

## Menarcheal Age of Nigerian Urban Secondary School Girls in Benin City

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### Abstract

**Background:** Age at menarche varies with time and the influence of social factors depends on the population under consideration.

**Objective:** To determine the mean age at menarche among secondary school girls in Benin City and examine some social factors that might influence it.

**Methods:** In this cross-sectional study in Benin City, Nigeria, information on age at menarche was obtained from 1,640 menstruating urban secondary school girls (aged between 10 and 20 years) using the status quo method. Information sought in the structured questionnaire used included date of birth, date of menarche, educational attainment of parents, and occupation of parents, birth position, family size and state of origin. Data was analyzed using SPSS (Statistical Package for Social Sciences), version 15.0.

**Results:** The mean age at menarche was 13.44 + 1.32 years (95% Confidence Interval, CI= 13.36-13.50). Of the 1,640 girls who have attained menarche, 31(1.9%) were below the age of 12 years (early menarche). Socioeconomic status, birth position and family size had significant bearing with mean menarcheal age at  $p < 0.001$ ,  $p < 0.01$  and  $p < 0.01$  respectively.

**Conclusion:** The current mean age at menarche among secondary school girls in Benin City is 13.44 years and it is influenced by socioeconomic status, birth position and family size.

### Introduction

Menarche (the first menstrual bleeding of a female) represents the endpoint of a complex sequence of events that characterize sexual maturation and puberty in girls [1,2]. It is unique, and probably, the most accurately recallable indicator of puberty among girls and a widely used indicator of adolescence sexual maturation [3,4]. Variations in age at menarche between individuals and populations have been documented [5-7]. It is influenced by social, environmental and genetic factors [5-9]. The mean age at menarche varies from one population to another. For instance, the reported mean age at menarche were as follows: Iran 12.91 + 1.23 years [10], South Africa 12.75 + 1.32 years [8], India 13.18 + 1.08 years [9], Kenyan 12.5 + 2.8 years [11]. Even within Nigeria, similar variations in age at menarche have been observed; 13.98 + 1.30 years in the West [12], 13.03 + 1.02 years in the East [13], and 13.50 + 1.33 years in the North [14]. A study involving one secondary school in Benin City, Nigeria reported a mean age at menarche of 13.16 + 1.22 years [15]. In both developing and developed countries, some studies have reported a decline in the average age at menarche [16-19]. This trend towards a reduction in the average age of menarche has been attributed to improvement in living standard and nutrition [1]. On the other hand, in some countries, this downward trend seems to have come to a halt [20]. In view of the reported secular trend, there is a need to monitor the age at menarche. Data on age at menarche are useful in health planning, establishment of adolescent health centers and improvement in health promotion services for girls [21]. In addition, contemporary issues such as introduction of sex education in Nigerian schools require knowledge of the age at menarche as well as the sequence of events of puberty; menarche being the last in this sequence.

An early age at menarche is associated with an increased risk of some clinical conditions, such as breast cancer [22], obesity [23], endometrial cancer [24], and uterine leiomyomata [25]. Some studies have indicated that women who attained menarche at the age of 11 years and below have a higher risk of development of breast cancer than those who attained menarche at the age of 12 years and above [26,27]. Late menarcheal age is thought to protect, at least to some extent, women in Sub-Saharan Africa from breast cancer [28]. In this regard, the observed trend towards a reduction in the average age at menarche in West African countries (Nigeria inclusive) portends some danger as it relates to occurrence of breast cancer [13,14]. In addition, there are indications in the literature that the age at menarche might

be related to subsequent reproductive performance, such as the age at first intercourse, the age at first pregnancy and risk of subsequent miscarriage [29]. From the foregoing, it is obvious that there is a need to monitor closely the average age at menarche in Nigeria. Majority of the Nigerian studies that focused on age at menarche were conducted some decades ago [12-14]. The purpose of the present study was to determine, in this new decade, the age at menarche among secondary school girls in Benin City, Nigeria and identify some social factors that might influence it.

### Subjects and Methods

This cross-sectional study was conducted in two urban public secondary schools for female students in Oredo Local Government Area (OLGA), Edo State, Nigeria. According to Edo State Ministry of Education Statistics, there are nine public secondary schools in the LGA comprising 4 females-only, 3 co-educational and 2 males-only [30]. Consent for the study was obtained from the school authorities. Of the four girls' secondary schools, two were randomly selected by ballot. The total populations of students in the two schools selected were school A 1,394 and school B 772, giving a grand total of 2,166 which was the target study population. The survey was designed to include all the students in the two schools (schools A and B). The principal of each of the two schools introduced the authors during the morning assembly. Subsequently, we addressed the students on the relevance of the study and how to accurately fill the questionnaire. We also emphasized to the students that the questionnaires were anonymous and that their participation was voluntary. Data was collected between October and November, 2011, using a structured-anonymous questionnaire.

