

Anthropometric and Menstrual Characteristics of Girls from Nigeria and Niger Republic

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Citation

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Abstract

This study investigated the anthropometric and menstrual characteristics of girls from Nigeria and Niger Republic, who are students of the Ahmadu Bello University, Zaria. Girls from Nigeria ($n = 160$) and Niger republic ($n = 38$) with mean age 22.81 ± 3.33 and 25.22 ± 1.83 respectively participated in the study. Height, weight, chest waist, hip circumferences and waist-hip ratio and body mass index were obtained following standard protocols. Menstrual characteristics of the subjects were obtained through designed questionnaire. The result showed that birth weight and BMI are significantly higher in Nigerian than Nigerien girls ($P < 0.001$). Menarcheal age and menstrual cycle length of Nigerian girls is lower than that of girls from Niger republic ($P < 0.05$). Premenstrual syndrome symptoms showed significant association with amenorrhea, backache and tiredness in girls from Niger republic ($P < 0.001$, $P < 0.01$ and $P < 0.001$) respectively. Overall, the study showed that girls from Nigeria showed higher values than girls from Niger republic. This study tends to suggests that girls from Nigeria may have higher reproductive success than girls from Niger Republic, this differences might result from environmental factors that need further probing.

INTRODUCTION

Anthropometric characteristics have been shown to predict higher reproductive success in women. For example, maternal height have been associated with the number of children and twinning ($_{1,2,3}$), waist and hip circumferences and waist-hip ratio is associated with having more sons ($_4$), body mass index and waist-hip ratio with higher fertility and health in women ($_{5,6,7}$) and higher gluteofemoral adiposity have been associated with lower menarcheal age ($_{8,9,10}$). Female anthropometry that reveals adiposity has shown strong influence on female reproductive characteristics marked by age menarche ($_{10}$), this age at menarche is widely varied in different populations and is delayed especially in populations with poor nutrition ($_{11,12}$). This was the basis for the hypothesis proposed Frisch and Mc Arthur ($_{13}$) that a female need to store a critical amount of fat to reach menarche, even tough the theory generally failed ($_{9,10}$). It is now thought that the distribution of fats towards the gluteofemoral region tend to be more plausible ($_{8,9,10}$).

Menstrual cycle is controlled by hormones and other factors influence its lengths and regularity ($_{14}$), and have a direct implication for women's fecundability and risk of hormonally associated diseases ($_{15}$).

This study was designed to investigate if there are

differences in the anthropometric and menstrual characteristics of girls from Nigeria and Niger Republic.

METHODOLOGY

SUBJECTS

This study was based on a cross-sectional sample of 198 female subjects who are students of the Ahmadu Bello University, Zaria. Girls from Nigeria ($n=160$) and Niger Republic ($n=38$) with mean age 22.8 ± 3.33 and 25.22 ± 1.83 respectively participated in the study, after giving informed consent. The method involved administering questionnaires for the collection of demographic data (age, birth weight and nationality), and direct measurements of weight, height, chest, waist and hip circumference) and menstrual status (menarcheal age, menstrual cycle, menstrual bleeding and prevalence of menstrual disorders).

ANTHROPOMETRY

Measurements were taken as follows: body weight was measured to the nearest 0.1kg with a balanced scale with minimal clothing. Height was measured to the nearest 0.1 cm with the subject on bare feet. Waist chest, hip, thigh, forearm and arm circumferences were taken with the subject standing, the waist circumference was measured at the minimal abdominal girth approximately midway between the xiphoid process and the umbilicus. Hip circumference

was measured at the level of the greatest protrusion of the gluteal muscle. All circumference measurements were carried out using nonflexible tape. The waist-hip-ratio was calculated as

WHR= waist circumference (cm) /hip circumference `cm)

MENSTRUAL CHARACTERISTICS

Information on menstrual characteristics was obtained by way of questionnaires. The questionnaire contained questions on the pattern of menstrual flow, menarcheal age, menstrual disorders such as menorrhagia, Mittleschmerz, amenorrhea and parameters constituting pre-menstrual syndrome as described by Antai et al (16).

