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ANTHROPOMETRIC AND MENSTRUAL CHARACTERISTICS OF YOUNG IGBO GIRLS IN SOUTH-EAST, NIGERIA

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ABSTRACT

Background: Anthropometric parameters are important tools in monitoring and evaluating physical changes associated with growth, puberty and sexual maturation of a girl child. Physical anthropometry provides parameters for monitoring and evaluating hormone mediated change in growth and maturation. The variability in menstrual pattern and menarche is common. Providing accurate information on menstrual characteristics is important for patient education and for clinical evaluation. The aims of this study were to determine the anthropometric and menstrual characteristics of young girls of south-eastern Nigeria.

Methods: This was a cross sectional study of the anthropometric and menstrual characteristics of five hundred Igbo young girls from the five eastern states, aged 9-25 years. The anthropometric parameters measured include height (H), weight (W) waist circumference (WC), Chest circumference (CC), Hip circumference (HC) biacromial diameter (BAD), iliac diameter (BID) and BMI. Measurements were taken following standard protocol. The menstrual characteristics which include menarcheal age, dysmenorrhea, amenorrhea, oligomenorrhea and others were obtained through questionnaire.

Results: Anthropometric Parameters significantly differed across the five eastern states ($p < 0.05$). The mean H, W, BMI, WC, CC, HC, BAD and BID of the subjects were 164 ± 6.64 cm, 59.83 ± 10.06 kg, 76.2 ± 7.70 cm, 88.6 ± 7.66 cm, 95.6 ± 9.7 cm, 85.93 ± 7.4 cm and 73.10 ± 9.75 cm respectively. The mean menarcheal age was found to be 13.07 ± 1.69 years; Mean menstrual cycle was 28.46 ± 1.53 days. Mean menstrual bleeding was 4.30 ± 0.96 .

Conclusion: There is a significant difference in the anthropometric characteristics of females across the five states of the south east. The age at menarche varied with state, it occurred early in females from Abia and late in Anambra females. The reported menarcheal age in this study was comparable to a recent study but was however, early compared to the previous Nigerian studies.

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INTRODUCTION

Background of the Study

Menstruation is a normal physiologic event in females and Menarche is a significant event that marks the onset of sexual maturation in the females. Studies have shown that menarche is variable geographically between cultures, racial and ethnic background; there is therefore a need to evaluate the menarcheal age among females in South Eastern Nigeria,

this is important for patient education and for clinical evaluation. There is a wide spectrum of differences on how people may experience menstruation, these differences may cause significant anxiety for patients and their families if not properly understood (Cosgrove *et al.*, 2003). Variations have been documented in menarcheal age of Nigerian subjects ranging from 13.6 years in the North East, 12.53 ± 1.33 in the North West, 13.66 ± 1.82 in the South West and 12.80 ± 1.22 in the South South (Adesina and Peterside, 2013). Differences have also been reported for cycle duration and extent of flow in Nigerian studies (Ikaraoha *et al.*, 2005; Jacks *et al.*, 2005; Danborn and Oyibo 2008). There is paucity of data on the menstrual characteristics of young females in South East, Nigeria and Knowledge of which will help reduce menstrual

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morbidity, anxiety and increase reproductive health among young females in the South East. Anthropometry involves the study and techniques of measuring the human body in terms of dimensions, proportion and ratios (WHO, 1995; Bruce, 2003; Shetty, 2004). Female anthropometry shows a strong influence on female reproductive characteristics marked by menarcheal age (Reddy *et al.*, 2005). Low *et al.* (1978) in a study on Chinese girls evaluated the growth of the biacromial and biiliac diameters in relation to the age at the onset of menarche and observed that girls with an early onset of menarche have broader shoulders (biacromial diameter) and wider hips (biiliac diameter) than girls with a late onset of menarche which had broader biacromial and biiliac diameters during their pubertal growth. The study also elucidates that the rate of growth of the biacromial and bi-iliac diameters are greater in the late menarche girls. There was also a relatively greater growth in bi-iliac diameter than in the biacromial diameter in the Chinese girls. Danborno and Oyibo (2008) studied Nigerian and Nigerian girls evaluating their anthropometric and menstrual characteristics and showed that the anthropometric traits in Nigerian girls were higher than that of girls from Niger republic. There is need to evaluate the anthropometric characteristics of young females in South East Nigeria.

