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Prevalence of food insecurity among rural communities and its effects on nutritional status of children (8-15 years) in Ondo State, Nigeria

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Food insecurity is the major problem facing developing countries. The nutritional well-being of children growing up in this condition is seriously affected. In view of this, the present study aimed at investigating prevalence of household food insecurity and nutritional status of children from rural communities in Ondo State, Nigeria. The study was a descriptive cross-sectional designed studied among 909 males and 897 females children randomly selected from public primary schools in Ondo State, Nigeria. Demographic characteristics, dietary intakes and anthropometric measurements (height, weight and head circumference) of the children were collected through questionnaires. The quantity of dietary intake and percentage RDI met of the children were determined using portion size/household instruments, chemical analysis and dietary reference intakes (DRI) standard. BMI-for-age and height-for-age z-score of the children were also determined using the method and reference of WHO. The household food security status of the children's family was determined using household coping strategies. The result showed that 37% of the families were food secure while the remaining (63 %) were food insecure. The percentage met of DRI by the children in terms of energy, protein and mineral (calcium, iron, zinc, sodium, potassium and magnesium) were considerably less than recommended intakes. The mean height of female children was significantly higher when compared with male counterpart between 10-14 years, while that of their weight was lower between 6-9 years. For the BMI-for-age z-score, 13.9% of the children were obese/overweight 39.6% normal and 46.5% underweight; while that of height-for-age z-score, 56.8% were normal and 43.3% stunted. Head circumference-for-age z-score, 52.7% of the children had normal head circumference and 47.3% had head circumference below normal. The present study investigated household food insecurity status and nutritional status of children. The findings showed high prevalence of household food insecurity and child malnutrition, hence, there is a need for nutrition programmes such as school feeding in order to complement the nutrient intake of the children from homes.

Keywords: Household food insecurity, nutritional status, children.

INTRODUCTION

Food is one of the most basic needs and necessity for human survival; and it is achieved through qualitative feeding practices. The feeding practices and access to the appropriate quality and quantity of foods are essential components of optimal nutrition for young children

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(Lutter, 2003; Lutter and Rivera, 2003). Food security—defined as access by all people at all times to enough food for an active and healthy life, is one of the major factors necessary for a household members, particularly children, to be healthy and well-nourished (Nord et al., 2008). Food insecurity, in turn, refers to limited or uncertain physical and economic access to secure sufficient quantities of nutritionally adequate and safe foods in socially acceptable ways to allow household members to sustain active and healthy living (FAO. 1996;

Wolfe and Frongillo, 2001). By this definition, household food insecurity has two broad components: insufficient access to a nutritionally adequate and safe food supply at the household level (Wolfe and Frongillo, 2001; Coates et al., 2006), and inadequate utilization of these foods by household members. Household food insecurity can negatively affect food consumption, including reduced dietary variety, nutrient intake, and nutritional status of household members.

Household food insecurity (HHFI) causes hunger and malnutrition in most countries, including Nigeria (FAO. 1997a; FAO. 1997c). The nutrition and health consequences of HHFI have been documented among adults and children even in both developed and developing countries (Kendall et al., 1996; Rose, 1999; Lee and Frongillo, 2001; Stuff et al., 2004; Olson, 1999; Tarasuk and Beaton, 1999; Vozoris and Tarasuk et al., 2003; Quine and Morrell, 2006). HHFI was negatively associated with dietary intake (Kendall et al., 1996; Rose, 1999; Lee and Frongillo, 2001; Stuff et al), health, and nutritional status (Lee and Frongillo, 2001; Stuff et al., 2004; Olson, 1999; Tarasuk and Beaton, 1999; Vozoris and Tarasuk et al., 2003; Quine and Morrell, 2006) of adults in developed and developing countries (Gulliford et al., 2003; Hadley and Patil, 2006; Oldewage-Theron et al., 2006). HHFI also influences health and nutritional status of children (Cook et al., 2004; Matheson et al., 2004). It has been implicated as the main factors causing poor feeding practices and protein-energy malnutrition among children (Kuntal et al., 2008; Sanusi et al., 2006). For example, children in low-income, food-insecure households had significant decreases in energy intake and meat consumption (Matheson et al., 2002) and consumed fewer carbohydrates and fruits and less total energy (Casey et al., 2001) than children in food-secure households. Oh and Hong (2003), Osei et al. (2010) and Alaimo et al. (2001) reported that household food insecurity was strongly and negatively associated with dietary intake, anthropometric status and learning ability of children.

