ORIGINAL RESEARCH

# Adolescent reproductive health challenges among schoolgirls in southeast Nigeria: role of knowledge of menstrual pattern and contraceptive adherence

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**Background:** Reproductive health services in the form of adolescent health and contraceptive services are fundamental in the prevention of a high incidence of teenage pregnancy. The purpose of this study was to determine the age at menarche, menstrual pattern, and awareness of and use of modern contraception among secondary school girls in Abakaliki, Nigeria.

**Subjects and materials:** This was a cross-sectional study in which self-administered questionnaires were completed by 482 adolescent girls at two girls' secondary schools between August and September 2012.

**Results:** The mean age at menarche was 13.13±1.37 years. The mean menstrual cycle length was 27.8±3.14 days, and the mean duration of menstrual flow was 4.8±1.14 days. Thirty-seven (7.7%) respondents were ignorant of their cycle length, while 29 (6.0%) had irregular cycles. Premenstrual syndrome and dysmenorrhea were major menstrual issues, which resulted in 69 (14.3%) and 59 (12.2%) of respondents resorting to self-medication and absenteeism from school, respectively. Mothers were the main source of their daughters' adolescent education, while friends and mass media were the main source of contraceptive information. Though there was a high level (75.7%) of awareness of contraceptive information among the girls, usage (8.9%) was poor. Only eight (18.6%) of the 43 respondents who had ever used modern contraception were adherent to modern contraceptives. Students who were more than 15 years old, attained menarche at 13 years or less, and whose families were of low socioeconomic classes were more likely to be sexually active.

**Conclusion:** The declining age at menarche, menstrual challenges, and poor reproductive health status of adolescent girls in this study have made menstrual issues and contraceptive adherence critical aspects of adolescent health care, especially when appropriate sources of reproductive health information were not fully harnessed. Therefore, there is an urgent need to establish adolescent-friendly clinics and include sexuality education in the curriculum of schools in this environment.

**Keywords:** menstrual pattern, contraception, reproductive health, adolescent girls, Nigeria

## Introduction

Menarche is the onset of menstruation, and it is one of the most significant milestones in the reproductive life of a woman. It is the hallmark of adolescence, marking the transition from girlhood to womanhood. The mean age at menarche varies from population to population, and is known to be a sensitive indicator of various characteristics of populations, including nutritional status, geographical location, environmental conditions, and magnitude of socioeconomic inequalities in a society.[1–4] For most females, it occurs between the ages of 10 and 16 years, with remarkable variation.[3,4] Studies

however suggest that menarche tends to appear earlier in life as the sanitary, nutritional, and economic conditions of a society improve.[4,5] The normal range for menstrual cycles is between 21 and 35 days. While most periods last from 3 to 5 days, duration of menstrual flow normally ranges from 2 to 7 days. For the first few years after menarche, irregular and longer cycles are common.[3,6,7]

The incidence of teenage pregnancy and its complications in Nigeria is unacceptably high, and the incidence ranges from 2.25% to 21.9%.[8–12] The majority of these teenage pregnancies are unintended and to single mothers.[9] The high incidence of teenage pregnancy in our environment may be attributed to the ignorance of adolescents on their menstrual pattern and poor contraceptive practice.[13,14] Therefore, knowledge of the length and variations in menstrual cycles and awareness and use of modern contraception is necessary for adolescent sexuality and education. More so, identification of deviations from normal menstrual cycles may help to guide in the clinical evaluation of young girls. It was for these reasons this study was undertaken. It was aimed at determining the age at menarche, menstrual pattern, awareness of modern contraception, and use of and adherence to modern contraception among secondary school adolescent girls in Abakaliki, southeast Nigeria. Findings from this study may help in bridging the knowledge gap in adolescent reproductive health in Nigeria.

## Subjects and methods

Abakaliki is the capital of Ebonyi State, with an estimated population of 4.3 million according to the 2006 national census. It occupies a land mass of 5,935 km$^2$. Approximately 75% of the population of Ebonyi State dwell in rural areas with farming as the major occupation.[15] Abakaliki consists of two local government areas, namely Abakaliki and Ebonyi, out of 13 local government areas in Ebonyi State. This was a school-based cross-sectional study carried out between August and September 2012. Permission to interview the students and the comprehensive list of the secondary schools in Abakaliki were obtained from Ebonyi State Postprimary School Management Board. Abakaliki has 38 secondary schools: 16 boys' secondary schools, nine girls' secondary schools, and 13 mixed schools.