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Information sought in the questionnaire included: date of birth, date of onset of first menstrual bleeding, birth position among their siblings, family size (number of siblings), state of origin, level of education and occupation of both parents/guardian. The family size was categorized into small size (no sibling or one or 2 siblings); medium size (3 or 4 siblings); large size (5 or more siblings). The socio-economic status of the parents was determined using the classification suggested by Ogunlesi et al. [31]. This was analyzed via combining the highest educational attainment, occupation and income of the parents (based on the mean income of each educational qualification and occupation). In this Social Classification System, classes I and II represent high social class, class III represents middle social class while classes IV and V represent low social class. In this way, the girls were categorized into high, middle and low socio-economic groups. The data was analyzed using the SPSS (Statistical Package for Social Sciences), version 15.0.

## Results

At the time of this survey, a total of 2,166 female students (1,394 in school A and 772 in school B) were attending the two public girls' secondary schools in the LGA (randomly selected by ballot). Seven students (5 from school A and 2 from school B) declined to participate. The response rates were 99.4% in school A and 99.7% in school B. Overall response rate was 99.7%. The questionnaires of 9 students were excluded from the analysis because they were incompletely filled,

Age in years	Total number of girls (respondents)	Number (%) who have attained menarche
10	72	0(0)
11	13	1(7.7)
12	109	16(15.1)
13	296	95(32.4)
14	356	218(61.2)
15	380	337(88.7)
16	490	471(96.1)
17	315	313(99.4)
18	112	112(100.0)
19	62	62(100.0)
20	15	15(100.0)
Total	2150	1640(100.0)

Table 1: Distribution of age at menarche.

Age (years) at menarche	Total no of girls who have attained menarche	Socioeconomic status (SES)		
		High No(%)	Middle No(%)	Low No(%)
10	0	0(0.0)	0(0.0)	0(0.0)
11	1	1(9.1)	0(0.0)	0(0.0)
12	16	10(62.5)	6(37.5)	0(0.0)
13	95	47(49.5)	38(40.0)	10(10.5)
14	218	106(48.6)	95(43.6)	17(7.8)
15	337	31(9.2)	176(52.2)	130(61.4)
16	471	8(1.7)	143(30.4)	320(67.9)
17	313	2(6.5)	16(5.1)	295(88.4)
18	112	0(0.0)	13(11.6)	99(88.4)
19	62	0(0.0)	57(91.9)	5(8.1)
20	15	0(0.0)	12(80.0)	3(20.0)
Total	1640	205(12.5)	548(33.4)	887(54.1)
Mean age at menarche (95% CI)	13.44+1.32 (13.38-13.50)	12.78+1.21 <sup>a</sup> (12.61-12.95)	13.42+1.18 <sup>b</sup> (13.32-13.52)	13.56+1.29 <sup>c</sup> (13.42-13.59)
t-statistic (p-value)		a vs b=4.41 (<0.01)	b vs c=2.08 (>0.05)	a vs c=7.95 (<0.001)

Table 2: Socioeconomic status (SES) and mean age at menarche.

Birth position	Total no of girls who have attained menarche	Mean age at menarche	95% Confidence Interval, CI
1 <sup>st</sup>	437	13.02+1.22	12.91-13.13
2 <sup>nd</sup>	333	13.04+1.09	12.92-13.16
3 <sup>rd</sup>	323	13.14+1.12	13.02-13.26
4 <sup>th</sup>	164	13.30+1.23	13.11-13.49
5 <sup>th</sup>	77	13.52+1.19	13.25-13.79
6 <sup>th</sup>	33	13.53+1.38	13.06-14.00
7 <sup>th</sup>	38	13.65+1.40	13.21-14.10
8 <sup>th</sup>	27	13.68+1.43	13.14-14.23
Total	1640	13.44+1.32	13.38-13.50

Table 3: Birth position and mean age at menarche.

thereby leaving a total of 2,150 questionnaires (respondents) for data analysis. Students in both schools had similar socio-demographic characteristics, thus further analysis of data was carried out for the combined group of students.

