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Menarcheal age in school girls in Calabar, Nigeria

Aribo E. O., Ikemti F. J. and Nwangwa J.

Department of Physiology, University of Calabar, Calabar, Nigeria

ABSTRACT

There are documented studies showing a pattern of declining age at menarche in the developed world due to better nutrition, environment and general conditions of living. Nigeria, though a developing country is well endowed with natural resources. Moreso, it is hoped that with democratization, the living standard of the average Nigerian should improve. One may wonder whether the nation's wealth, democratization and the said improvement in gross domestic product (GDP) actually affect the standard of living of the average Nigerian girl vis a vis their age of menarche. This study therefore sought to evaluate the trend in Calabar, Nigeria as a function of improved health and general condition of living. The study was conducted on 1,200 students in junior secondary school 1 – 3 (JSS1 to JSS3) in selected public and private secondary schools in Calabar. A structured questionnaire was used to obtain relevant information while the weight and height were measured with a bathroom scale and improvised stadiometer respectively. The result showed a mean menarcheal age of 13.70 ± 0.55 . Duration of menstrual flow was 4 – 5 days for most students. The mean menarcheal age of these girls did not differ significantly from the international average of 13.53 years. There was however a significant reduction in the mean menarcheal age of girls in private schools when compared with those in public schools ($P < 0.05$). The mean BMI of girls in private schools was significantly higher than that of girls in public schools ($P < 0.05$). The difference is attributable to the difference socio-economic and educational levels of parents of girls in the two groups of respondents.

INTRODUCTION

The word menarche is derived from two Greek words 'men' meaning 'moon' and 'arkhe' meaning 'beginning' and refers to the first menstrual bleeding in female humans (Adedavoh et al, 2003; Guyton and Hall, 2011). It is a pivotal transitional event in the life-course of females (Karapanou and Papadimitious, 2010). It heralds new expectations and rights and is critical in the adolescent girls reorganization of her body image and sexual identity (Wu et al, 2002).

There is a wide range of variation in the timing of menarche but girls usually experience it between the ages of eight and fourteen years (Coila, 2011). There is however a general trend of declining age at menarche in several countries (Rigion et al, 2010; Cho et al, 2010; Harris et al, 2008; Hong et al, 1993). It may be preceded by physical and emotional feelings like breast tenderness, mood swings, abdominal cramps and nausea (Langham, 2011).

As part of puberty, menarche is the culmination of a series of physiological and anatomical processes of puberty (Anderson et al, 2003). Endocrinologically, menarche functionality is succinctly experienced in stages (Guyton and Hall, 2011). Menarche as a discrete event is thought to be the relatively chanced result of gradual thickening of endometrium induced by rising but fluctuating pubertal estrogen and shedding of endometrium (Guyton and Hall, 2011).

Age at menarche is determined by several factors including genetic factors, ethnicity/race, nutritional status and body fat, physical activity as well as environmental influences. Though there is genetic influence, the specific genetic determinants are largely unknown (Towne et al, 2005).

Starvrou *et al*, (2002) linked the *x bal* and *P vull* polymorphisms of estrogen receptor (*Era*) gene with age at menarche. There are strong ethn racial differences in the onset of menstruation and pubertal maturation (Karapanonu and Papadimitriou, 2010). Parent *et al* (2003) observed the influence of geographical and environmental differences in the timing of menarche and pointed to the possibility of the interplay of factors like altitude, temperature, humidity and lightening which signals the hypothalamus – pituitary – gonadal axis, mediated through melatonin circuit (Karapanou and Papadimitriou, 2010) as well as waist circumference (Lassek and Gaulin, 2007) but negatively correlated with hip and thigh circumferences (Lassek and Gaulin, 2007). Ellison (2001) and Chang *et al*, (2000) found a positive correlation between menarcheal age and height rather than weight.

Socio-economic factors or life settings such as rural – urban residence, family size as well as income level and parental education have been associated positively with age at menarche (Wronka and Pawhinska-Chmara, 2005; Padez, 2003).