Malnutrition continues to be a problem of public health importance in Nigeria despite the various interventions in the past two decades. Scientific study has reported that high morbidity and mortality in children is attributed to large proportion of Nigeria families who were food insecure (Ijarotimi and Oyeneyin, 2005); hence, high prevalence of Protein-Energy Malnutrition (PEM) and micronutrient deficiencies (UNICEF/Federal Government of Nigeria (1994), Maziya-Dixon et al., 2003). Diets in populations are frequently deficient in macronutrients (protein, carbohydrates and fat, leading to protein–energy malnutrition), micronutrients (electrolytes, minerals and vitamins, leading to specific micronutrient deficiencies) or both; and these have adverse effects on the health, cognition, motor development, and general growth of children (Crawley, 2004; Keikhaei et al., 2007).

Progress in improving the quality of dietary intakes of children in the developing countries has been remarkably slow (Crawley, 2005) due to several factors, such as rise in food costs (Keikhaei et al., 2007), spending on other necessities (Frank et al., 1996; Meyers et al., 1998) and poverty (Cutts et al., 1998). The relationship between poverty and children's nutrition and health are widely recognized (Aber et al., 1997; Coakley, 2001; Newacheck, 1994; WHO/NHD, 2000; WHO, 2002;Desch et al., 1990). Poor feeding practices are, therefore, a major threat to social and economic development as they are among the most serious obstacles to attaining and maintaining normal health status among children (Udani et al., 1992). Growing up in conditions of poverty has negative effects on quality of dietary intakes, health, physical growth and cognitive development (Ivanovic et al., 2000; Ivanovic et al., 2002; Mian, 1998; Onis, 2000), and it increases the risk of death among children (Filmer and Pritchett, 2001).

In view of the food shortages that being experienced in many homes in Nigeria (FAO ,1997a), the study aimed at evaluating the prevalence of food insecurity and malnutrition of Nigerian children.

MATERIALS AND METHODS

Study location

The study was conducted in rural communities of Ondo State, Nigeria. The people in the community are predominantly Yoruba ethnic group. The community is blessed with articulate populace who constitute a virile and productive workforce. The people engage in agriculture and produce food and cash crops such as cocoa for domestic consumption, raw materials for local industries and exports. Few proportion of the populace is also traders, artisans, government and private workers.

Study design and sample size determination

A cross-sectional study was conducted among school children (8- 15 years) in public primary schools between January and April, 2011. The sample size was determined on the basis of an estimate of 50% of prevalence of malnourished (wasted) children, a 5% level of precision and a confidence level of 95%, using the formula for calculating sample size as described by Gahlinger and Abramson. The estimated sample size was 1806 school age children (909 males and 897 females); and the subjects were selected from semi-peri-urban, peri-urban and urban communities using simple random technique of the two-third of the total primary schools in the community.

Data Collection

Data were collected by trained health researchers using structured self-administered questionnaires designed in Yoruba and English language. The questionnaires were given to the children in primary 5 and 6 at school to take home for their parents to fill after adequate demonstration on how to fill the questionnaire had been given. The children were told to return the questionnaire in the following school day; and those children whose their questionnaires were adequately filled were finally recruited for the study. The children in primary 5 and 6 arms were purposely selected, because of their ability to read and interpret the content of the questionnaire into local language effectively. The questionnaire was designed to collect information on the following:

Socio-economic status

The socioeconomic status was determined using the parameters like children' parental occupations, educational attainments and monthly incomes. Using these parameters for assessing socio-economic status of children has earlier reported by Boey, 2003.

