



Menstrual Pattern among Female Medical Students in University of Maiduguri, Nigeria

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ABSTRACT

Aims: To determine menstrual pattern and disorder associated with it among female medical students.

Study Design: Cross-sectional study.

Place and Duration of Study: College of Medical Sciences, University of Maiduguri, Borno State, Nigeria between February – September 2010.

Methodology: Self descriptive cross-sectional study was carried out among 169 Medical students (MBBS II-V) between the ages 19-46 years. Respondents were selected from each class using stratified random sampling method. Stratification was done according to their class. Questionnaires were designed and administered to the respondents to complete. Three researchers and two research assistances were on site to assist. Students were briefed on the objective of the study and duly completed questionnaires were collected and analyzed. Subjects who had primary amenorrhea and/or history of abdominal or pelvic surgery were not eligible for the study. The questionnaire included data such as; age of menarche, menstrual pattern, severity of pain (dysmenorrhea), marital status, effects of exercise, socioeconomic status, Body mass Index (BMI) and Diet. The method of observation involved personal interaction and questioning of respondent to find out if they had anything peculiar about their cycle. The number of days of menstrual flow on menarche and number of pads use per day were in the questionnaire.

Results: It was observed that 148(87.6%) respondents had regular length of menstrual cycle, particularly in the age groups 20-22 and 23-26 years which recorded 39 and 43 respondents respectively. Irregular menstrual cycle was found in 21(12.4%)

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respondents, which showed its peak at the age group of 17-19(33.3%) years, between age groups. It was also observed that 118(69.8%) respondents had painful menstrual flow, out of which 71(60.2%) had mild pain, 30(29.7%) had moderate pain while 17(14.4%) had severe pain. Result of length of menstrual cycle between single and married respondents showed that, 20(71.4%) of single respondents had short menstrual length compared to 8(28.6%) married respondents of corresponding short menstrual length. It was revealed that in 148(87.6) respondents that had regular menstrual cycle type, 106(71.6%) menstrual flow was average, while in 31(21.0%), it was scanty and heavy in 11(7.4%) respondents. 10(47.6%) respondent had average irregular menstrual cycle, while 9(42.9%) and 2(9.5%) respondents had scanty and heavy irregular menstrual cycles. The result showed no significant variation in frequency of menstrual cycle ($p=0.5$). 99(58.6%) of respondents did no physical exercise; while 70(41.4%) did at least 30 minutes exercise ($p=0.38$). 101(59.8%) respondents belong to high upper, 51(30.2%) in upper-middle and 17(10.0%) belonged to lower socioeconomic status ($p=0.14$). 135(80.0%) respondents had daily fast food habits, out of which 95(80.5%) had positive history of pain and 34(20.0%) had no daily fast food ($P=0.80$). 30(17.8) respondents were underweight, 120(71.0%) had average weight and 19(11.2%) respondents were overweight ($p=0.20$).

Conclusion: Study has established mean age at menarche, menstrual pattern and menstrual disorder (pain) in relation to BMI, exercise and socioeconomic factor among female Medical Students of University of Maiduguri, Nigeria. The prevalence of dysmenorrhea was very high among the female medical students. Although further research is needed, as relationship between Menstrual cycle, obesity, diet and exercise are conflicting with other studies.

Keywords: Variation; menarche; menstrual pattern; Dysmenorrhea; Maiduguri, Nigeria.

1. INTRODUCTION

Menstrual cycle is a physiological change that occurs in females. The phenomenon of menstruation is the flow of blood from the uterus through the vagina and it occurs primarily in humans and their close evolutionary relatives like chimpanzees (Strassman, 1996). Woman's first menstruation is called menarche, it is an important maturity indicator used to assess the developmental status of a pubertal female (Blondell et al., 1999; Cameron and Nadgdee, 1996). Menarche occurs averagely at the age of 12 years. The end of a woman's reproductive phases called menopause, commonly occurs between the ages 45 and 55 years. Menstrual cycle is a determinant of a woman's reproductive health. Disorders in cycles or its irregularities are a major gynecological problem among female adults especially adolescent and a major source of anxiety to them and their family. Information on a woman's menstrual pattern will aids in clinical evaluation of gynecological problems and will make womanhood easier for adolescent women and adults (Harlow and Campbell, 2004).