The study participants were selected through multistage sampling. Two secondary schools – Azuiyiokwu Girls' Secondary School and Ugwuachara Girls' Secondary School, Abakaliki – were initially selected through simple random sampling from the nine girls' secondary schools. Meetings were further held with these school authorities to discuss the study.

The girls were selected based on the World Health Organization definition of adolescent age: 10–19 years.[16] The questionnaire was pretested in a different secondary school, where the possibility of its self-administration by the students was ascertained. Then, with the list of the students in each school as a sampling frame, systematic random sampling was used to select the total number of samples allocated to each school. An initial random start was made, and thereafter every student with an odd serial number was selected. The number of samples allocated to each of the two girls' secondary schools was proportional to the population strength of students in these schools. The inclusion criteria comprised students who were between 10 and 19 years old, had attained menarche, had odd serial numbers in the school register, and had given their consent to participate in the study. Exclusion criteria were students who were either less than 10 years or more than 19 years old, had not attained menarche, had even serial numbers in the school register, and had declined consent to participate in the study. On the day of the study in each of these schools, the study was further explained to the students, and the research team distributed the questionnaires simultaneously to the students that met the inclusion criteria. The questionnaires were administered on August 8, 2012 at Azuiyiokwu Girls' Secondary School and September 5, 2012 at Ugwuachara Girls' Secondary School. These were the days the aforementioned school authorities gave approval for the questionnaires to be administered. Students who were sampled completed the questionnaires with relevant data in their classrooms and returned them to the research team immediately, in order to prevent interpersonal communication and influence of peers on individual responses among the girls. The information on the questionnaires covered the students' sociodemographic data, age at menarche, menstrual cycle pattern, premenstrual symptoms, history of sexual activity, awareness of modern contraception, use of modern contraception, and adherence to modern contraceptive use. Olusanya et al's social classification,[17] using the educational status of the adolescent girls' mothers and their fathers' occupation, was adopted for this study. On determining the awareness of the respondents of modern contraceptives, they were asked if any of the modern contraceptives – condoms, pills, injectable contraceptives, intrauterine devices, implants – were known to them or not. Adherence to modern contraceptive use was defined as the use of modern contraceptives for every incidence of sexual activity. The arithmetic mean of the girls' ages at appearance of first menstruation was used to determine the age at menarche. The minimum sample size for the study was calculated based on the formula for estimating sample

size for cross-sectional studies described by Daniel.[18] With a 50% prevalence (for the sake of having a larger sample size), the minimum sample size was 384. After adding an assumed attrition rate of 20%, the calculated sample size was 461.

Statistical analysis was done using the SPSS version 17 software (SPSS Inc, Chicago, IL, USA).The $\chi^2$ test was used for the discrete variables. A *P*-value of less than or equal to 0.05 was considered statistically significant. Ethical clearance for the study was obtained from the Ethics Committee of the Federal Teaching Hospital, Abakaliki. Informed written consent was obtained from the study participants who were at least 18 years old, or from next of kin for the participants who were under 18 years of age.

## Results

A total of 500 questionnaires were administered in the two schools, and 482 (96.4%) completely filled questionnaires were retrieved and analyzed. Table 1 shows the sociodemographic characteristics of the participants. The age range of the respondents was 13–19 years. The mean age at menarche was 13.31±1.37 years. The majority (71.2%) of the respondents were from low social class families (social classes III, IV, and V).

