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Pattern of growth and associated dietary practices of junior high school adolescents in a south western Nigerian community

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Abstract

This study assessed the pattern of growth of 300 adolescents in two public secondary schools in south west of Nigeria. Questionnaires to ascertain adolescents' dietary practices were used, and some anthropometric measurements to determine their height and weight were conducted. The results show that majority of the respondents (80%) had three square meals daily and ate different types of fruits per day. More than half (52%) were underweight, 15.3% were malnourished, and 7.7% were overweight. Only a quarter were well nourished. Compared to the NCHS/WHO recommended Standards, this study reveals that female adolescents had larger values for weight and height than male adolescents ($p<.05$). A well articulated nutrition education programme aimed at improving the food consumption habits of school age adolescents should be adequately addressed.

Keywords: *Dietary practices, adolescents, Nigeria, anthropometric measurement*

INTRODUCTION

Studies on adolescent growth pattern have been documented (Jelliffe, 1966) especially in developing countries where 85% of adolescents live and make up about 20% of the world's population (WHO, 1997). Information relating to the anthropometric evaluation of West African adolescents exists (Prazuck et al, 1989). Some studies have been carried out in some parts of Nigeria (Ogunranti, 1986; Chukwunenye, 1984; Janes, 1974); most of which focused on pre-school pupils and not necessarily secondary school adolescents.

Up to five to 20% of Nigerians are malnourished (FAO, 2005). Hungry and malnourished adolescents are frequently unable to work and fall sick more often (Brauscheiweig. et al, 2000) due to unavailability of food, inadequate diet, unhealthy socio–cultural practices and poor economic conditions (FAO, 2004). Adolescence is a period of rapid development (Cavadini, et al, 2000) when young people acquire new capacities and faced with new situations. Thus, growth assessment is important (Gorin et al, 1998) and serves as a means for evaluating the health and nutritional status of children. It provides an indirect measurement of the quality of life of an entire population (WHO, 1976). In addition to clinical and food consumption data, health program planners need reliable information which anthropometric studies can provide (Shamssain, 1989). The most common anthropometric measurement include weight, height, triceps skin fold, head circumference, chest circumference, mid upper – arm circumference (MUAC) and maximum thigh circumference (Jelliffe, 1966). Reference data can be used (De Onis & Habicht, 1996); however, caution must be taken to ensure appropriate use and interpretation of anthropometric indices (WHO, 1995).

The goal of our study was, therefore, to ascertain the extent of the dietary practices in the study area and recommend appropriate intervention programs. Specifically, this study was designed to:

- collect anthropometric data on junior secondary school adolescents.
- identify dietary practices of junior secondary school adolescents.

- determine the pattern of overweight and underweight in male and female adolescents; and
- make recommendations based on the findings of this study that will improve adolescent nutritional status.

METHODS

This study was a cross sectional survey. The target population was secondary school students from two high schools in Ilisan-Remo. Ilisan-Remo, a semi-urban community is the 4th largest town among the 33 towns in Remoland. It is situated 68km northwest of Lagos, 60km Southwest of Ibadan and approximately 60km from Abeokuta, the Ogun State Capital. It is slightly evaded by Lagos – Ibadan expressway from Sagamu junction by 11km and 8km from Ode – Remo junction. (Onasanya et al, 2002). The predominant occupation among the people of Ilisan – Remo is peasant farming and petty trading. Cash crops and arable crops are the common types grown. There are also Teachers, Blacksmiths, Vulcanizers, Hairdressers, Barbers, Tailors, Mechanics, Electrician, Health Workers, Military and Paramilitary Officers.

Of the 10 schools in the community, two were randomly selected. Only 300 students from the junior secondary classes volunteered to participate.

Anthropometric measurements

Weight**:** A bathroom weighing Scale calibrated in Kilogram (Kg) was used to weigh the children. At the beginning of each measurement, the pointer was brought to zero point to make sure there was "no zero error".

Height: Participants were measured bare-footed, with feet together and heels against the wall, head approximately in the Frankfurt plane (they were asked to look straight ahead) and standing up "real straight", a thin plastic ruler was placed above the head perpendicular to the measuring tape and parallel to the ground to measure the height accurately (Jellife et al, 1966; Gorstein et al, 1994; WHO and de Onis et al. 1996).

Survey questionnaire

The survey questionnaire was used to seek information on participants' demographics (age, sex, and religion) and food consumption pattern. The structured questionnaire was pre – tested at a secondary school similar to the study population. As a result, necessary corrections were made.

Data collection

Three field assistants were recruited and trained on how to use the weighing scale and the measuring tape. The trained field assistants helped in administering the questionnaire, weighing and measuring the children. This exercise took place for a period of one week immediately after morning assembly.

Data analysis

Questionnaires were retrieved, coded and entered into the computer. The Statistical Package for Social Sciences (SPSS) was used to analyze the frequency distributions.