Menstrual cycle abnormalities may also be associated with psychological stress, strenuous physical exercise, low body weight and endocrine disturbance. By late adolescence, 75% of girls experience some problem associated with menstruation. Delayed, irregular, painful, and heavy menstrual bleeding are leading reasons for physician office visits by adolescents (Arkutu, 1995). Menarche reversely correlates with age at onset of puberty with breast development. In girls with early onset of breast development, the interval to menarche is

longer (3 years or more) than in girls with later onset. By 15 years of age, 98% of females will have had menarche (Marti-Henneberg and Vizmanos, 1997). Menstrual cycles are irregular during the first year of menarche due to anovulatory cycles. Height, weight and body fat content continue to increase for 1-2 years following menarche and the cycles become regular within 2-3 years (Begum, 2009).

According to Klein and Litt (1981), menstrual flow lasts 2-7 days in 70-80% of cases, and changing three to five pads per day suggests normal flow. The duration between two menstrual cycles ranges from 21 to 45 days in the 1-2 years after menarche. When ovulatory cycles begin, 60-80% of the cycles are 21-35 days long, which is a similar pattern to that in adults. Some variety of menstrual dysfunction occurs in approximately 75% of adolescent girls, and may affect the life of adolescent and young adult women.

Primary amenorrhea has been defined as no menarche by 16 years of age; however, many diagnosable and treatable disorders can and should be detected earlier, using the statistically derived guideline of 14 to 15 years of age. Thus, an evaluation for primary amenorrhea should be considered for any adolescent who has not reached menarche by 15 years of age or has not done so within 3 years of the larche. Accordingly, lack of breast development by 13 years of age also should be evaluated (Reindollar et al., 1981)

A number of medical conditions can cause irregular or missed menses in adolescents. Although secondary amenorrhea has been defined as the absence of menses for 6 months, it is statistically uncommon for girls and adolescents to remain amenorrheic for more than 3 months or 90 days - the 95th percentile for cycle length. Thus, it is valuable to begin evaluation of secondary amenorrhea after the absence of menses for 90 days. Therefore, girls and adolescents with chaotically irregular cycles with more than 3 months between periods should be evaluated, not reassured that it is "normal" to have irregular periods in the first gynecologic years (Begum et al., 2009).

Dysmenorrhea is one of the most common gynecologic disorders among adolescent girls. It is defined as pelvic pain directly related to menstruation, and is associated with symptoms ranging from headache and back pain to nausea, vomiting and diarrhea. It is classified into two categories: primary when pelvic examination and ovulatory function are normal; and secondary when there is an identifiable gynecological pathology. Primary dysmenorrhea characteristically begins when adolescents attain their ovulatory cycles; generally within the first year after menarche (Durain, 2004). Excess production of prostaglandins (PG) leads to pain in the endometrium during the ovulatory cycle. PG stimulates the myometrial contraction and local vasoconstriction that cause the menstrual effluent to be expelled from the uterine cavity. It was shown that women with dysmenorrhea have higher levels of PG in their plasma and menstrual effluent than women without dysmenorrhea (Durain, 2004). Additionally, elevated serum vasopressin, nitric oxide and interleukin-6 levels have been reported in women with primary dysmenorrhea (Sun et al., 2005; Yeh et al., 2004). Dysmenorrhea is the major cause of activity restriction and college absence in adolescent girls. However, this condition is often considered as physiological pain and ignored by adolescents; and only few Adolescents need to consult a physician for menstrual pain (Begum et al., 2009).

