Assessment of age at menarche and menstrual pattern among secondary school girls in Awka, Southeast Nigeria

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INTRODUCTION

Menarche is an important physiological milestone in the reproductive life of a woman. It is the onset of the very first menstruation of a young woman.1 Menstruation is a normal physiological process that begins during adolescence and may be associated with various features occurring before or during the menstrual flow.1 It is the culmination of a cascade of physiological events involving the pituitary gland, the ovaries and the uterus. Age at menarche is known to be influenced by many factors including genetics, nutrition, sporting activities, environment and economic status and may have geographical variation.2-4 Various studies have reported varying ages at menarche in different populations. Ikaraoha in Rivers state of Nigeria reported 13.19±1.32 years for urban and 14.22 years for rural areas while a Kano study among secondary school students gave a mean age at menarche of 12.8 years.5,6 There was no statistically significant association between the age at menarche and the socioeconomic status of the parents in these studies.5,6 Another study at Abakaliki observed a mean age at menarche of 13±1.0 years and with a high socioeconomic status of parents tending to reduce the age among the participants.7 Diorgu reported a mean menarcheal age of 12.8±1.6 years in Portharcourt.8 Pandez in Mozambique reported 13.9±1.29 years.9

ABSTRACT

Background: Menarche is an important physiological milestone in girls and this usually occurs during their secondary school years. The menstrual pattern may vary in these adolescents. This knowledge may assist in counselling the young girls on reproductive health issues.

Methods: A cross-sectional study of female secondary school students from Kenneth Dike secondary school, Awka; Amaenyi girls’ secondary school and community secondary school, Okpuno, all in Awka, Anambra state of Nigeria. All together 545 students were selected following informed consent. The study instrument was a pre-tested, semi-structured and self-administered questionnaire. Data analysis was done with IBM SPSS 20 software. Tests of association between variables were done with Fisher’s exact test and the level of significance set at p≤0.05.

Results: The mean age of the 545 respondents was 16.79±1.736 years and majority of them are of the Igbo ethnic group (90.5%). The average age at menarche was 12.77±1.159 years. There is a significant difference between the age at menarche and the father’s occupation. The modal duration of flow was 4 days (48.7%) while 95.2% had a normal cycle length of 21-35 days.

Conclusions: The average age of menarche of secondary school girls in Awka was 12.77±1.159 years. Most of the students had normal menstrual flow duration of 2-7 days with a cycle length of 21-35 days.

Keywords: Age, Menarche, Menstrual pattern, School, Awka
However, menarcheal age of 13.66 years was reported in Morocco.10

Even though, biology of the human reproductive system is taught in Nigerian secondary schools, cultural and family inhibitions have restricted open discussion of menstrual issues especially with adolescents.9 However, adolescent girls and young women still discuss menstrual issues with their mothers and other close female associates.

In a Gambian study, two thirds of the surveyed girls reported having learnt about menstruation before menarche; however at menarche most felt unprepared.11 Teachers were the main source of information, but when asking for advice most girls preferred to ask their mothers. Mothers reported facing difficulties in discussing menstruation with their children and felt that boys did not need to be taught about it. Most girls used reusable cloth unless they are given free menstrual pads from school.11

In the adolescent, with onset of menstruation, the cycle and pattern of flow may take some period of time to stabilize. Some may have abnormally long or short cycles and volume of flow may vary as well.12 A study in Northwest Nigeria showed that about one-quarter of the adolescent girls had a cycle length of 28 days. The average duration of flow was 4.9±5.1 days with a normal amount of blood flow and regular menses in more than 80% of the adolescent school girls.13 In a similar study in Portharcourt, South Nigeria, the average duration of the menstrual cycle was 29.8±3.3 days.8

Though studies have been done on various aspects of menarche and menstrual life of school girls in different parts of the world and the country, none has been documented in Awka, Southeast Nigeria which is the capital city of Anambra state and the seat of a teaching hospital and a medical college, Chukwuemeka Odumegwu Ojukwu university college of medicine and its affiliated teaching hospital. This study was aimed at finding the age at menarche and the menstrual pattern of secondary school girls at Awka, Southeast Nigeria. The results and findings will be a good tool in the hands of reproductive health practitioners in counselling and management of related conditions in these adolescents.