Table 2 shows the menstrual characteristics of the respondents. Over two-fifths (43.46%) of the respondents had a cycle length between 27 and 29 days. The mean cycle length was

**Table 1** Sociodemographic characteristics of respondents

| Characteristics | Frequency (n=482) | Percentage |
|---|---|---|
| **Age (years)** | | |
| 13 | 18 | 3.7 |
| 14 | 24 | 5.0 |
| 15 | 146 | 30.3 |
| 16 | 130 | 27.0 |
| 17 | 118 | 24.5 |
| 18 | 32 | 6.6 |
| 19 | 14 | 2.9 |
| **Age at menarche (years)** | | |
| 9 | 2 | 0.4 |
| 10 | 12 | 2.5 |
| 11 | 43 | 8.9 |
| 12 | 57 | 11.8 |
| 13 | 133 | 27.6 |
| 14 | 144 | 29.9 |
| 15 | 75 | 15.6 |
| 16 | 16 | 3.3 |
| **Social class of the parents** | | |
| I | 23 | 4.8 |
| II | 86 | 17.8 |
| III | 219 | 45.4 |
| IV | 124 | 25.7 |
| V | 30 | 6.2 |

**Table 2** Menstrual characteristics of respondents

| Characteristics | Frequency (n=482) | Percentage |
|---|---|---|
| **Menstrual cycle length (days)** | | |
| 21–23 | 51 | 10.6 |
| 24–26 | 57 | 11.8 |
| 27–29 | 203 | 42.1 |
| 30–32 | 75 | 15.6 |
| 33–35 | 30 | 6.2 |
| Irregular cycle | 29 | 6.0 |
| Ignorant of cycle length | 37 | 7.7 |
| **Menstrual flow duration (days)** | | |
| 2–3 | 58 | 12.0 |
| 4–5 | 310 | 64.3 |
| 6–7 | 114 | 23.7 |
| **Menstrual problems*** | | |
| Dysmenorrhea | 309 | 64.1 |
| Premenstrual symptoms | 362 | 75.1 |
| Use of self-medication | 69 | 14.3 |
| Absenteeism from school | 59 | 12.2 |
| None | 89 | 18.5 |

**Note:** *Students were free to tick more than one option.

27.8±3.14 days. None of the respondents had a cycle length less than 21 days. A total of 29 (6.0%) respondents had an irregular cycle, while 37 (7.7%) were ignorant of their cycle lengths. Most (79.5%) of the respondents had a menstrual flow duration of between 4 and 6 days. The mean duration of menstrual flow was 4.8±1.14 days. A total of 362 (75.1%) of the adolescent girls had primary dysmenorrhea. This was followed by premenstrual symptoms. The premenstrual symptoms and dysmenorrhea were serious in that they resulted in 69 (14.3%) and 59 (12.2%) of the respondents resorting to self-medication and absenteeism from school, respectively.

Table 3 contains the sources of menstrual information, history of sexual activity, and awareness and practice of modern contraception among the adolescent girls. Mothers were the primary source of menstrual information in 81.5% of respondents. A total of 101 (21%) of the students were sexually active. Even though 365 (75.7%) of the students were aware of modern contraception, only 89 (18.5%) of them were aware of emergency contraception and 43 (8.9%) of them had ever used modern contraception. Only eight (18.6%) of the 43 respondents who had ever used modern contraception were adherent to modern contraceptives. The major sources of information on modern contraception among these students were friends (58.9%) and mass media (51%). Only 15 (16.9%) of the 89 students who were aware of emergency contraception had ever used it. The majority of these few emergency-contraceptive users used oral contraceptive pills. Table 4 shows the effect of sociodemographic characteristics on sexual activity. Students who were more

**Table 3** Source of menstrual information, history of sexual activity, and awareness and practice of modern contraception among the adolescent girls