This cross-sectional study was conducted to determine: (i) the patterns of menstrual cycles associated with the age of menarche; (ii) the prevalence of menstrual disorders; menstrual irregularity, dysmenorrhea and prolonged menstrual bleeding; and (iii) the effect of

menstrual pain on social activities such as exercise diet and BMI among female college students.

2. MATERIALS AND METHODS

This is a cross-sectional descriptive survey carried out from February to August, 2010 in Maiduguri, Borno State, Nigeria. The study was conducted among years II, III, IV and V (MBBS II - V) female medical students. A total of 169 female students (respondents) participated in the survey; their ages range from 19-46 years. Respondents were selected from each class using stratified random sampling method. Stratification of the students was done on basis of their class. Questionnaires were designed and administered to the respondents to complete. Three researchers and two research assistances were on site to assist. Students were briefed on the objective of the study and duly completed questionnaires were collected and analyzed. The aim of the study and the contents of the questionnaire were explained to each respondent, and voluntary participation was requested. Subjects who had primary amenorrhea and had a history of abdominal or pelvic surgery were not eligible for the study. The questionnaire included data such as; age of menarche, menstrual pattern, severity of pain (dysmenorrhea), marital status, effects of exercise, Body mass Index (BMI) and Diet. The method of observation involved personal interaction and questioning of respondent to find out if they had anything peculiar about their cycle. The number of days of menstrual flow on menarche and subsequent flow as well as number of pads use per day were in the questionnaire. The number of pads used per day served as indicator for the estimation of menstrual flow. Effects of pain on volume of flow and effect of childbirth on menstrual cycle were also asked. Questionnaires were distributed and collected on the same day to ensure confidentiality and minimize bias. The data were analyzed manually and tabulated in percentages; Ethical approval was obtained from the University of Maiduguri Ethical committee. No respondent's name was recorded for confidentiality.

3. RESULTS AND DISCUSSION

Out of the 200 questionnaires distributed, 169 were retrieved and the information contained in each questionnaire was analyzed and presented in tabular form (Tables 1-8).

It was observed that menstrual cycle according to age groups was more regular in 101(59.8%) respondents, particularly in the age groups of 20-22 and 23-25 years recorded 39(55.7%) and 43(64.2%) respondents respectively. Irregular menstrual cycle was found in 21(12.4%) respondents, which showed its peak at the age group of 17-19(33.3%) years, between age groups (Table 1a).

Irregular menstrual cycle length was higher in age group 20-22 years 11(52.4%), then 5(23.8%) in age groups 17-19 and 23-25 years respectively (Table 1b). 135(79.9%) respondents moderate blood flow, while 149(88.1%) respondents had 3-5days of blood flow. Frequency of menstrual cycle was regular in 148(87.6%) respondents and 21(12.4%) of the respondents had irregular menstrual cycle. It was also observed that 118(69.8%) respondents had painful menstrual flow, out of which 71(60.2%) had mild pain, 30(29.7%) had moderate pain while 17(14.4%) had severe pain (Table 2).

Table 1a. Distribution of length of menstrual cycle between age groups

Average Menstrual Cycle Length (days)	Age Interval (Years)				
	17-19	20-22	23-25	26-28	29 & Above
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
25 (Short)	2 (13.3)	13 (18.6)	9 (13.4)	1 (7.7)	1 (25.0)
26-29 (Normal)	7 (46.7)	39 (55.7)	43 (64.2)	9 (69.2)	3 (75.0)
30 (Long)	1 (6.7)	7 (10.0)	10 (14.9)	3 (23.1)	0 (0.0)
Irregular	5 (33.3)	11 (15.7)	5 (7.5)	0 (0.0)	0 (0.0)
Total (%)	15 (100)	70 (100)	67 (100)	13 (100)	4 (100)

