

**PHYSIOLOGICAL VARIATION OF MENSTRUAL CYCLE AMONGST FEMALE STUDENTS IN TERTIARY INSTITUTIONS OF RIVERS STATE**

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**ABSTRACT**

Menstrual cycle is a process that every woman who have attained puberty must undergo and this occur monthly in a normal physiologic pattern unless in some cases were certain factors may halt the monthly process. This cycle varies in individual. The aim of this study is to ascertain the physiological variation of menstrual cycle amongst female students of tertiary institutions in Rivers State. This is a cross-sectional study involving students with age between 8 to 23 years. The study revealed that the participants experienced their first menstrual cycle between the 8 to 17 years and it was peak at the age of 13 years. 33.5% of the students have 4 days duration of menstrual flow; 24.5%, 5 days; 17.3%, 3 days; 11.1%, 7 days; 6.1%, 6 days; 5%, 2 days; and 0.42% of students have their duration of flow for 8, 10, 14 and 15 days respectively. 73.7% of the participants have moderate flow, 20.7% have heavy with clots and 5.6% have scanty flow. 77% of the participants have changes in the size of their breasts, while 23% do not have any change. Study shows that 93% of the respondents do not experience facial pimples and 7% experienced. 87% of the students developed painful breasts and 13% do not. 70% of the participants have dizziness and weakness while 30% do not. 5% of the participants have their cycle lent less than 21 days; 15% have it between 22-24 days; 46%, 25-28 days; 21%, 29-32 days; 4%, 33-35 days; and 9% have too irregular. 69% of the respondents have premenstrual syndrome while 39% do not have premenstrual syndrome.

**KEYWORDS:** Physiological, Menstrual cycle, Variation, Students.

**INTRODUCTION**

Every woman must pass through the periodic process of menstrual cycle as soon as they attain maturity and it continues until certain age when the menstrual cycle stops to set in another stage of life. The menstrual cycle begins on the first day of menstrual bleeding and end with the beginning of the next menstrual bleeding. However menstrual cycle commonly called menstrual period varies in individual in terms of duration of flowing, length of cycle, pattern of flowing, stability in periodicity and premenstrual syndrome.

Menstrual cycle begins at puberty, ranging from the ages of 10 to 16, and stops at menopause at an average age of 51. (Rosner, *et al*, 2020; Coast, *et al*, 2019; Pan B, and Li J., 2019).

The length and regularity of menstrual cycles reflect changes in ovarian steroid production (. Kato *et al*, 1999; Harlow SD and Ephross SA, 1995). if an undetected pregnancy and loss occurs, menstrual cycle length may be misclassified if self-reported information is used alone (Harlow SD and Matanoski GM, 1991). Study by Yan *et al*, 2014 shows that demographic and lifestyle factors are associated with menstrual cycle features and that the patterns of effects are alike. Physical activity of 4 or more hours per week was associated with an increased cycle length (Yan *et al*, 2014), which could be due to a dampening of FSH pulses during the lutealfollicular transition, leading to delayed maturation of the next cohort of follicles (Akaike H. A, 1974; De Souza, *et al*, 1997). Increased cycle length is associated with delayed ovulation and increased follicular phase length, since luteal phases are self-limited to 14 days (Vollman RF, 1977). Cycle length has been negatively associated with

age because of shortening of the follicular phase (Harlow SD and Ephross SA, 1995; Dennerstein, *et al*, 1997; Yan *et al*, 2014). Harlow *et al*, (1991), revealed that overweight is associated with the occurrence of long cycles in college women. Alcohol consumption has shown to be associated with a reduction in long cycles in young women (Cooper *et al*, 1996; Yan *et al*, 2014) and changes in hormone dynamics (Reichman *et al*, 1993; Mendelson JH and Mello NK, 1988). Non modifiable factors, like ethnicity, and potentially modifiable risk factors, like smoking, physical activity, and alcohol consumption, may affect menstrual cycle outcomes (Yan *et al*, 2014). Also, study by Bae, *et al*, (2018) shows that modifiable risk factors, such as smoking, obesity, and stress, were significantly associated with menstrual cycle irregularity.