METHODS

Current study was conducted amongst girls drawn from post-primary schools in Awka, the capital city of Anambra state of Southeast Nigeria in May 2019. Many secondary schools in Awka are characterized by the absence of boarding facilities with the resultant high numbers of day students. Three post-primary schools were selected at random Kenneth Dike secondary school, Awka; Amaenyi girls’ secondary school and community secondary school, Okpuno. Kenneth Dike secondary school and community secondary school, Okpuno are co-educational institutions while the other is a female secondary school.

The survey employed a cross-sectional, descriptive study design. One class of a stream was selected at random starting from junior secondary school II (JSS II) to senior secondary school III (SSS III). The JSS I was excluded because it usually consists of very young children who are in their very first experience of post-primary education and are not yet in tune with secondary school life. Secondary school education in Nigeria is structured in a way that students spend a total of six years. The first three years are spent in the junior secondary segment while the last three are spent in the senior secondary segment. JSS II stream of a school may have up to three classes for instance, and only one class was selected. In the co-educational school, obviously only the female students in the selected classes were included in the study.

All together 545 students were drawn following informed consent. Their parents/guardians also gave their permission as well. The study instrument was a pre-tested, semi-structured and self-administered questionnaire which contained questions on socio-demographic characteristics including age, father’s occupation and mother’s level of educational attainment, religion and tribe. The father’s occupation classification as a measure of socio-economic status was that developed by Oyedeji.14 Also contained in the questionnaire were height and weight (which were measured by the research assistant), age at menarche, duration of flow, presence of heavy flow, cycle length, dysmenorrhoea, etc. The weight and height were measured as the questionnaire was being administered. These were used to calculate their body mass index (BMI). Some of the selected students had not achieved menarche and therefore did not finish all the questions contained in the questionnaire. Data analysis was done with IBM SPSS 20 software. Tests of association between variables were done with Fisher’s exact test and the level of significance set at p≤0.05.

RESULTS

The mean age of the 545 respondents was 16.79±1.736 years and majority of them are of the Igbo ethnic group (90.5%). Most of them were in the 15-17 years age group. Seventy one percent of the respondents had normal body weight (BMI of 18.5-24.9 kg/m²) while only 1.3% of them were obese. The rest of the socio-demographic characteristics of the respondents are shown in (Table 1). The age at menarche of the respondents is shown in (Table 2). The average age at menarche was 12.77±1.159 years. The modal age was 12 years.

Most of the respondents (83.9%) informed their mothers first about the onset of menarche even though a lesser number got pre-menarcheal education from them (67.2%) as shown in (Table 3).
There was a significant difference between the age at menarche and the father’s occupation (Table 4). But there was no significant difference between the flow duration and the respondents’ BMI, presence of dysmenorrhoea or the cycle length (Table 5).

The menstrual pattern is shown in (Table 6). The modal duration of flow was 4 days (48.7%) while 95.2% had a normal cycle length of 21-35 days.

### Table 1: Socio-demographic characteristics of the respondents.

| Variables (n=545)       | N     | (%)  |
|-------------------------|-------|------|
| **Age (years)**         |       |      |
| 12-14                   | 43    | 7.9  |
| 15-17                   | 323   | 59.3 |
| 18-20                   | 168   | 30.8 |
| 21-23                   | 11    | 2.0  |
| Mean±SD                 | 16.79±1.736 |      |
| **BMI**                 |       |      |
| Underweight             | 91    | 16.7 |
| Normal weight           | 387   | 71.0 |
| Overweight              | 60    | 11.0 |
| Obese                   | 7     | 1.3  |
| **Tribe**               |       |      |
| Igbo                    | 493   | 90.5 |
| Hausa                   | 5     | 0.9  |
| Yoruba                  | 10    | 1.8  |
| Others                  | 37    | 6.8  |
| **Religion**            |       |      |
| Anglican                | 104   | 19.1 |
| Roman Catholic          | 255   | 46.8 |
| Pentecostal             | 183   | 33.6 |
| Islam                   | 3     | 0.6  |
| Others                  | 0     | 0    |
| **Father’s occupation** |       |      |
| Professional            | 79    | 14.5 |
| Administrative officer  | 60    | 11.0 |
| Artisan                 | 107   | 19.6 |
| Business man            | 229   | 42.0 |
| Farmer                  | 70    | 12.8 |
| **Mother’s educational status** | | |
| No formal education     | 18    | 3.3  |
| Primary                 | 76    | 13.9 |
| Secondary               | 265   | 48.6 |
| Tertiary                | 186   | 34.1 |
| **Resides with whom?**  |       |      |
| Parents                 | 313   | 57.4 |
| Relatives               | 57    | 10.5 |
| Guardian                | 163   | 29.9 |
| Step mother             | 7     | 1.3  |
| Others                  | 5     | 0.9  |