Ethical consideration

The departmental research committee of Babcock University granted approval for this study. Details related to the purpose of this study, description of procedures, risks, confidentiality issues, and rights to withdraw at any time were discussed with the teachers and the students who participated in the study. Questions and concerns raised by the teachers and students were addressed.

RESULTS

Participants' characteristics

Of the 300 respondents, 160 (53.3%) were males and 140 (46.7%) females aged 11 to 15 years. Majority of the participants, 258 (86%) were Christians, 35 (11.7%) were Muslims and 7 (2.3%) were Traditionalists.

Anthropometric measurements

Mean height (in cm) and weight (in kg) of female and male adolescents aged 11 to 15 years

At age 11, the males were taller than the females. However, females aged 12 – 15 years tend to be taller than males of the same age. At 11 years of age, the males appeared heavier than the females while females aged 12 – 15 years tend to be heavier than males of the same age (Table 1).

Table 1: Mean height (cm) and weight (Kg) of female and male adolescents by age

Age (Years)	Females		Males	
	Mean height (cm)	Mean weight (Kg)	Mean height (cm)	Mean weight (Kg)
11	136.7	31.1	138.1	32.6
12	145.1	36.6	137.9	32.8
13	145.8	37.6	141.6	34
14	150.1	42.2	149.7	39.1
15	154.1	45.8	153.4	43.3

Mean height (in cm) and weight (in Kg) of female and male adolescents aged 11 to 15 years compared to the NCHS/WHO Reference Population

Males in the sample appeared to be considerably shorter than the males in the reference population. Similarly, the females appeared to be shorter than the females in the reference population (Table 2).

Table 2: Comparison of mean height (in cm) of female and male adolescents and the NCHS/WHO Reference Population by age

Age (years)	Mean Height (cm) by sex		NCHS/WHO Reference Height (Female)	NCHS/WHO Reference Height (Male)
	Females	Males		
11	136.7	138.1	147.6	145.7
12	145.1	137.9	155.2	152.3
13	145.8	141.6	158.8	159.8
14	150.1	149.7	161.4	166.7
15	154.1	153.4	162.2	171.4

Table 3 shows that the males and females tend to be considerably lighter in weight than the males of the Reference Population.

Table 3: Comparison of mean weight (in Kg) of female and male adolescents and the NCHS/WHO Reference Population by age

Age (years)	Mean weight (in Kg) by sex		NCHS/WHO Reference Weight (Female) in Kg	NCHS/WHO Reference Weight (Male) in Kg
	Females	Males		
11	31.1	32.6	40.0	38.3
12	36.6	32.8	46.6	43.0
13	37.6	34.0	50.5	50.0
14	42.2	39.1	54.2	56.7
15	45.8	43.3	56.5	61.7

Respondents' standard weight for age

The percent (%) of standard weight-for-age was calculated using the formula:

$$\frac{\text{Actual weight of Child}}{\text{Standard Reference weight}} \times 100$$

The result showed that more than half, 156 (52.0%) were between 60% and 80% of the Recommended Standard weight, suggesting that they were underweight, 75 (25.0%) were between 80% and100% showing they were well nourished, 46 (15.3%) were below 60% which means they were malnourished, and 23 (7.7%) were overweight.

Pattern of growth of female and male adolescents

There were significant differences in the growth pattern for height/age and weight/ age of secondary school female and male adolescents aged 11 to 15 years when compared with the NCHS/WHO International Reference Population ($P<0.05$) (Table 4).

Pattern of growth of adolescents compared to the NCHS/WHO Reference Population

The formula below was used for derive the percentage of mean difference:

$$\frac{\text{Difference in Mean}}{\text{Mean of Reference Population}} \times 100$$

The result shows that the height of the females seemed close to that of the females of the NCHS/WHO reference population than males of the same age. Furthermore, the females seemed to have a height pattern similar to the females in the reference population unlike the males of the same age.

Dietary practices

Table 5 shows the number of meals per day, and type and combination of fruits and food eaten at least once a day.

Number of meals per day

Majority of the participants, 239 (79.7%) said they ate thrice a day, while 3 (1%) indicated that they ate once a day.

Type and combination of fruits eaten at least once a day

Majority of the respondents, 102 (34.0%) said they ate all kinds of fruits. A few, 32 (10.7%), 37 (12.3%) and 22 (7.3%) indicated that they ate banana, pineapple and orange respectively. The fruit combination on Table 5 is based on the multiple choices of respondents as reflected in the research instrument.

Type and combination of food eaten at least once a day

Majority of the respondents, 156 (52.0%) said they ate rice. A total of 51 (19.3%) indicated that they ate rice with other foods such as beans, *Amala* and *Moinmoin*. The food combination above is based on the multiple choices of respondents as reflected in the research instrument.