STATISTICAL ANALYSIS

Data were expressed as mean standard \pm deviation, Student's t-test was used to test for significant differences in anthropometry, menarcheal age, menstrual cycle, menstrual bleeding in days. Significant difference in prevalence of premenstrual syndrome was checked using Chi-square analysis. The differences were accepted as significant when $P < 0.05$, SigmaStat 2.0 (Systat Inc., Point Richmond, CA) was used for the statistical analysis.

RESULTS

Descriptive statistics of the anthropometric characteristics of the subjects is shown in Table 1. The result showed that birth weight, thigh circumference and BMI significantly differed between the population ($P < 0.001$, 0.03 and 0.01 respectively).

The mean and standard deviation of menstrual characteristics of the two populations are shown in Table 2. There were significant differences in the menarcheal age and length of menstrual cycle ($P = 0.03$, and 0.03) respectively. For all other anthropometric variables Nigerian girls had higher values than girls from Niger Republic, except the hip circumference where girls from Niger Republic had higher value. Table 3 shows the incidence of menstrual disorders and their occurrences in Nigerian and Nigerien girls. Only amenorrhea showed significant difference in the prevalence ($P < 0.001$) within the two populations, even though the prevalence of menorrhagia and Mittleschmerz were higher in girls from Niger Republic.

The prevalence of premenstrual syndrome in both populations is shown in Table 4. Significance association were observed in backache, tiredness and headache in girls from Niger Republic ($P < 0.001$, $P = 0.03$, $P < 0.001$)

respectively. Comparing the difference prevalence of PMS between the girls from the population still girls from Niger Republic tend to suffer more from symptoms of PMS than girls from Nigeria.

Figure 1

Table 1: Anthropometric characteristics of girls from Nigeria and Niger Republic

	Nigerian Girls (n = 160)	Nigerien girls (n = 38)	t	P
	Mean \pm SD	Mean \pm SD		
Birth weight (kg)	3.26 \pm 3.33	2.91 \pm 0.57	-3.31	<0.001
Height (cm)	162.14 \pm 5.95	162.32 \pm 5.55	-0.17	0.86
Weight (kg)	57.64 \pm 9.52	54.62 \pm 9.32	1.77	0.08
BMI (kg/m ²)	21.95 \pm 3.33	20.21 \pm 4.92	-2.61	0.01
Chest circumference (cm)	87.69 \pm 6.65	85.30 \pm 8.11	-1.41	0.16
Waist circumference (cm)	73.56 \pm 7.39	72.46 \pm 8.87	-0.78	0.43
Hip circumference (cm)	94.32 \pm 7.36	94.43 \pm 7.31	0.08	0.93
Thigh circumference (cm)	52.76 \pm 5.52	50.58 \pm 5.70	-2.15	0.03
Arm circumference (cm)	25.67 \pm 2.86	25.14 \pm 3.79	0.96	0.34
Forearm circumference (cm)	23.43 \pm 1.86	22.83 \pm 1.89	-1.76	0.08
Waist hip ratio	0.78 \pm 0.04	0.77 \pm 0.06	-1.62	0.11

Figure 2

Table 2: Menstrual characteristics of girls from Nigeria and Niger Republic

	Nigerian Girls (n = 160)	Nigerien girls (n = 38)	t	P
Menarcheal age (years)	13.59 \pm 1.58	14.18 \pm 1.33	2.14	0.03
Menstrual cycle (days)	27.63 \pm 2.53	28.71 \pm 3.32	2.20	0.03
Menstrual bleeding (days)	4.65 \pm 1.11	4.97 \pm 1.21	1.57	0.12

Figure 3

Table 3: Menstrual disorders in Nigerian and Nigerien girls.

