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ORIGINAL ARTICLE

Relationship of Physical Activity with Pattern and Outcomes of Menstrual Cycle among Undergraduate Medical Students

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ABSTRACT

Background: Menstrual cycle is affected by a number of factors either positively or negatively. Disturbed menstrual cycle impacts physical, mental and social well being of women. Physical activity and exercise affect pattern of menstrual cycle depending upon its intensity.
Aim: To explore the relationship of physical activity and pattern of menstrual cycle particularly dysmenorrhea and its impact on absenteeism.
Study Design: Cross-sectional study
Place and Duration of the Study: Department of Community Medicine, HITEC-IMS Taxila from 1st March to 31st August 2020.
Methodology: One hundred and six randomly selected female undergraduate medical students of 1st to 4th year. A self-reported structured questionnaire was used to collect the data.
Results: Mean age of respondents was 21.1±1.6 years. Body mass index of 47.2% respondents was normal, 26.4% were overweight and 15.1% were obese. Menstrual flow was reported light by 11.3% respondents, 74.5% had moderate and 14.2% had heavy menstrual flow. Dysmenorrhea was reported by 85% respondents, 13% had mild, 14% had moderate and 33% had severe pain during menstruation. Absenteeism was reported by 28.3% participants and was found to be associated with dysmenorrhea. Statistically significant ($p<.05$) association was found between physical activity and dysmenorrhea.
Conclusion: Abnormalities of menstrual cycle among medical students can affect their physical well-being leading to class absenteeism. Regular and continuous physical activity can be of a great effect in improving menstrual pain and related problems.
Keywords: Menstrual cycle, Dysmenorrhea, Physical activity, Undergraduate medical students

INTRODUCTION

Menarche is the most important developmental milestone of adolescent years among girls that marks the initiation of natural and continuous biological process called menstruation. Menstrual cycle is a normal physiological phenomenon characterized by regular rhythmic flow of blood from the uterus through the vagina, occurring once a month throughout the childbearing years and ceasing permanently after menopause (45-55 Years). Anovulatory cycles lead to irregular menstrual cycle in early years (age 12-15) that gradually becomes regular in 2-3 years.[1] Interval of 21-45 days between two cycles with a menstrual flow lasting for 2-7 days requiring changing of 2-5 pads per day is suggestive of normal regular pattern. Regular menstrual cycle is predictor of reproductive health of females. Irregularities of menstrual cycle are related to majority of gynecological problems of adult females causing stress and anxiety among them. Various factors like depression, stress, body mass index (BMI), endocrine abnormalities and physical exercise are associated with regularity and pattern of menstrual cycle.[2] During ovulatory cycles, excessive production of prostaglandins causes abdominal and lower pelvic pain, headache, nausea, vomiting and backache leading to restricted physical activity and absenteeism among female students.[3] Major cause of limited physical activity and absence from college is dysmenorrhea. In addition to prostaglandins, elevated serum vasopressin, nitric oxide and interleukin-6 levels determine severity of dysmenorrhea.[4] Female medical students are prone to have stress due to exhausting study routine, assessments and change of lifestyle particularly eating, sleeping and exercise habits during academic years.[5] Academic stress leads to dysfunction of hypothalamo-pituitary ovarian axis making them vulnerable to develop menstrual abnormalities. Menstrual irregularities may negatively influence concentration span, academics, social life resulting in absence from college, poor academic performance and limitation of daily physical and sports activities.[6]

Physical activity affects reproductive hormones, ovulation and fertility. Women having sedentary life style are likely to have evident physical and emotional menstrual symptoms.[7] Moderate physical activity is associated with prolongation of menstrual cycle controlled by FSH pulses, late ovulation and longer follicular phase whereas intense exercise causes luteal phase abnormalities leading to oligomenorrhea and amenorrhea.[8] Females having sedentary life style experience amenorrhea on beginning exercise. Physical activity is usually considered to have negative impact on menstrual cycle particularly dysmenorrhea. On the other hand, low intensity regular physical exercise helps to diminish dysmenorrhea and reduced rescue medication use for dysmenorrhea among young girls and females.[9] Physical activity increase endorphin levels, stabilize hormone levels and their effect on the hypothalamic-pituitary axes, improve oxygen supply to muscles leading to overall improvement in physical and psychological well-being.[10]

The aim of the present study was to examine pattern of physical activity and menstrual cycle among medical students and to explore the existence of any relationship between physical activity and pattern and outcomes of menstrual cycle particularly dysmenorrhea and absenteeism.

MATERIALS AND METHODS

This cross-sectional study was conducted at HITEC-IMS Taxila during the month of March to August, 2020. One hundred and six female students were randomly selected from each of 1st to 4th year MBBS class. A structured self-reporting questionnaire consisting of 18 close-ended questions was used to collect data through Google forms after informed consent. Questionnaire was distributed among study participants through their official institutional email. Out of 45 from each class, 11 from 1st year, 16 from 2nd year, 40 from 3rd year and 39 students from 4th year responded to the questionnaire making it the total of 106 students who participated. Data was analyzed using SPSS version 26. Mean and standard deviation was calculated for continuous variables. Frequencies were calculated for categorical variables. Data was cross tabulated and chi square test (significance level $p<.05$) was applied to find association between physical activity and pattern of menstrual cycle and absenteeism.