Table 1b. Distribution of length of menstrual cycle within age groups

Average Menstrual Cycle Length (days)	Age Interval (Years)					Total (%)
	17-19	20-22	23-25	26-28	29 & Above	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
25 (Short)	2 (7.7)	13 (50.0)	9 (34.6)	1 (3.8)	1 (3.8)	26 (100)
26-29 (Normal)	7(6.9)	39 (38.6)	43(42.6)	9 (8.9)	3 (2.9)	101(100)
30 (Long)	1 (4.8)	7 (33.3)	10(47.6)	3 (14.3)	0 (0.0)	21 (100)
Irregular	5 (23.8)	11 (52.4)	5 (23.8)	0 (0.0)	0 (0.0)	21 (100)

Result of length of menstrual cycle between single and married respondents showed that, 20(71.4%) of single respondents had short menstrual length compared to 8(28.6%) married respondents of corresponding short menstrual length. Similar trends of increase were observed in single compared to married respondents along normal, long and irregular menstrual length (Table 3a). Menstrual length within single and married was observed to be 25(58.2%) along married column and 71(56.3) along single column, while 20(15.9) was observed in single and 8(18.6) in married respondents (Table 3b).

It was revealed that in 148(87.6) respondents that had regular menstrual cycle type, 106(71.6%) menstrual flow was average, while in 31(21.0%), it was scanty and heavy in 11(7.4 %) respondents. 10(47.6%) respondent had average irregular menstrual cycle, while 9(42.9%) and 2(9.5%) respondents had scanty and heavy irregular menstrual cycles respectively (Table 4b). Menstrual cycle types were more regular in all the bleeding types as shown in (Table 4a) below. 99(58.6%) of respondents did no physical exercise; while 70(41.4%) have at least 30 minutes exercise (p=0.38). 48(40.7%) that responded positive to history of pain did exercise, 22(43.1%) of respondents with negative history of pain also did at least 30 minutes exercise (Table 5). 101 (59.8%) respondents belong to high upper, 51(30.2%) in upper-middle and 17 (10.0%) belonged to lower socioeconomic status (p=0.14) as seen in (Table 6).

135(80.0%) respondents had daily fast food habits, out of which 95(80.5%) had positive history of pain and 34(20.0%) had no daily fast food (P=0.80); (Table7). 30(17.8) respondents were underweight, 120(71.0%) had average weight and 19(11.2%) respondents were overweight (p=0.20). In underweight category 18 (15.3%) had pain, in average weight category 90(76.3%) had pain while in overweight category 10(8.4%) had pain (Table 8).

Table 2. Menstrual cycle characteristics in female Medical Students

Menstrual Characteristics	Number of Subjects	Percentage (%)
Length of cycle (days)		
25 (Short)	26	15.4
26-29 (Normal)	101	59.8
30 (Long)	21	12.8
Irregular	21	21
Total	169	100
Blood flow per cycle		
Small (4 pads per day)	22	13.0
Moderate (5-10 pads/day)	135	79.9
Heavy(2 pads at a time)	12	7.1
Total	169	100
Duration blood flow/day		
< 2	4	2.4
3-7	149	88.1
> 8	16	9.5
Total	169	100
Menstrual cycle		
	Frequency	Percentage
Regular	148	87.6
Irregular	21	12.4
Total	169	100
Menstrual pain		
	Number of Subjects	Percentage (%)
Yes	118	69.8
No	51	30.2
Total	169	100
Classification of pain		
Mild	71	60.2
Moderate	30	29.7
Severe	17	14.4
Total	169	100

Table 3a. Distribution of length of menstrual cycle between single and married respondents

Average menstrual cycle length (days)	Marital Status		Total (%)
	Single (%)	Married (%)	
25 (Short)	20 (71.4)	8 (28.6)	28 (17.8)
26-29 (Normal)	71 (74.0)	25 (26.0)	96 (56.8)
30 (Long)	19 (79.2)	5 (20.8)	24 (14.2)
Irregular	16 (76.2)	3 (23.8)	19 (11.2)