### Table 2: Age at menarche of respondents.

| Variables                                             | Frequency (n=545) | (%) |
|-------------------------------------------------------|-------------------|-----|
| **Achieved menarche?**                                | Yes               | 503 | 92.3 |
|                                                       | No                | 42  | 7.7  |
| **Age at menarche (years)**                           |                   |     |      |
| 9                                                     | 3                 | 0.6 |
| 10                                                    | 11                | 2.2 |
| 11                                                    | 36                | 7.2 |
| 12                                                    | 168               | 33.4|
| 13                                                    | 152               | 30.2|
| 14                                                    | 100               | 19.9|
| 15                                                    | 31                | 6.2 |
| 16                                                    | 2                 | 0.4 |

### Table 3: Characteristics and events around menarche of the respondents.

| Variables                                             | Frequency (n=545) | (%) |
|-------------------------------------------------------|-------------------|-----|
| **First person informed of menarche** (n=503)          | Mother            | 422 | 83.9 |
|                                                       | Teacher           | 4   | 0.8  |
|                                                       | Girlfriend        | 22  | 4.4  |
|                                                       | Others            | 55  | 10.9 |
| **Educated on menses prior to menarche** (n=503)       | Yes               | 469 | 93.2 |
|                                                       | No                | 34  | 6.8  |
| **Pre-menarche education given by** (n=469)            | Mother            | 315 | 67.2 |
|                                                       | Sister            | 53  | 11.3 |
|                                                       | Teacher           | 71  | 15.1 |
|                                                       | Friend            | 12  | 2.6  |
|                                                       | Others            | 18  | 3.8  |
| **Received post-menarche education** (n=501)           | Yes               | 457 | 91.2 |
|                                                       | No                | 44  | 8.8  |
| **Ever discussed menstruation with your mother** (n=503)| Yes               | 472 | 93.8 |
|                                                       | No                | 31  | 6.2  |

### DISCUSSION

Current study showed an average age at menarche of 12.77±1.159 years and is similar to the findings of 13.19±1.32 years in a Portharcourt study and 12.8 years in other Portharcourt and Kano studies. It is also similar to the reports from other African countries of Mozambique and Morocco. There is also an agreement with the mean menarcheal age of 12.52 years found in an Indian study. The significant association between the father’s occupation and the age at menarche is expected as this is a reflection of the socio-economic status which is known to have an inverse relationship with the age at menarche.
| Table 4: Association between age at menarche and socio-demographic characteristics of the respondents. |
|----------------------------------|---------------|----------------|-----------------|-----------------|----------------|----------------|
| Variables                        | Age at menarche (years) N (%) | Test statistics | F value | P value |
|----------------------------------|-------------------------------|-----------------|---------|---------|
| **BMI**                          |                               |                 |         |         |
| <18.5 (Underweight)              | 0 (0.0)                       |                 |         |         |
| 18.5-24.9 (Normal weight)       | 2 (0.5)                       |                 |         |         |
| 25.0-29.9 (Overweight)          | 1 (1.7)                       |                 |         |         |
| ≥30 (Obese)                     | 0 (0.0)                       |                 |         |         |
| **Tribe**                       |                               |                 |         |         |
| Igbo                            | 3 (0.7)                       |                 |         |         |
| Hausa                           | 0 (0.0)                       |                 |         |         |
| Yoruba                          | 0 (0.0)                       |                 |         |         |
| Others                          | 0 (0.0)                       |                 |         |         |
| **Mother’s educational status** |                               |                 |         |         |
| No formal education             | 0 (0.0)                       |                 |         |         |
| Primary                         | 0 (0.0)                       |                 |         |         |
| Secondary                       | 3 (1.2)                       |                 |         |         |
| Tertiary                        | 0 (0.0)                       |                 |         |         |
| **Resides with**                |                               |                 |         |         |
| Parents                         | 2 (0.7)                       |                 |         |         |
| Relatives                       | 0 (0.0)                       |                 |         |         |
| Guardian                        | 1 (0.7)                       |                 |         |         |
| Step-mother                     | 0 (0.0)                       |                 |         |         |
| Others                          | 0 (0.0)                       |                 |         |         |
| **Father’s occupation**         |                               |                 |         |         |
| Professional                    | 0 (0.0)                       |                 |         |         |
| Administrative officer          | 1 (1.8)                       |                 |         |         |
| Artisan                         | 1 (1.1)                       |                 |         |         |
| Business man                    | 1 (0.5)                       |                 |         |         |
| Farmer                          | 0 (0.0)                       |                 |         |         |
Table 5: Association between flow duration and some selected factors.