RESULTS

Mean age of respondents was 21.1±1.6 years. Eleven (10.4%) were from 1st year, 16 (15.1%) were from 2nd year, 41 (38.7%)

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were from 3rd year and 38 (35.8%) were from 4th year MBBS. Seventy five (70.8%) students were day scholars and 31 (29.2%) were living in hostel. Majority of respondents 77 (72.6%) had menarche between 13-14 years of age, 17 (16%) had at 15 years or above. Whereas only 12 (11.3%) had between 10-12 years of age. Body mass index of respondents showed that 50 (47.2%) had normal, 28 (26.4%) were overweight and only 16 (15.1%) were obese. Self-reported life style of participants showed that only 10 (9.4%) had active life style. Majority of female students 68 (64.2%) had moderately active and 28 (26.4%) had sedentary life style (Table 1).

Tab 1: Menstruation profile of Respondents

Variable	No.	%
Does menstrual cycle occur monthly?		
Yes	101	95.3
No	5	4.7
Length of menstrual cycle (days)		
< 28	22	20.8
28	26	24.5
29-30	45	42.5
>30	13	12.3
Average span of menstrual cycle (days)		
1-3	7	6.6
4-5	36	34.0
6-7	54	50.9
>7	9	8.5
Type of menstrual flow		
Light	12	11.3
Moderate	79	74.5
Heavy	15	14.2
Number of sanitary napkins used		
1-2	43	40.6
3-4	43	40.6
>4	20	18.9
Pain during menstrual cycle (dysmenorrhea)		
Yes	90	85
No	16	15
Severity of pain		
Mild	14	13.2
Moderate	41	38.7
Severe	35	33.0
Associated symptoms during periods		
Headache	2	1.9
Backache	19	17.9
Mood swings	13	12.3
Cramps	17	16.0
All of the above	55	51.9

Tab. 2: Physical activity during menstrual cycle

Variable	No.	%
Hours do you spend sitting?		
4-5	67	63.2
6-7	26	24.5
>7	13	12.3
Time do you spend doing physical activity		
20-30 min	40	37.7
1hr	37	34.9
>1hr	29	27.4
Perform any physical activity during period?		
Yes	61	57.5
No	45	42.5
Type of physical activity?		
Daily household chores	50	47.2
Walk	38	35.8
Sports	2	1.9
Gym	4	3.8
Any other	12	11.3
Effect of physical activity on your menstrual symptoms		
Relieves the symptoms	40	37.7
Aggravates your symptoms	31	29.2
Has no effect	35	33.0

Regarding absenteeism from college due to pain or associated symptoms, 76 (71.1%) participants don't have to skip college activities, whereas only 30 (28.3%) have to skip academic activities due to pain and associated symptoms during menstrual cycle (Fig. 1).

Chi square test was applied to determine association between life style, physical activity and its type during menstrual cycle and pain during that period. Statistically significant association was found between physical activity during periods and dysmenorrhea (p=0.047) and BMI (p=0.032). However statistically insignificant association was found between life style and type of physical activity (Tables 3).

Table 3: Association between pain & physical activity during menstrual cycle

Variable	Pain during menstrual cycle		P value
	Yes	No	
Body mass index (kg.m^2)			
Normal	34	16	0.032*
Overweight	16	12	
Obese	10	6	
Life style			
Sedentary	23	5	0.108
Moderately active	59	9	
Active	6	4	
Perform any physical activity during Menstrual cycle			
Yes	47	14	0.047*
No	41	4	
Type of physical activity?			
Daily household chores	42	8	0.653
Walk	31	7	
Sports	1	1	
Gym	3	1	
Any other	11	1	

*Statistically significant at .05

Table 4: Association between pain and physical activity during menstrual cycle

Physical activity	Severity of Pain			P value
	Mild	Moderate	Severe	
Yes	9	28	12	0.000*
No	5	13	23	

*Statistically significant at .05

Table 5: Association between pain and absenteeism from college during menstrual cycle

Pain during menstrual cycle	Absence from college because of symptoms during menses		P value
	Yes	No	
Yes	29	59	0.013*
No	1	17	

*Statistically significant at .05

Fig. 1: Absenteeism from college during menstrual period

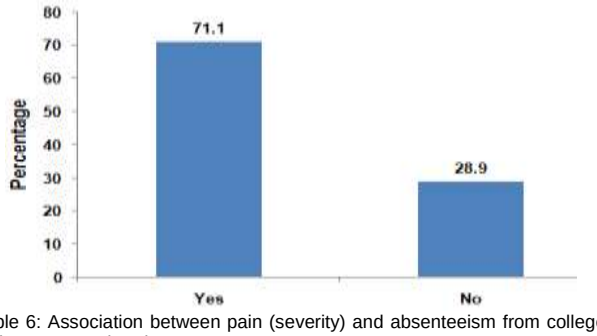

Table 6: Association between pain (severity) and absenteeism from college during menstrual cycle

Absence from college because of symptoms during menses	Severity of Pain			P value
	Mild	Moderate	Severe	
Yes	1	7	21	0.000*
No	13	34	14	

*Statistically significant at .05

Statistically significant association was found between severity of pain and physical activity during menstrual cycle as well

(Table 4). To determine association between pain during menstrual cycle and inability to go to college, chi square test was applied and statistically significant association was found between pain and absenteeism from college due to pain during that period (Table 5). Statistically significant association was found between severity of pain and absenteeism from college during menstrual cycle (Table 6).