The major cause of menstrual cycle irregularity is functional hypothalamic amenorrhea linked with reduced gonadotropin-releasing hormone secretion and hypothalamic-pituitary-adrenal (HPA) axis dysregulation (Reindollar, *et al*, 1986; Loucks AB and Thuma JR, 2003; Liu JH, 1990; Berga S, Naftolin F, 2012). Study, revealed that smoking could cause hypoestrogenism (Westhoff, *et al*, 1996) and high stress has been demonstrated to affect the HPA axis activity (Westhoff, *et al*, 2014). Women who had BMI of 25–30 or  $\geq 30$  have high risk of developing irregular menstruation (Bae, *et al*, 2018).

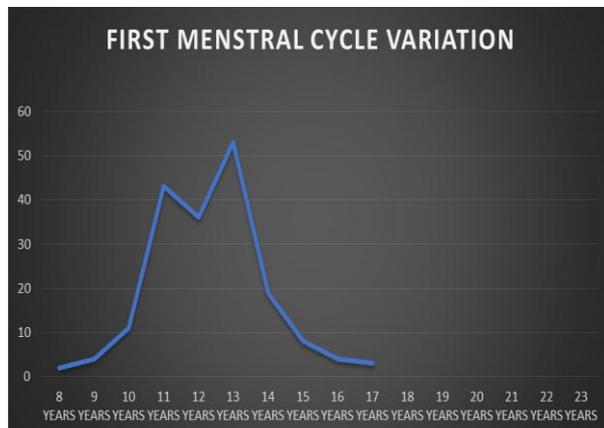
**MATERIAL AND METHODS**

A cross-sectional study was carried out amongst female students in tertiary institutions in Rivers State, and the study lasted for a period of six weeks. Well-structured questionnaires were administered to the participants. Each participant had one questionnaire to fill correctly and independently and thereafter, filled questionnaires were returned to the researchers. Statistical analysis of data was done using Microsoft Excel. P value < 0.05 was considered significant for data.

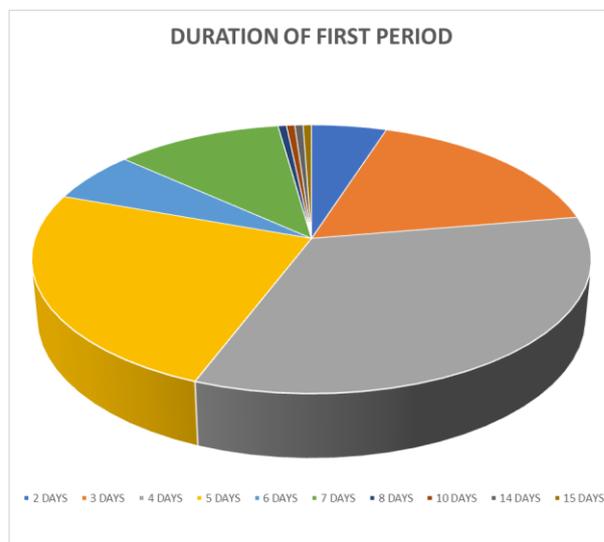
**RESULTS**

Participants (students) attained menarche between the ages of 8 to 17 years with variation in duration of menstrual flow. The study revealed that the participants experienced their first menstrual cycle between the 8 to 17 years and it was peak at the age of 13 years. 33.5% of the students have 4 days duration of menstrual flow; 24.5%, 5 days; 17.3%, 3 days; 11.1%, 7 days; 6.1%, 6 days; 5%, 2 days; and 0.42% of students have their duration of flow in 8, 10, 14 and 15 days respectively. 73.7% of the participants have moderate flow, 20.7% have heavy with clots and 5.6% have scanty flow. 77% of the participants have changes in the size of their breasts, while 23% do not have any change (Table 1). Study shows that 93% of the respondents do not experience facial pimples and 7% experienced. 87% of the students developed painful breasts and 13% do not. 70% of the participants have dizziness and weakness

while 30% do not. 5% of the participants have their cycle lent less than 21 days; 15% have it between 22-24 days; 46%, 25-28 days; 21%, 29-32 days; 4%, 33-35 days; and 9% have too irregular. 69% of the respondents have premenstrual syndrome while 39% do not have premenstrual syndrome.