| Characteristics | Frequency | Percentage |
|---|---|---|
| **Source of menstrual information* (n=482)** | | |
| Mothers | 393 | 81.5 |
| Friends | 77 | 16.0 |
| Teachers | 49 | 15.6 |
| Books | 15 | 3.1 |
| None | 33 | 6.2 |
| **Prior history of sexual activity (n=482)** | | |
| Yes | 101 | 21.0 |
| No | 381 | 79.0 |
| **Awareness of modern contraception* (n=482)** | | |
| Condom | 357 | 74.1 |
| Oral contraceptive pills | 282 | 58.5 |
| Injectable contraceptives | 111 | 23.0 |
| Intrauterine devices | 36 | 7.5 |
| None | 117 | 24.3 |
| **Source of information on modern contraception* (n=365)** | | |
| Parents | 51 | 14.0 |
| Friends | 215 | 58.9 |
| Mass media | 186 | 51.0 |
| Hospital | 43 | 11.8 |
| Teachers | 27 | 7.4 |
| Books | 33 | 9.0 |
| **Ever used modern contraception (n=482)** | | |
| Yes | 43 | 8.9 |
| No | 439 | 91.1 |
| **Adherence to modern contraception (n=43)** | | |
| Yes | 8 | 18.6 |
| No | 35 | 81.4 |
| **Types of modern contraception ever used (n=43)** | | |
| Condoms | 28 | 65.1 |
| Oral contraceptive pills | 13 | 30.2 |
| Injectable contraceptives | 2 | 4.7 |
| **Awareness of emergency contraceptives* (n=482)** | | |
| Yes | 89 | 18.5 |
| No | 393 | 81.5 |
| **Ever used emergency contraception (n=89)** | | |
| Yes | 15 | 16.9 |
| No | 74 | 83.1 |
| **Emergency contraceptives used by the respondents (n=17)** | | |
| Oral contraceptive pills | 13 | 86.7 |
| Injectable contraceptives | 2 | 13.3 |

**Note:** *Students were free to tick more than one option.

**Table 4** Effect of sociodemographic characteristics on sexual activity

| Characteristics | Sexual activity | | P-value |
|---|---|---|---|
| | Yes | No | |
| **Age (years)** | | | |
| ≤15 | 23 | 165 | 0.0002* |
| >15 | 78 | 216 | |
| **Age at menarche (years)** | | | |
| ≤13 | 73 | 174 | 0.0001* |
| ≥14 | 28 | 207 | |
| **Social class of the parents** | | | |
| ≤II | 14 | 95 | 0.02* |
| ≥III | 87 | 286 | |

**Note:** *Statistically significant.

deduced from the fact that the previous study was conducted in rural areas, unlike this one, which was conducted in an urban area. Therefore, environmental and nutritional factors may have contributed to this difference. These environmental factors consist of a higher rate of infectious diseases, especially malaria, in this environment, lack of social amenities, low socioeconomic status, and ignorance that are common among rural dwellers when compared with urban residents. Previous studies have reported menarche to occur earlier in urban residents than in rural dwellers.[19,22] Also, the mean age of menarche of 13.31±1.37 years in this study is higher than the 12.5 years reported in the USA and Europe.[23]

The current study shows that early age at menarche increases the risk of early sexual activity, supported by a previous report from the USA.[23] In our environment, where menarche marks the initiation of a woman's reproductive activity, early menarche leads to early coital activity and early marriages,[24] with attendant complications of induced abortion, preeclampsia and eclampsia, obstructed labor, and vesicovaginal fistula. Some of these complications lead to maternal morbidity and mortality in young women who often are adolescents. Adolescent maternal mortality ratio in Sokoto, northwest Nigeria, is 5,415 per 100,000 live births and accounts for more than 23% of maternal mortalities in Abakaliki, southeast Nigeria.[25,26] Moreover, the significant proportion of students who were sexually active at more than 15 years of age in this study was supported by a previous review by Olalekan, in which urban dwellers and Ibo women were less likely to have had early coitarche.[27] Early sexual activity, common among the children of low socioeconomic parents in this study, may have been due to these girls lacking the basic needs of life, thereby necessitating their sexual activity as a means of socioeconomic survival. This is supported by a previous report in South Africa in which

than 15 years old, had attained menarche at 13 years old or less, and whose families were of low socioeconomic status were more likely to be sexually active.