	Nigerian Girls (n = 160)	Nigerien girls (n = 38)	χ^2	P
	(%)	(%)		
Menorrhagia	56 (35.00)	14 (36.84)	0.003	0.96
Mittleschmerz	94 (59.5)	27 (71.05)	1.27	0.26
Amenorrhea	6 (3.75)	8 (21.05)	11.48	<0.001

Figure 4

Table 4: Prevalence of Premenstrual Syndrome in Nigerian and Nigerien Girls

Premenstrual syndrome symptoms	Nigerian Girls (n = 160) (%)	Nigerien girls (n = 38) (%)	χ^2	P
Low Abdominal discomfort	123 (76.87)	28 (73.68)	0.004	0.94
Pimples/puffy face	104 (65.40)	22 (57.98)	0.09	0.77
Painfully engorged breast	106 (66.25)	29 (76.32)	0.91	0.34
Depression	79 (49.38)	14 (36.84)	0.16	0.69
Tiredness	88 (55.00)	29 (76.31)	4.76	0.03
Aggression	42 (26.25)	14 (36.84)	1.22	0.27
Joint/muscle pain	64 (40.00)	19 (50.00)	0.72	0.40
Increase appetite	32 (20.00)	4 (10.53)	1.24	0.27
Headache	27 (16.88)	15 (39.50)	8.08	<0.01
Increased weight	35 (21.88)	9 (23.87)	0.01	0.94
Backache	68 (42.50)	27 (71.05)	17.36	<0.001
Common cold	68 (42.50)	22 (57.89)	2.35	0.13

DISCUSSION

Our results have characteristically demonstrated that anthropometric traits of girls from Nigeria are higher than that of girls from Niger Republic with BMI and thigh circumference reaching significant differences. To the best of our knowledge this is the first report comparing such traits between to the two countries. Difference in anthropometric and menstrual traits across populations has been attributed to nutritional status and invariably a reflection of the socioeconomic status of that population (17).

A recent report by Lessek and Gaulin (10) has attributed early age of menarche to the nature of fat distribution rather than the earlier theory of critical weight proposed by Frisch and Arthur (13). It could be drawn from that the early menarcheal age in girls from Nigeria may be due to this phenomenon. Significant difference were noted in BMI and thigh circumference of the two groups with girls from Nigeria being higher than girls from Niger Republic, this also agrees with the findings of Lessek and Gaulin (10) in America were girls with menarche significantly differ in gluteofemoral fat.

The prevalence (3.75 %) of amenorrhea observed in Nigerian subjects falls within the reported prevalence of 3 – 4 % (19,20), but the observed prevalence (21.0 %) in Nigerien subjects is radically above the normal range. Even though, there are myriads causes of amenorrhea which include anatomic defects, primary hypogonadism, hypothalamic causes, pituitary causes and other endocrine disorders (21), from the present study it seems the major cause of the high prevalence of amenorrhea among the Nigerien subjects compared to the Nigerian subjects is hypothalamic in origin.

This hypothalamic cause may be possibly due to higher degree of stress and poor nutrition, but this claim needs further probing.

The prevalence and pattern of premenstrual syndrome observed in the present study is lower than the prevalence reported by Antai et al (16) on a sample of students from the University of Calabar. Further is similarity and dissimilarity in the pattern. In the Antai et al (16) data the prevalence decrease from 85 % for lower abdominal discomfort to 11 % in common cold, this is in contrast with our own results which also showed that lower abdominal pain has the highest prevalence 78 %, and common cold with 42.8% prevalence, is similar to the result in Nigerian girls. The result of the Nigerian and Nigerien girls are more comparable than the results from Antai et al (16).

CONCLUSION

This study has shown using anthropometric and menstrual parameters that girls from Nigeria would have more reproductive success than girls from Niger Republic. This may be due to the fact that the Nigerien girls are more exposed to higher level of stress factors which could be environmental, nutritional, psychological or socio-economical when compared to Nigerian girls.

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