DISCUSSION

In our study we tried to illustrate the relationship of physical activity on pattern of menstrual cycle particularly pain and absenteeism among female undergraduate medical students. Mean age of the respondents was 21.1 years. Most frequent form of physical activity was “house hold chores” 50 (47.2%) followed by ‘walk” 38 (35.8%). Absenteeism from academics related to menstrual cycle was reported by 28.3% respondents. Statistically significant association of physical activity during menstrual cycle was found between pain (p=.04) and severity of pain(p=.001).Similarly, absenteeism during menstrual cycle was statistically associated both with pain (p=.01) and severity of pain (p=.001). Systematic review of similar studies revealed that regular exercise prior and during menstruation significantly reduced menstrual pain intensity when compared to no treatment. However, role of type of exercise (high-intensity versus low- intensity) in providing beneficial effects is not evident.[11] These desirable effects of physical activity on pain relief are due to optimization of corticotrophin – releasing hormone, cortisol, prolactin, thyroid hormones, endorphins and prostaglandins among physically active females. Absence from work or academics during menstruation was reported to be associated with pain (OR= 1.5, 95% CI 0.49 to 2.03).[11]

Results of present study are consistent with findings of a Saudi research that highlighted significant impact of menstrual pain on absenteeism (p=.0001), reduced physical activity (p=.023), low concentration (p=.001) and poor academic performance (p=.011).[12] Pattern of physical activity in our study showed that majority of students 67 (63.2%) had 4-6 hours sitting and majority 40 (37.7%) had 20-30 minutes physical activity. This pattern is also consistent with research conducted in Saudi Arabia, according to which walking was the most frequently reported physical activity and mean duration of sitting and physical activity was (6.1±3mins) and (25.2±5.9 minutes) respectively. This similarity of findings might be due to similar demographic structure of study sample (female medical students of ages between 18-21 years)[12].

Majority participants of this study had normal BMI 50(47.2%), whereas 28(26.4%) were overweight and only 16(15.1%) were obese. Regular menstrual cycle was 101(95.3%) respondents. Majority of them had pain during menstrual cycle 90(85%) and pain reported was mild, moderate and severe reported by 14(13.2%), 41(38.7%) and 35(33%) respectively. Absenteeism associated with menstruation was reported by 30(28.3%) students. These results are supported by the findings of an Indian study conducted on female undergraduate medical students. More than half of participants 108 (59.01%) had normal (18.5–24.9) BMI and 54(29.50%) were overweight. Physical activity reported by majority of students was walk 124(67.76%). However, severe dysmenorrhea as the cause of absence was reported by only 12(6.56%) students.[13] In the present study 61(57.5%) performed physical activity regularly compared to 45(42.5%) physically inactive females. Exercise was found to be associated with pain and severity of pain in our study. These findings are consistent with results reported by Indian study, where 134(72.2%) reported to exercise occasionally compared to 49 (26.7%) and statistically significant association was observed between pain and exercise (p=0.032)[13].

Dysmenorrhea was reported in 90 (85%) participants in present study. Whereas a relatively low prevalence of dysmenorrhea (60.9%) was reported by a study carried out by Ibrahim et al[14] at Saudi Arabia. However, absenteeism due to dysmenorrhea among medical students reported by both studies was exactly same i.e., 28.3%. Our study showed that dysmenorrhea was associated with BMI (p=.032), which disagrees with the results reported by Ibrahim et al[14] also showing no association between pain and BMI. This finding might be due to the differences among study population. In our study BMI was reported that 50 (47.2%) had normal, 28 (26.4%) were overweight and only 16 (15.1%) were obese compared to 56 (61.2%) obese in Saudi Arabia.[14] Results of our study are comparable to another study conducted at Iran by Safarzadeh et al[15] reported that demonstrated a statistically significant association between exercise and pain during menstrual cycle (p=.001). Higher percentage of pain was reported among individuals who had exercise less than twice week. No of individuals with pain went down with an increase in physical activity. This finding contradicts our finding and 31 (29.2%) participants reported to have pain aggravated due to exercise during menstrual cycle.

CONCLUSION

The results of this study are comparable to those in other parts of the world. Altered pattern of menstrual cycle among medical students can affect their physical well-being leading to class absenteeism. Regular and continuous physical activity can be of a great effect in improving menstrual pain and related problems. Health promotion, screening programs and stress management trainings can minimize the unwanted outcomes and consequences of normal physiological cycle and identify the abnormalities timely.
Conflict of interest: Nil

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