## Discussion

The mean age at menarche in this study (13.31±1.37 years) was similar to other studies done in other centers.[19,20] This was however less than the 15 years previously reported in a study in Ebonyi State.[21] The reason for this difference could be

poor individuals, owing to lack of alternatives to earning a livelihood, indulged in transactional sex.[28]

The mean cycle length of 27.8±3.14 days with the majority of the adolescent girls having a cycle length of between 27 and 29 days is similar to previous reports in sub-Saharan Africa.[29,30] The students (13.4%) who either had irregular menstrual cycles or were ignorant of their cycle length in this study were prone to teenage pregnancy if sexually active. The mean duration of menstrual flow of 4.8±1.14 days in this study is similar to a previous report in Ghana.[30]

Dysmenorrhea occurring in 64.1% of this study respondents is less than the 72% and 74.4% previously recorded in Nigeria and Ghana, respectively.[30,31] This however compares with 65% reported in the USA.[32] Premenstrual syndrome, which occurred in 75.1% of the respondents, is less than the 85.5% reported in Calabar, Nigeria.[33] Premenstrual syndrome and dysmenorrhea being so severe to warrant school absenteeism by 12.2% of the students in this study is similar to a report in India.[22] The use of self-medication by 14.35% of the respondents in this study is however higher than the 7.13% reported in india.[22] The reason for this difference may be differences in pain threshold between the groups of adolescents in the two regions. It might also be poverty, as the majority of respondents in this study belonged to low socioeconomic families. The unavailability of adolescent-friendly clinics in our environment may have contributed to self-medication among the respondents.

Education of adolescent girls on menstruation is important, because some misconceptions exist among them about menstruation. Some perceive it as a bad or strange thing, while others see it as a frightening or embarrassing experience.[34] The majority (81.4%) of the respondents in this study got their menstrual education from their mothers, similar to the findings of other studies in Nigeria and Ghana.[15,30] Mothers are of critical importance and are also the preferred choice of education on menstrual issues and emotional support to daughters, since many daughters are uncomfortable discussing menstruation with their fathers.[34] However, these girls are prone to getting wrong information from their mothers in view of the higher illiteracy rate among the mothers when compared to the fathers, especially in low socioeconomic classes, in Nigeria.[35] In this study, experiencing menstruation might have been shocking to the 6.2% of the respondents who had not received any menstrual education. The right sources of menstrual education comprising teachers, health institutions, media, and books/magazines constituted a small proportion in this study. This shows that education on menstruation still needs to be improved upon by making use of the

schools, health institutions, and print and electronic media, as it is not the sole responsibility of the family.

The finding that a fifth (21%) of the respondents were sexually active was similar to the 26.8% reported by Adinma et al in Anambra State.[36] The high proportion (75.7%) of the adolescent girls aware of modern contraception in this study was more than the 38.2% reported by Adinma et al in Anambra State, but similar to the 81% reported in Ghana.[36,37] Also, the 8.9% of the 365 students using modern contraception in this study was less than the 21% reported in Ghana.[37] The 18.6% of these sexually active respondents who were adherent to modern contraception was less than the 35% previously reported in southeast Nigeria.[38] This difference may have been because this study dealt purely with adolescent girls in secondary schools, unlike the previous study, which dealt with both male and female undergraduates. The low contraceptive usage and adherence among the sexually active adolescent girls in this study indicates that reproductive health providers and other stakeholders need to strategize on a formidable approach to reverse this unpleasant trend in this environment. Condom use, being the commonest known and used contraceptive method by the respondents, was similar to reports in other Nigerian and Ghanaian centers.[35,36] Friends and mass media constituted the major source of contraceptive information in this study, consistent with a report from Ghana.[36] With the high numbers reporting contraceptive information from friends, these students may not be getting the right information. The knowledge and use of emergency contraceptives by the sexually active adolescent girls in this study was very poor. This will therefore increase their risk of unwanted pregnancy with its associated complications.

This study was strengthened by the school-based design and its sampling technique. It was however weakened by the information on menstrual patterns and contraception, which was prone to recall bias.

## Conclusion

There has been a gradual decline in the age at menarche in Ebonyi State. A good proportion of the adolescent girls resort to self-medication when they have severe premenstrual syndrome and dysmenorrhea. Though there was high level of awareness of modern contraceptive methods in this study, their usage by the sexually active adolescent girls was very poor. The right sources of menstrual and contraceptive information were not fully utilized by the adolescent girls. Therefore, there is an urgent need to establish adolescent-friendly clinics and include sexuality education in the curriculum of schools in this environment. This will not only help the

adolescent girls have the right menstrual and contraceptive information but also increase their acceptability of reproductive health services.

## Disclosure

The authors report no conflicts of interest in this work.

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