Table 3b. Distribution of length of menstrual cycle within single and married respondents

Average menstrual cycle length (days)	Marital Status	
	Single (%)	Married (%)
25 (Short)	20 (15.9)	8 (18.6)
26-29 (Normal)	71 (56.3)	25 (58.2)
30 (Long)	19 (15.1)	5 (11.6)
Irregular	16 (12.7)	3 (11.6)
Total (%)	126 (74.6)	43 (25.4)

Table 4a. Menstrual bleeding between types of cycle

Menstrual Cycle Types	Menstrual Bleeding		
	Scanty (%)	Average (%)	Heavy (%)
Regular	31 (77.5)	106 (91.4)	11 (84.6)
Irregular	09 (22.5)	10 (18.6)	02 (15.4)
Total (%)	40 (23.7)	116 (68.6)	13 (7.7)

Table 4b. Menstrual bleeding within type of cycle

Menstrual Cycle Types	Menstrual Bleeding			Total (%)
	Scanty (%)	Average (%)	Heavy (%)	
Regular	31 (21.0)	106 (71.6)	11 (7.4)	148 (87.6)
Irregular	09 (42.9)	10 (47.6)	02 (9.5)	21 (12.4)

Table 5. Distribution of exercise in relation to menstrual pain

30 minutes exercise	Number of subjects		Percentage (%)
Yes	70		41.4
No	99		58.6
Total	169		100

Daily exercise	Positive history of pain (%)	Negative history of pain (%)	Total (%)
Yes	48 (40.7)	22 (43.1)	70 (84.6)
No	70 (59.3)	29 (56.9)	99 (15.4)
Total	118	51	169

P value=0.38, Not Significant

Table 6. Distribution of socioeconomic status in relation to menstrual pain

Socioeconomic Status	Number of subjects	Percentage (%)	
High Upper(>160000)	101	59.8	
Upper Middle (120000-160000)	51	30.2	
Lower Middle (80001-120000)	17	10.0	
Total	169	100	

Socioeconomic Status	Positive history of pain (%)	Negative history of pain (%)	Total (%)
High Upper	77 (65.3)	26 (51.0)	101 (59.8)
Upper Middle	30 (25.4)	16 (31.4)	51 (30.2)
Lower Middle	11 (9.3)	09 (17.6)	17 (10.0)
Total	118	51	169

P value=0.14, Not Significant

Table 7. Distribution of Diet (Fast food) in relation to menstrual pain

Fast Food	Number of subjects	Percentage (%)	
Yes	135	80.0	
No	34	20.0	
Total	169	100	

Fast Food	Positive history of pain (%)	Negative history of pain (%)	Total (%)
Yes	95 (80.5)	38 (74.5)	133 (78.7)
No	23 (19.5)	13 (25.5)	36 (21.3)
Total	118	51	169

P value=0.80, Not Significant

Table 8. Distribution of Body Mass Index (BMI) in relation to menstrual pain

Body Mass Index	Number of subjects	Percentage (%)	
Underweight (BMI < 18.5)	30	17.8	
Average weight (BMI 18.5-24.9)	120	71.0	
Over weight (BMI > 25.0)	19	11.2	
Total	169	100	

Body Mass Index	Positive history of pain (%)	Negative history of pain (%)	Total (%)
Underweight	18 (15.3)	08 (15.7)	26 (15.4)
Average weight	90 (76.3)	40 (78.4)	130 (76.9)
Over weight	10 (8.4)	03 (5.9)	13 (7.7)
Total	118	51	169

P value=0.20, Not Significant

4. DISCUSSION

The present study was conducted to determine the relationship between bleeding at menarche and subsequent bleeding, marital status and average menstrual cycle, how day to day activities affect menstrual pattern. The age of menarche is determined by number of factors such as, general health, genetic factors, socioeconomic and nutritional status (Chowdhury et al., 2000).