MATERIAL AND METHODS

Study Design and Sample Size

This was a cross-sectional study of 500 Igbo girls who attended a youth conference in Abakaliki, Ebonyi state. The Igbo girls were from five South Eastern Region states of Nigeria which comprise Anambra (n=100) Abia (n=100) Ebonyi (n=100) Enugu (n=100) and Imo (n=100). The subjects were between the ages of 9-25 years old. Demographic data and other relevant data were obtained through a designed questionnaire.

Anthropometry

Measurements were taken as follows: body weight was measured to the nearest 0.1kg with An Avery height and weight scale (Avery, Birmingham, England); the subjects were on minimal clothing and without shoes prior to the measurement. Standing height was measured to the nearest 0.1cm with the subject on bare feet. Waist circumference was measured to the nearest 0.1cm with non-stretchable tape at the midway between the iliac crest and the sub costal margin. Hip circumference was measured at the greatest provision of the gluteal muscles using a non-stretchable tape.

Biacromial and bi-iliac diameters were measured with a sliding calliper as the distance between the most lateral margins of the acromial processes of the scapulae and the distance between the iliac tuberosities respectively. BMI was calculated as weight per height squared

$$BMI = \frac{W}{h^2}$$

The technique employed in taking measurement was in accordance to the guidelines suggested by WHO expert committee (1995).

Menstrual Characteristics

Data on the menstrual characteristics was obtained by way of questionnaire. The questionnaire contained questions on Menarcheal age, pattern of menstrual flow and menstrual disorders such as Amenorrhea, Dysmenorrhea, Menorrhagia, Mittlescherimez and Oligomenorrhea.

Statistical Analysis

Data were expressed as mean \pm standard deviation; student's t-test was used to test for significant differences in anthropometric parameters, menarcheal age, menstrual cycle and menstrual bleeding days. A significant difference in prevalence of premenstrual syndrome was checked using ANOVA. SPSS version 17 was used for the statistical analysis. The differences were accepted as significant when $P < 0.05$

RESULTS

Table 1. Shows the mean value of the anthropometric parameters of young Igbo girls across the five state of south east Nigeria. There was a significant difference in the Anthropometric parameters ($p < 0.05$) across the five states, the subjects from Anambra had higher mean values. The mean H, W, BMI, WC, CC, HC, BAD and BID of the subjects were 164 ± 6.64 cm, 59.83 ± 10.06 kg, 76.2 ± 7.70 cm, 88.6 ± 7.66 cm, 95.6 ± 9.7 cm, 85.93 ± 7.4 cm and 73.10 ± 9.75 cm respectively. Table 2 Shows the mean menstrual characteristics of Igbo girls across the five states of south east Nigeria. There was a significant difference in the age at menarche and menstrual bleeding days across the five states ($p < 0.05$), there was however, no significant difference in the menstrual cycle. Menarche occurred early in the subjects from Abia and late in the subjects from Anambra.

Table 1. Anthropometric characteristics of Igbo girls across states of South Eastern Nigeria