Of the 2,150 respondents, 1,640 (76.3%) have attained menarche while the remaining 510 (23.7%) have not. Analysis of the questionnaire of the 1,640 girls who have attained menarche showed that the mean age at menarche for both schools combined was 13.44 + 1.32 years (95% Confidence Interval, CI= 13.38-13.50) while it was 13.25 + 1.23 years (95% CI= 13.19-13.31) for school A and 13.50 + 1.36 years (95% CI= 13.40-13.60) for school B. Of the 1,640 girls who have attained menarche, 31(1.9%) were before the age of 12 years (early menarche); (Table 1). The mean age at menarche was significantly higher in low socioeconomic group compared to high socioeconomic group (Table 2). Girls belonging to high socioeconomic class attained menarche 8.0 and 9.0 months earlier than girls belong to middle and low socioeconomic classes respectively (Table 2). As shown in Table 3, first-born children attained menarche earlier than latter-born children with first-born children attaining menarche 8.0 months earlier than eight-born children. Of the 1,640 girls who have attained menarche, 8(0.5%) were the only child in their family and the mean age at menarche was 12.80 + 1.11 years (95% CI= 12.03-13.57). Table 4 shows the mean age at menarche according to family size. As shown in Table 4, girls from small-size families attained menarche 4.0 and 7.0 months earlier than their counterparts from medium-size and large-size families respectively. Based on state of origin, the mean age at menarche did not differ.

## Discussion

The mean age (13.44 years) at menarche observed in the present study in Edo State was comparable to 13.43 years reported from Port Harcourt among urban school girls [32] but lower than 14.22 years reported among rural school girls in Etche (both in Rivers State, Nigeria) [33]. The lower mean menarcheal age observed in the present study might be explained by differences in socio-demographic factors. For instance, in the present study the subjects were urban school girls while in the study in Etche, the subjects were rural school girls. The report of a study in Plateau State, Nigeria indicated that rural school girls tend to achieve menarche at an older age than urban school girls [14]. In contrast, Goon et al. [34] reported that the age at menarche was comparable between urban and rural girls. They attributed this parity to improved living conditions among their rural population [34]. It must be noted that the methods of collecting and analyzing data vary from one study to another, indicating the need to exercise caution when comparing age at menarche in different studies.

Data from the present study showed that 1.9% of the girls attained menarche early (below the age of 12 years). A similar prevalence of

Family size	Total no (%) of girls who have attained menarche	Mean age at menarche	95% Confidence Interval, CI	t-statistic (p value)
Small size	221(13.5)	13.09+1.31 <sup>a</sup>	12.91-13.26	a vs c: t= 4.82 (<0.01)
Medium size	1063(64.8)	13.41+1.28 <sup>b</sup>	13.33-13.49	a vs b: t= 3.32 (<0.05)
Large size	356(21.7)	13.64+1.37 <sup>c</sup>	13.50-13.78	b vs c: t= 2.79 (<0.05)
Total	1640(100.0)	13.44+1.3 <sup>2</sup>	13.38-13.50	

**Table 4:** Family size and mean age at menarche.

early menarche was reported from Wannune, Benue State, Nigeria [34]. A previous study in Benin City alluded to occurrence of early menarche in their series but failed to report the prevalence [15]. The clinical implication is that this small group of girls with early menarche might be at increased risk of breast cancer, obesity, endometrial cancer and uterine leiomyomata [22-25], and require a close follow up. In addition, Schor and Neia [29] reported that the age at menarche might be related to the age at first sexual intercourse, which may result in an unwanted teenage pregnancy. Such a pregnancy may be catastrophic for the teenager. The practical implication is that sex education in Nigerian schools should be started early, well before the age of 12 years.

As in previous studies in Nigeria [12-15], socioeconomic status (SES) of the parents influenced their daughters' age at menarche. In the present study it was observed that girls belonging to high socioeconomic class attained menarche 9 months earlier than their counterparts in the low socioeconomic class. This is comparable to the 8.5 months difference reported in a previous study in Nigeria [13]. On the other hand, the observed difference in the present study is lower than the 11 and 12 months respectively reported in two previous studies in Nigeria [15,35]. The reason for the smaller difference found in the present is not clear but it might mean that the effect of SES is becoming less prominent with time.

In the present study it was observed that first and early born girls tend to attain menarche at an earlier age than their counterparts who were born latter or were last born. A similar observation has been reported in a previous study [15]. There is no readily available explanation for this observation. However, it has been speculated that there is usually more pressure and expectation on first-born children to achieve, forcing them to mature faster than latter-born children. It is, therefore, thought that this early attainment of maturity in first-born children, make them attain menarche at an earlier age compared to their latter- born siblings.

Data from the present study indicated that girls from small-size families tend to attain menarche at a younger age than girls from large-size families. A previous study has reported a similar finding [36]. Family size may exert its effect on age at menarche through concealed poverty because the larger the family size the lower the income per capita. This effect is likely to be more pronounced in societies with low socioeconomic status.

In conclusion, the current mean age at menarche in Benin City is 13.44 years and it is influenced by social factors such as socioeconomic status, birth position and family size.

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