DISCUSSION

This study shows that most of the children examined were in poor health and malnourished and this probably explains the slow rate of physical maturation as manifested by a mean height and weight that were considerably lower than the internationally accepted standards. The main factor responsible for this may include dislike for certain foods by the adolescents (especially foods rich in Carbohydrates). The findings of the research show that most of the children (52%) ate rice at least once a day (Table 5) which is consistent with the findings of Chukwunenye (1984).

An interesting result of this study is the comparison curve of females for height. The result revealed that female adolescents have growth patterns comparable to the NCHS/WHO recommended Standards. A possible reason for this could be attributable to the adolescent growth spurt and also the sense that height is less affected by nutritional and socioeconomic factors than weight. This result is complemented by the findings of Nwokoro et al., (2006).

Furthermore, the findings emanating from this study confirms the result obtained by earlier researchers (Shamssain, 1991, 1989; Prazuck et al., 1989) but in contrast with Ogunranti (1986) which showed that Nigerian children 4 – 18 years have growth standards higher than NCHS/WHO recommended standards. Our study revealed that the adolescents were considerably undernourished and malnourished which could be due to inadequate intake of recommended daily allowance; most likely due to poor socioeconomic conditions prevalent in the community. This is also consistent with the findings of Oderinde (2005).

CONCLUSION

The standard of health and nutrition of secondary school adolescents aged 11 – 15 years is poor with most of them suffering from under nutrition. It is very likely that the significant difference between the height and weight of children and the NCHS/WHO Reference Population may be mainly due to inadequate knowledge of what constitutes a balanced diet.

Based on this, there is need for action on the part of all stakeholders especially parents, health practitioners, school teachers and nutritionists within the community in raising the level of awareness and ensuring quality life for the children. Specifically,

- There should be more localized research on adolescent nutrition to serve as basis for reference data.
- Adequate education, especially nutrition education geared towards improving the food consumption habits of the adolescents should be ensured. Parents should also be educated on the relevance of the female child to the society and the need for appropriate feeding.
- A nutritional rehabilitation center should be established as this has been shown to improve the weight gain of malnourished children (Ojofeitimi & Teniola, 1980).
- Government should ensure that foods are available at reasonable prices. Students should also be encouraged to eat mid-day meals.
- Food and nutrition should be incorporated into the Junior Secondary School curriculum to enable the adolescents become aware of what an adequate diet entails.
- Clinics/health centers providing school health services should be established to provide routine growth monitoring services for secondary school children and the health facilities in the community should also be well equipped with essential drugs to ensure quality health care for the children.
- There should be periodic capacity building workshops on appropriate nutrition for schools' guidance and counselors to equip them with relevant information that will enable them meet the challenges of adolescent nutrition.

Table 4: Analysis of the pattern of growth of female and male adolescents

Variable	Mean		Standard		Standard Error of Mean		T - Value		P	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Weight (kg)	38.66	30.36	5.61	4.69	2.51	2.09	-2.83	-2.84	0.02	0.0216
Height (cm)	146.36	135.39	6.51	7.04	2.91	3.15	-2.71	-2.67	0.02	0.0283

$P<0.05$

Table 5: Dietary practices of adolescents

	Frequency (f)	Percent (%)
A. Number of times food was eaten in a day		
Three times	239	79.7
Twice	26	8.7
Four times	22	7.3
Five times	10	3.3
Once	3	1.0
Total	300	100
B. Distribution by type and combination of fruits eaten		
All Fruits	102	34.0
Pineapple	37	12.3
Orange	32	10.7
Banana	22	7.3
Banana/Mango/Orange/Pineapple	18	6.0
Apple	16	5.3
Banana/Orange/Apple/Pawpaw/Pineapple	13	4.3
Mango/Orange/Pineapple	11	3.7
Apple/Pawpaw	11	3.7
Pawpaw	10	3.3
Banana/Orange/Pawpaw	8	2.7
Mango	7	2.3
Orange/Pineapple	6	2.0
Banana/Pawpaw/Pineapple	3	1.0
Mango/Orange/Apple/Pawpaw/Pineapple	2	0.7
Pawpaw/Pineapple	2	0.7
Total	300	100
C. Distribution by food type and combination eaten at least once a day		
Rice	156	52.0
Beans	35	11.7
*Amala	19	6.3
Rice/Beans/Meat	18	6.0
Snacks	14	4.7
Rice/**Moinmoin/Egg **Moinmoin	13	4.3
Rice/Beans/*Amala	8	2.7
Egg/*Amala/Snacks	8	2.7
Rice/Snacks/Fruit	7	2.3
Rice/Snacks/Meat	6	2.0
Egg	6	2.0
Fruits	4	1.3
Meat	2	0.7
Beans/Egg	2	0.7
Total	2	0.7
	300	100

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