**Figure 1: Age at first menarche.**



**Figure 2: Duration of flow of menstrual cycle.**

**Table 1: Changes in size of breasts during menstrual flow.**

Yes	No
77	23
77%	23%

**Table 2: Participants who developed pimples.**

No	Yes
164	13
93%	7%

**Table 3: Participants who have painful breast.**

Yes	No
153	21
87%	13%

**Tablet 4: Participants who developed dizziness and weakness.**

NO	YES
24	56
30%	70%

**Table 5: Menstrual cramps.**

Yes	No
135	41
77%	23%

**Table 6: Length of cycle.**

Less than 21 Days	22-24 Days	25-28 Days	29-32 Days	33-35 Days	More Than 36 Days	Too Irregular to Say
8	26	79	36	7		15
5%	15%	46%	21%	4%		9%

**Table 7: Variation of First Menstrual Cycle with Age.**

Early Maturers		Late Maturers	
Age	Respondents	Age	Respondents
8	2	15	8
9	4	16	4
10	11	17	3
11	43	23	1
12	26		
13	53		
14	19		
MEAN 24.7		MEAN 3.6	
P < 0.00006		P < 0.00007	

## DISCUSSION

Menstrual cycle is a process that every woman who have attained puberty must undergo and this occur monthly in a normal physiological pattern unless in some cases were certain factors may halt the monthly process. This cycle varies in individual in duration of flow, length of cycle, pattern of flow (scanty, moderate or heavy with or without clot). Virtually every woman who have attained puberty and she has started menstrual period will experience certain physiological changes in her body. These changes may occur before or during the menstrual cycle. These physiological changes vary in individuals. The study shows that participants attained menarche between 8 and 15 years. However, number of students who attained menarche at the age of 13 years were many compared to other years. The study revealed that 13 years was the peak at which the participants attained menarche (Figure 1). These variations in age at menarche could be due to certain physiological parameters that may not be expressed evenly in all participants. Again, the study shows that most participants experienced duration of flow of menstrual periods between 4 to 6 days (Figure 2).

Our study revealed that the participants experienced physiological changes in their body during the menstrual periods. 77% of the participants have changes in the size of their breast and 23% do not have changes while on menstruation (Table 1). Their breast becomes full than when they were at the pre-menstruation stage. These changes may be due to certain hormones that increases

the size of breasts during menstruation. Also, 87% of the students have painful breasts and 13% do not have while on menstruation (Table 3). 93% of the participants developed facial pimples while 3% do not experienced pimples during menstruation. These pimples occur during menstrual periods and disappear as soon as their cycles end. The study revealed that 70% of the participants also developed dizziness and weakness and 30% do not. These weakness and dizziness could be from the flow of the cycle. 77% of the respondents have menstrual cramps and these cramps could be due to the released of prostaglandins. 5% of the participants have their cycle length less than 21 days and 46% have theirs between 25 to 28 days. However, the p-value for the participants who attained menarche at early and late are significant (Table 7).

These physiological changes occur during menstrual periods and varies in individual. As stated above, that most of the participants developed fullness of their breast, painful breast, pimples and menstrual cramps as soon as they begin to see their period. These physical or physiological changes experienced by the participants could be due certain chemical messagers in the participants' body. May be these chemical messagers may not be in equal proportion in the participant's body leading to variations experienced during menstrual cycle. However, the mechanisms involved in these physiological changes is not known.

## CONCLUSION

This study showed that most participants experienced physiological changes such as fullness of breasts, painful breast, pimples and menstrual cramps while on their menstrual periods.

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## DECLARATIONS

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**Conflict of interest:** No conflict of interest

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