In this study the minimum age at menarche was 9 years, while the maximum age at menarche was 17 years with an average mean of 13 years which correlates with study by Begum et al. (2009). However, in another study by Desalegn et al. (2009), the mean age at menarche was 15 years which might be due to poor nutritional status of the women in rural communities where the study was conducted. The mean age of menarche for rural female adolescents was significantly higher than for urban ones, which is in agreement with the result found in Nigeria (Ikaraoha et al., 2005). Ikaraoha et al. (2005) also reported a mean age at menarche of 13.89 years for the urban secondary school girls in Rivers State of Nigeria (South-south Nigeria); Jack et al. (2005) reported a mean age of 13.6 years for secondary school girls in Maiduguri (North-East Nigeria).

This can be explained by the better socioeconomic status for urban girls than rural ones and the lack of fat for rural girls due to malnutrition. Besides, rural girls travel long distances to school every day which may partially put them to stress and delay their menarche. Menarche typically occurs between the ages of 12 and 13 years; but with the improvements in the nutritional status and general health it has declined in many populations during the last decades (Bullough, 1981).

Dysmenorrhea (pain) is the most common (87.6%) problem associated with female medical students in this study. Other studies reported its prevalence as 67.7% (Lee et al., 2006) and 73.8% (Amita et al., 2008). In this study, 71(60.2%), 30(29.7%) and 17(14.4%) respondents suffered from mild, moderate and severe grades of pain which correlate with study conducted by Amita et al. (2008) that reported grades of pains as 63.29% 30.37% and 6.32% from mild, moderate and severe pains respectively. while study by Jerry et al. (1981) showed that 14% severe, 38% moderate and 49% subjects were mild sufferers. Other common disorders in present study were abnormal menstrual flow, abnormal duration of flow followed by irregular length of cycle, while in the Malaysian study by Lee et al. (2006) a "long cycle" was a common menstrual disorder among adolescent girls; this may be due to difference in their gynecological age. In our study, all the girls had menarche far more than three years, while in reference study most of those with abnormal cycle length were within two years of achieving menarche, suggestive of anovulatory cycles at the time of study. In WHO study on menstrual and ovulatory patterns in adolescent girls, the mean menstrual cycle length was 50.7 days, in the first cycle after menarche, and bleeding lasted for an average of 4.7 days (WHO, 1986). The female reproductive system usually requires approximately two years maturing before adolescent girls will have consistently regular ovulatory cycles (WHO, 1986). Prolonged menstrual bleeding usually occurs early after menarche due to anovulatory cycles. In anovulatory cycles, estrogen unopposed by progesterone produces an unstable endometrial lining that eventually breaks down and vasoconstriction and myocardial contractility do not occur (Bayer and DeCherney, 1993).

Culturally, pain is seen as a necessary part of menstruation and girls are brought up with this notion especially if the mother/or sister had experienced painful menstrual periods in her lifetime. In this study dysmenorrhea (pain during menstruation) correlated with a study done

by Desalegn et al. (2009) which also reported higher cases of dysmenorrhoea in most respondents. In our study, dysmenorrhea was more common among those who had regular cycles as against results reported by Desalegn et al. (2009), that there were more respondents had irregular painful menstrual cycles.

5. CONCLUSION

The present study has determined age at menarche, the relationship between bleeding at menarche and subsequent bleeding, marital status and average menstrual cycle among the female Medical Students of University of Maiduguri, Borno State, Nigeria. The prevalence of dysmenorrhea was very high among the female medical students. Relationship between dysmenorrhea and obesity (BMI), socioeconomic status, exercise and dietary habits have also been presented. Changes in the normal menstrual pattern of women may affect their physical as well as mental well-being. Although further research is needed, as relationship between Menstrual cycle, obesity, diet and exercise are conflicting with many other studies. Health education is needed about menstrual pattern and its irregularities.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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