Age at menarche can be assessed in three different ways, viz the status quo, recall quo and the prospective method (Cameron, 2002). Most studies on this subject employ either the status quo or the recall method (Stanhope and Traggi, 2006). World wide average age at menarche has been difficult to estimate but several works place it at 13.53±98 years (Febic *et al*, 2009). In the USA it is 12.5 years (Morris *et al*, 2010), 12.12 years in Canada, 12.9 years in the UK (Morris, 2010), 12.4 years in Italy (Rigion *et al*, 2010), 13.10 years in Korea (Cho *et al*, 2010), 13.10 years in French (Gaudieau *et al*, 2010) and 12.74 years in Accra Ghana (Aryeetey *et al*, 2011). Even in the same country there could be differences in age of menarche as factors influencing menarche are not evenly distributed. With a general trend for an earlier age at menarche, worldwide improvement in level of education and increased revenue from oil in Nigeria, the standard of living of an average Nigerian should have also increased. The Nigerian gross domestic product (GDP) is said to have been growing at an annual rate of 6.13, reaching an all time high of 8.60 in 2010 (Trading Economics, 2014). The study was therefore carried out to access the menarcheal age of school girls in Calabar, the capital of Cross River State of Nigeria as a function of the improved national GDP and compared with similar studies elsewhere.

MATERIALS AND METHODS

Materials and study population

A total of 1,200 post menarcheal Junior Secondary School 1 – 3 (JSS 1 – 3) students from four secondary schools in Calabar and attending regular schools (day time) were used for the study. A structured questionnaire which captured their biodemographic data, age at menarche, source of information on menstruation, socio-economic status and educational level of parents were used to obtain data. A bathroom scale and a stadiometer were used to measure their weight and height respectively.

Research design

This was a school-based descriptive cross-sectional recall quo or retrospective study conducted to investigate the menarcheal age of girls in selected secondary schools in Calabar. It was conducted between October and November, 2012.

Sample/sampling technique

Two homogenous girls' secondary schools and two co-educational secondary schools in Calabar Metropolis were used for the study. Sample selection was by multi-stage sampling technique. The selected schools were two public (Big Qua Girls and Unical International) and two private (Sacred Heart Girls and Christian High) secondary schools.

Method of data collection

Permission was obtained from the authorities of the schools concerned and parents after objectives of the study were explained to them. The questionnaire was administered to students who were so granted permission on fixed days. Weight and height were measured without shoes and with only minimal clothing. BMI was computed.

Statistical Analysis

The mean menarcheal age was computed while the student t-test was used to compare mean ± SEM of menarcheal age between girls in public and private schools. Chi-square was used to assess association between categorical variable and statistical significant taken as $P < 0.05$. Descriptive analysis in the study employed simple frequency and comparative percentages.

RESULTS

The mean menarcheal age of the girls was 13.70 ± 0.55 years. There was however a significant difference in the mean menarcheal age of students in private schools compared with those in public schools ($p < 0.05$). This is shown in table 1, relationship between socioeconomic variables of parents and type of school attended by students (i.e. whether public or private) as shown in table 1 demonstrated the influence of the variables on timing of menstruation.

Ninety four and a half per cent (94.5%) of girls in private schools have parents who had attained tertiary education as against 52.3% in public schools. More of the less educated parents found their girls in public schools (table 1). Sixty one per cent and 42.7% of children in private and public secondary schools respectively have parents who are civil servants.

Duration of menstrual flow for most of the girls in both private and public schools was 4 – 5 days per cycle (60% in private and 64.8% in public schools). The major source of information about menarche was mothers with 58.3% and 77% in public and private schools respectively (Table 2). The mean BMI of the students was 32.57 kg/m^2 . However, girls in private schools have a significantly higher BMI; 34.57 kg/m^2 than those in public schools (31.12 kg/m^2), $p < 0.05$ as shown in Table 3.

Table 1: Chi-square analysis of socio-economic variables

Variable	Criteria	Government		Private		Chi Cal.	Chi Table Value	df	p-value
		Freq.	%	Freq.	%				
Parent occupation	Govt. officer	96	16.0	86	14.8	58.53	11.10	5	$p < 0.05$
	Civil servant	256	42.7	354	61.0				
	Business	150	25.0	70	12.1				
	Farmer	10	1.7	2	0.3				
	Student	24	4.0	8	1.4				
	Others	64	10.7	60	10.3				
Parent educational level	Illiterate	14	2.3	6	1.0	203.17	9.49	3	$p < 0.05$
	Prim. Edu	92	15.3	0	0.0				
	Sec. Edu	180	30.0	46	7.9				
	Tert. Edu	314	52.3	548	94.5				

Table 2: Chi-square analysis of duration of menstrual flow, length of circle and menstrual knowledge