Anthropometric Parameters	Abia (n=100) Mean \pm SD	Anambra (n=100) Mean \pm SD	Ebonyi (n=100) Mean \pm SD	Enugu (n=100) Mean \pm SD	Imo (n=100) Mean \pm SD	F	p-value
Height (cm)	163.25 \pm 6.94	167.68 \pm 6.68	160.50 \pm 7.28	165.95 \pm 4.84	163.90 \pm 5.41	19.75	0.000
Weight (kg)	54.50 \pm 8.24	66.30 \pm 12.63	55.50 \pm 8.50	62.10 \pm 7.71	60.75 \pm 8.30	28.94	0.000
BMI (kg/m ²)	20.44 \pm 2.64	23.52 \pm 3.77	21.58 \pm 3.22	22.57 \pm 2.76	22.63 \pm 2.99	14.44	0.000
Waist circumference.	73.41 \pm 7.71	78.87 \pm 7.60	75.18 \pm 5.85	77.72 \pm 10.6	75.69 \pm 5.08	8.27	0.000
Chest circumference	84.84 \pm 7.06	92.08 \pm 7.95	87.88 \pm 5.88	90.93 \pm 9.23	87.25 \pm 5.43	16.25	0.000
Hip circumference.	92.33 \pm 11.76	100.46 \pm 10.03	91.19 \pm 6.4	97.36 \pm 9.43	96.65 \pm 6.78	17.45	0.000
Biacromial diameter.	82.42 \pm 5.44	92.96 \pm 9.22	82.93 \pm 5.2	86.74 \pm 7.41	87.12 \pm 5.94	23.51	0.000
Biliac diameter	71.63 \pm 7.9	78.99 \pm 9.4	71.12 \pm 5.17	74.80 \pm 5.5	68.96 \pm 14.5	18.24	0.000

Table 2. Menstrual characteristics of Igbo girls

	Abia (n=100) Mean ±SD	Anambra (n=100) Mean ±SD	Ebonyi (n=100) Mean ±SD	Enugu (n=100) Mean ±SD	Imo (n=100) Mean ±SD	Mean	F	p-value
Menarcheal age (years)	12.70±1.12	13.40±1.57	13.05±1.82	12.85±2.16	13.35±1.66	13.07±1.69	0.64	0.010
Menstrual cycle (days)	28.00±0.89	28.70±1.53	28.50±1.34	28.55±1.40	28.55±1.64	28.46±1.5	0.640	0.007
Menstrual Bleeding (days)	4.20±0.67	4.45±0.81	4.55±1.21	4.05±0.672	4.20±1.0	4.29±0.95	4.737	0.001

Table 3. Menstrual disorders of Igbo girls across the South Eastern States of Nigeria

	Abia (n=100) Mean ±SD	Anambra (n=100) Mean ±SD	Ebonyi (n=100) Mean ±SD	Enugu (n=100) Mean ±SD	Imo (n=100) Mean ±SD	Fisher's Exact text	p-value
Amenorrhea	6(6.00)	6(6.00)	5(5.00)	6(6.00)	0(0.00)	1.72	0.071
Dysmenorrheal	61(61.00)	55(55.00)	81(81.00)	65(65.00)	66(66.00)	3.16	0.002
Menorrhagia	5(5.00)	6(6.00)	26(26)	5(5.00)	1(1.00)	7.38	0.000
Mittelscherimez	15(15.00)	15(15.00)	16(6.00)	27(27.00)	10(10.00)	3.46	0.001
Oligomenorrhea	0(0.00)	0(0.00)	0(0.00)	15(15.00)	0(0.00)	6.332	0.000

The mean menarcheal age of the subjects in this study was 13.35±1.66 years. The mean menstrual cycle and menstrual bleeding days were 28.46±1.5 days and 4.3±0.96 days respectively. Table 3 Shows the incidence of menstrual disorders across the five eastern states. There was a significant difference in the incidence of the menstrual disorders across the five states ($p < 0.05$) except for Amenorrhea. Dysmenorrhea was the most common menstrual disorder and occurred at a prevalence of 65%.