| Variable                          | Flow duration (days) N (%) | Test statistics | P value |
|-----------------------------------|----------------------------|-----------------|---------|
|                                   | 1-7              ≥8          | F value        |         |
| **BMI**                           |                 |                |         |
| <18.5 (Underweight)               | 72 (98.6)        1 (1.4)      | 1.146          | 0.766   |
| 18.5 – 24.9 (Normal weight)       | 362 (99.5)       2 (0.5)       |                |         |
| 25.0 – 29.9 (Overweight)          | 59 (100.0)       0 (0.0)        |                |         |
| ≥ 30 (Obese)                      | 7 (100.0)        0 (0.0)        |                |         |
| **Tires easily (anaemia)**        |                 |                |         |
| Yes                               | 290 (99.7)       1 (0.3)        | 0.744          | 0.388   |
| No                                | 210 (99.1)       2 (0.9)         |                |         |
| **Heavy flow**                    |                 |                |         |
| Yes                               | 229 (99.1)       2 (0.9)        | 0.523          | 0.470   |
| No                                | 271 (99.6)       1 (0.4)         |                |         |
| **Menstruates monthly**           |                 |                |         |
| Yes                               | 458 (99.6)       2 (0.4)        | 2.371          | 0.124   |
| No                                | 42 (97.7)        1 (2.3)         |                |         |
| **Dysmenorrhea**                  |                 |                |         |
| Yes                               | 372 (99.7)       1 (0.3)        | 2.624          | 0.105   |
| No                                | 128 (98.5)       2 (1.5)         |                |         |

Table 6: Menstrual pattern of the respondents.

| Variable                          | Frequency ( % ) |
|-----------------------------------|-----------------|
| **Menstrual flow duration (days)** |                 |
| 1                                 | 2 (0.4)         |
| 2                                 | 3 (0.6)         |
| 3                                 | 44 (8.7)        |
| 4                                 | 245 (48.7)      |
| 5                                 | 173 (34.4)      |
| 6                                 | 17 (3.4)        |
| 7                                 | 16 (3.2)        |
| 8                                 | 2 (0.4)         |
| 10                                | 1 (0.2)         |
| **Tires easily after menstruation**|                 |
| Yes                               | 291 (57.9)      |
| No                                | 212 (42.1)      |
| **Heavy flow**                    |                 |
| Yes                               | 231 (45.9)      |
| No                                | 272 (54.1)      |
| **Menstrual cycle length (days)** |                 |
| < 21                              | 13 (2.6)        |
| 21-35                             | 479 (95.2)      |
| > 35                              | 11 (2.2)        |
| **Dysmenorrhea**                  |                 |
| Yes                               | 373 (74.2)      |
| No                                | 130 (25.8)      |
| **Missed school due to menses**   |                 |
| Yes                               | 122 (24.3)      |
| No                                | 381 (75.7)      |
| **Reason for missing school (N=121)**|       |
| Pain                              | 100 (82.6)      |
| Heavy flow                        | 16 (13.2)       |
| Felt dizzy                        | 5 (4.1)         |

In other words, girls from a high socio-economic class tend to achieve menarche at a younger age. Most of the respondents informed their mothers first at the achievement of menarche and it was their mothers also that educated majority of them on menarche and menstruation. This is in keeping with the family life as girls are known to have close relationship with their mothers especially on feminine matters. Such were also the findings in other studies.5,7,8

The modal menstrual flow duration in this study of 4 days is within the normal physiology. Only 0.6% of the students had abnormal flow duration of more than 7 days. In fact, 99.0% of them had normal duration of flow. However, 24.4% of the students missed school attendance on account of menstruation as was the case in other studies in India and Ghana and majority of them did so because of dysmenorrhea.16,17 This will likely affect their academic performance in the long run.

It is surprising that there is no significant association between the duration of flow and development of tiredness (which suggests anaemia) as one would expect. However, long flow duration may not necessarily be accompanied by heavy loss which is what will lead to anaemia. Flow duration is not also related to the respondents’ BMI, presence of dysmenorrhea or cycle regularity.

**CONCLUSION**

The average age of menarche of secondary school girls in Awka was 12.77±1.159 years. Most of the students had normal menstrual flow duration of 2-7 days with a cycle
length of 21-35 days. Only a small minority had a heavy flow.

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