periods	84 (97.7)	2 (2.3)	0.79	0.672
Oligomenorrhea: infrequent menstrual periods (fewer than six to eight periods per year).	55 (98.2)	1 (1.8)	0.81	0.665
Dysmenorrhea: painful menstruation			1.12	0.569
Heavy bleed than normal bleed	147 (95.5)	7 (4.5)	0.31	0.855
Normal cycle lengthened			2.77	0.249
Normal cycle shortened	87 (95.6)	4 (4.4)	0.36	0.834
	93 (93.9)	6 (6.1)		
	71 (97.3)	2 (2.7)		
Do you suffer from premenstrual symptoms? (N = 217)				
No				
Yes	15 (100)	0 (0.0)	0.67	0.713
	194 (96)	8 (4)		
Do you use medication to relieve menstrual irregularities? (N = 217)				
No	83 (96.5)	3 (3.5)	0.12	0.941
Yes	126 (96.2)	5 (3.8)		
Do you think that this medication is effective? (N = 131)				
No				
Yes	23 (100)	0 (0.0)	1.06	0.588
	104 (95.4)	5 (4.6)		

Did you seek any medical help from any clinician?				
No	153 (96.2)	6 (3.8)	0.11	0.942
Yes	56 (96.6)	2 (3.4)		
Did you discuss this problem with a family member or a friend?				
No				
Yes	48 (92.3)	4 (7.7)	2.96	0.227
	161 (97.6)	4 (2.4)		
Did you miss classes when you had menstrual irregularities?				
No				
Sometimes	97 (98)	2 (2)	5.04	0.169
Yes	89 (96.7)	3 (3.3)		
	23 (88.5)	3 (11.5)		

Table 5.

Relationship between students' academic year and type of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation and missing classes due to menstrual irregularities

Variable	Academic year		χ ²	p-value
	Basic years (2 nd , 3 rd) No. (%)	Clinical years (4 th , 5 th , 6 th) No. (%)		
Type pf menstrual irregularities (N = 217)				
Amenorrhea: absence of menstrual periods	42 (48.8)	44 (51.2)	1.93	0.38
Oligomenorrhea: infrequent menstrual periods (fewer than six to eight periods per year).	26 (46.4)	30 (53.6)	0.84	0.655
Dysmenorrhea: painful menstruation	66 (42.9)	88 (57.1)	1.11	0.573
Heavy bleed than normal bleed	43 (47.3)	48 (52.7)	1.28	0.527
Normal cycle lengthened	51 (51.5)	48 (48.5)	4.65	0.098
Normal cycle shortened	38 (52.1)	35 (47.9)	3.45	0.178
Do you suffer from premenstrual symptoms? (N = 217)				
No	7 (46.7)	8 (53.3)	0.73	0.691
Yes	89 (44.1)	113 (55.9)		
Do you use medication to relieve menstrual irregularities? (N = 217)				
No	37 (43)	49 (57)	0.78	0.675
Yes	59 (45)	72 (55)		
Do you think that this medication is effective? (N = 131)				
No	9 (39.1)	14 (60.9)	1.25	0.533
Yes	51 (46.8)	58 (53.2)		
Did you seek any medical help from any clinician?				
No	75 (47.2)	84 (52.8)	2.79	0.247
Yes	21 (36.2)	37 (63.8)		
Did you discuss this problem with a family member or a friend?				
No	20 (38.5)	32 (61.5)	1.63	0.442

Yes	76 (46.1)	89 (53.9)		
Did you miss classes when you had menstrual irregularities?				
No	45 (45.5)	54 (54.5)	0.82	0.844
Sometimes	40 (43.5)	52 (56.5)		
Yes	11 (42.3)	15 (57.7)		

Table 6.