Variable	Criteria	Government		Private		Chi Cal.	Chi Table Value	df	p-value
		Freq.	%	Freq.	%				
Duration of menstrual flow	2-3	115	19.2	132	22.0	3.633	15.50	8	p<0.05
	4-5	389	64.8	360	60.0				
	6-8	90	15.0	98	16.3				
	Above 8	6	1.0	10	1.7				
Length of menstrual circle	25-28	310	51.7	310	51.7	0.000	5.99	2	p>0.05
	28-30	212	35.3	212	35.3				
	30-34	78	13.0	78	13.0				
Sources of menstrual knowledge	Mother	350	58.3	439	77.0	79.14	12.60	6	p<0.05
	Father	58	9.7	3	0.5				
	Sister	60	10.0	58	10.2				
	Sch. Teacher	79	13.2	38	6.7				
	Friends	35	5.8	20	3.5				
	Mass Media	8	1.3	7	1.2				
	None	10	1.7	5	0.9				

Table 3: Anthropometric variables of respondents

Public school			Private school		
Average weight (Kg)	Average Height (m)	BMI (Kg/m ³)	Average weight (Kg)	Average Height (m)	BMI (Kg/m ³)
607.14	19.51	31.12	493.72	14.28	34.57

DISCUSSION

Menarche is an important event in the life of every female showing (directly or indirectly) many socio-economic, environmental, geographic genetic and nutritional variations (Padez, 2003). In this study, the mean menarcheal age for school girls in Calabar was 13.70 ± 0.55 years. This figure is lower than what is reported for some African countries like Sudan 13.85 years; Mozambique 13.91 ± 1.29 years; (Padez, 2003) but higher than the 12.45 years reported for South Africa (Jones et al, 2009) and 12.74 years for Ghana (Aryeetey et al, 2011). The menarcheal age from this study is similar to 13.19 ± 0.32 years obtained by Ikaroha et al (2004) for an urban area of Rivers State Nigeria but lower than 15.26 years obtained 12.74 years obtained for Sokoto in Northern Nigeria (Tunau et al, 2014). It is higher than that obtained for western nations which stood at 12.9 years (Morris, 2010) and agrees with Adedaboh et al, (2003) that most girls in industrialized societies have earlier menarche than their counterpart in developing nations. However, the mean menarcheal age of 13.70 ± 0.55 found in this study is not significantly different from the internationally accepted value of 13.53 ± 0.93 years (Febric et al, 2009).

This menarcheal age of 13.70 years can be attributed to the improved socioeconomy in Nigeria and demonstrates the positive correlation between socio-economic status and menarche. The difference in menarcheal age obtained in this study and that from a similar studies in Sokoto, Northern Nigeria and other parts of the world could be the result of differences in ethnic, economic, educational, genetic and environmental factors between the various locations (Karapanonu and Papadimitriou, 2010; Parent et al, 2003; Padez, 2003). The observed significantly lower menarcheal age among girls in private secondary schools compared with those in public secondary schools could be

a reflection of the better socioeconomic status and higher educational level of most parents in the latter schools, factors which positively influence age at menarche (Wronk and Pawlinskachmara, 2005). It was observed that 75.8% of the students in private schools have parents who are either senior government officials or civil servant compared with 58.7% in public schools. Also 94.5% of students in private schools have parents who had attained tertiary level of education as against 52.3% in public schools.

Like Padez, (2005); Parent et al, (2003) and Stubos, (2008), we observed mothers to be the major sources of information on menarche for the girls. This is most likely due to the closer ties between girls and their mothers and the fact that menarche is a feminine affair. The observation that 9.7% of girls in public schools had their fathers as their primary informants on menarche as against 0.3% in private secondary schools could be a pointer to the fact that the more educated or richer a father is, the less attention he gives...to his daughters' physiology. The observed higher BMI among girls in private secondary schools compared to those in public secondary schools is a direct reflection of the better socioeconomic status of parents of girls in the former schools and has a direct relationship with their earlier onset of menarche (Karapanou and Papadimitriou, 2010).

We therefore conclude that menarcheal age of school girls in Calabar is 13.70 ± 0.55 years with the age been lower among girls in private schools whose parents have a more robust socioeconomic status and a higher level of education than those from public secondary schools. Also, while mothers are the major sources of information to the school girls on menarche, more fathers of girls in public schools are primary providers of menarcheal information to their girls. Most girls have a normal menstrual flow of 4 to 5 day duration.

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