DISCUSSION

The findings of this study on the anthropometric characteristics of females in south east Nigeria show that the mean height was 164.25±6.64 cm, which is comparable to the mean height of Nigerian girls earlier reported by Obikili (1992). The mean weight was 59.83±10.06 kg, it was 2.19±0.54 kg higher than the reported value by Danborno and Oyibo (2008) on Nigerian girls; the mean values of BMI, Waist and Hip circumferences, Bi-acromial and Bi-iliac diameters were also slightly higher than the values reported by Danborno and Oyibo (2008) in Kaduna, North central Nigeria. The difference in mean values of the anthropometric parameters reported in this study compared to that of Danborno and Oyibo (2008) can be attributed to regional/ethnic variation which is probably due to effects of culture, genetics and nutritional status.

More so Danborno and Oyibo (2008) studied female Nigerian subjects in Kaduna north central Nigeria while this present study was in south east Nigeria. It has been documented that human body proportions are affected by ecological, geographical and racial factors (Tanner 1956, WHO 1995 and Agu *et al.*, 2013). Studies have also shown that differences in anthropometric and menstrual characteristics across a population is probably due to nutritional status and possibly is a reflection of the socioeconomic status of the population (Ikaraoha *et al.*, 2005; Singh and Promila, 2009). There was a significant difference in the anthropometric parameters of the subjects across the five south east Nigerian states ($p < 0.05$). The mean values were higher in the females from Anambra compared with other states (Table 1). Anambra is a major commercial center in the south east, it is home to many professionals, merchants and captains of industry; more so, it

is believed to have socioeconomic advantage than the other states. The higher anthropometric parameters of the subjects from Anambra may be as a result of socioeconomic factors and possibly suggest that Anambra females may have higher reproductive success. Female Anthropometry has a strong positive correlation with female reproductive characteristics and have been shown to predict higher reproductive success in women (Allal *et al.*, 2004; Reddy *et al.*, 2005; Danborno and Oyibo, 2008). The Mean age at menarche of south eastern Nigerian girls from this study was 13.07±1.69 years, this was however, low compared to the finding of Oduntan *et al.* (1976), they reported 13.7years for urban Nigerian girls; Ikaraoha *et al.* (2005) documented 13.89 years for urban girls in Rivers state, South-south Nigeria; Jack *et al.* (2005) reported 13.6 years for secondary school girls in Borno state, North-east Nigeria and Danborno and Oyibo (2008) documented 13.59±1.58 years for Nigerian girls in Kaduna state, North-central Nigeria. It was however, comparable to Adesina and Peter side (2013) who documented 12.80±1.22. The younger age at menarche reported in this study and that Adesina and Peterside (2013) suggest a secular trend in the age at menarche among Nigerian females, which can be attributed to improved living condition, nutrition, urbanization and general health which has been documented in other countries including African states (Adadevoh *et al.*, 2007; Pasquet *et al.*, 1999; Heskett *et al.*, 2002).

The mean menarcheal age of the subjects in this study was lower compared to other African studies; Adadevoh *et al.* (2007) reported 13.98±1.42 years in Ghana and Danborno and Oyibo (2008) documented 14.18±1.33 for Niger, and Zegeye *et al.*, 2009, documented 14.8 years in Ethiopia. The differences in the reported age at menarche across African states is possibly due to socioeconomic, environmental, nutritional, cultural and geographical factors. The mean menstrual cycle and the menstrual bleeding (flow) of south eastern Nigerian girls in this study are 28.46±1.53 and 4.30±0.96 days respectively. The observed values were consistent with an earlier study by Umeora and Egwatu (2008). There was no significant different in the length of the cycle however, the menstrual bleeding (flow) significantly varied across the five states. Dysmenorrhea (painful period) was more prevalent and occurred at arate of 65%, this is in agreement with previous studies. It has been reported to

interfere with daily activities and has also been documented as a leading cause of short term school absenteeism (Zegeye et al, 2009). It is caused by the release of prostaglandins and leukotrienes in the uterus which cause the uterus to contract.

Conclusion

There was a significant difference in the anthropometric characteristics of females across the five states of the south east. The age at menarche varied with state, it occurred early in females from Abia and late in Anambra females. The reported menarcheal age in this study was comparable to a recent study but was however, early compared to the previous Nigerian studies.

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