Relationship between students' marital status and type of menstrual irregularities, premenstrual symptoms, medication use, medical and family consultation and missing classes due to menstrual irregularities

Variable	Marital status			χ ²	p-value
	Divorced No. (%)	Married No. (%)	Single No. (%)		
Type pf menstrual irregularities (N = 217)					
Amenorrhea: absence of menstrual periods	0 (0.0)	2 (2.3)	84 (97.7)	7.93	0.094
Dysmenorrhea: painful menstruation	2 (1.3)	3 (1.9)	149 (96.8)	7.4	0.116
Normal cycle shortened	1 (1.4)	3 (4.1)	96 (94.5)	8.44	0.077
Type pf menstrual irregularities (N = 217)					
Oligomenorrhea: infrequent menstrual periods					
No					
Yes	2 (1.2)	5 (3.1)	154 (95.7)	9.72	0.045
No Heavy bleed than normal bleed					
No			56 (100)		
Yes	0 (0.0)	4 (3.2)		12.65	0.013
No Normal cycle lengthened					
No	2 (2.2)	1 (1.1)	122 (96.8)		
Yes	0 (0.0)	2 (1.7)	88 (96.7)	10.92	0.027
	2 (2)	3 (3)	116 (98.3)		
			94 (94.9)		
Do you suffer from premenstrual symptoms? (N = 217)					
No					
Yes	0 (0.0)	1 (6.7)	14 (93.3)	7.82	0.098
	2 (1)	4 (2)	196 (97)		
Do you use medication to relieve menstrual irregularities? (N = 217)					

No	0 (0.0)	4 (4.7)	82 (95.3)	13.83	0.008
Yes	2 (1.5)	1 (0.8)	128 (97.7)		
Do you think that this medication is effective? (N = 131)					
No	0 (0.0)	0 (0.0)	23 (100)	6.86	0.143
Yes	2 (1.8)	1 (0.9)	106 (97.2)		
Did you seek any medical help from any clinician?					
No	2 (1.3)	3 (1.9)	154 (96.9)	7.49	0.112
Yes	0 (0.0)	2 (3.4)	56 (96.6)		
Did you discuss this problem with a family member or a friend?					
No	0 (0.0)	1 (1.9)	51 (98.1)	6.59	0.159
Yes	2 (1.2)	4 (2.4)	159 (96.4)		
Did you miss classes when you had menstrual irregularities?					
No	1 (1)	5 (5.1)	93 (93.9)	16.22	0.013
Sometimes	1 (1.1)	0 (0.0)			
Yes	0 (0.0)	0 (0.0)	91 (98.9)		
			26 (100)		

Limitations And Recommendations

This study This study has several limitations, despite using a validated questionnaire with a large sample size. The limitations were a cross-sectional study. The study was limited to students in one university, which may not represent the general population of women. The menstrual patterns were based on

students' self-reports, rather than clinical examinations or hormone measurements, which may lead to bias.

Future research should be conducted in other colleges, and include the effects of confounding factors such as oral contraceptive pill use, unhealthy weight, smoking status, and sleep deprivation on psychological stress and monthly irregularity.

Conclusion

This study explored the association between examination stress and menstrual cycle among female medical students. The results showed that female medical students have a significant frequency of menstruation abnormalities during exams. Based on these results, to minimize the negative effects of the educational process, it is recommended that universities educate female students about relaxation techniques, such as yoga, before the exams. Also, females should have a better understanding of menstrual pain and perceptions of treatment choices could be improved.

Declarations

Ethics approval and consent to participate

Before completing the questionnaire, All study participants were informed about the objectives of the study, they were assured of the confidentiality of information, and then written informed consent was obtained from the individuals. The Ethics Committee of King Abdulaziz University Hospital (KAUH) confirmed the ethics of that study; (Ref No. 384-21).

Consent for publication

Not applicable

Availability of data and materials

corresponding author can provide access to the datasets generated and analyzed during the current investigation based on request at any time.

Competing interests

The authors declare that they have no competing interest.

Authors' contributions

Maisam Alhammadi, Afaf Albgomi, Manar Alzahrani, Fatma Fatta and Bahshayer Shalabi participated in writing the original draft of this manuscript. Also, all authors listed have sufficiently contributed to the development, editorial changes, and final approval of the final manuscript. Data collection was performed by Maisam Alhammadi, Afaf Albgomi, Manar Alzahrani, Fatma Fatta and Bahshayer Shalabi. Dr Samera AlBasri edited the main manuscript text. All authors read and approved the final manuscript.

Ethics declaration

The research study has been approved by KAU Research Ethics Committee (Ref No. 384-21) and all the methods done following the relevant guidelines.

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Figures

Figure 1

Percentage distribution of participants according to presence of menstrual irregularity during exams