Household food insecurity assessment scale

The household food security of the family was assessed using the modified coping strategies techniques as described by Coates et al., 2003 and Maxwell et al., 1999. The scale assessed household food security indirectly through food-related coping strategies, that is, the actions people take when they do not have enough food or money to buy food. The modified questions used were as follows:
1. In the past 1 month, were you ever worried that food would run out before you got money to buy more?
2. In the past 1 month, were you not able to feed your children nutritious animal-source foods like eggs and meat because you could not afford it?
3. In the past 1 month, did you or any of your family members ever eat less than usual because you felt there was not enough money to buy food?
4. In the past 1 month, did you or any of your family members ever skip a meal because there was no money to buy food?
5. In the past 1 month, how often did food stored in your home run out and there was no money to buy more?
　　The households were classified into four household food security (HFS) statuses, that is, food secure, mildly food insecure, moderately food insecure and severely food insecure, using the modified household food insecurity access scale described by Maxwell et al., 1999. The percentage of households that fall in each food insecurity access scale category, that is, mildly, mode-

rately and severely, was calculated relatively to the population size of the study.
　　The dietary intake of the children was obtained through interviewed method with reference to 24-hour dietary recall methods. The quantity of food intakes of the children were estimated using already prepared food sample portion size and other household instruments. The recipe for ten common food intakes of the children were sourced and prepared. The food samples were pooled and 100 g of the food samples were analyzed in triplicates for moisture, fat, protein (N x 6.25), crude fiber, ash and carbohydrate (estimated by difference) using the methods of Association of official Analytical Chemists (AOAC, 2005) methods. The gross energy value of the pooled food intake sample by the children was determined against thermocouple grade benzoic acid using a Gallenkamp ballistic bomb calorimeter (London, UK; model CBB -330-0104L). The sodium and potassium contents were determined by flame photometry. Other minerals (calcium, magnesium and zinc) were determined after wet digestion with a mixture of nitric, sulphuric and hydrochloric acid using Atomic Absorption Spectrophotometer (AAS Model SP9). The energy and nutrient intakes of the subjects were estimated using the results obtained from proximate and mineral analyses and the mean quantity of food intakes measured through 24-hour dietary recall method, that is, nutrient intake = portion size (g) of food intake x frequency x the nutrient content per (g) (Rutishauser and Black, 2002). The percentage nutrient intakes of the children were determined relatively to the Dietary reference intakes (DRI) (Institute of Medicine. (2006).

Anthropometric measurements

Anthropometric measurements (height, weight and head circumference) of the school age children were measured using the standard techniques described by Gibson (Gibson, 2005). Training for standardization of the measurements, followed by field practice and testing was performed prior to data collection. All measurement was carried out in the morning between 9 am and 12 noon. Weight was measured using a digital weighing scale (Model 880, Seca, Hamburg, Germany) calibrated to the nearest 0.1 kg. Height was measured using a portable measuring unit (Seca Bodymeter Model 208, Seca, Hamburg, Germany) calibrated to the nearest 0.1 cm. When measuring height, the subject stands straight looking ahead, with Frankfurt plane horizontal, with shoulders blades, buttocks, and heels almost together touching measurement board, arms at sides, legs straight, knees together and feet flat (Gordon et al., 1988). Head circumference (HC) was measured with a narrow (less than 1 cm wide), flexible, non-stretch tape made of fiberglass and with an accuracy of 0·1 cm. The head was steadied and the HC was measured by placing

Table 1. Socio-economic status of the head of the family

Parameters	Proportion of respondents (1768) (%)
Head of the family educational attainment	
None	9.8
Primary	11.9
Secondary	50.5
NCE/OND	23.7
HND/1ST degree	4.1
*Head of the family income in Naira	
<7500	30.2
7500-10,999	10.8
11,000-15,999	14.2
16,000-20,999	12.3
21,000-25,999	8.9
26,000-30,999	15.1
>30,000	8.5
Head of the family occupation	
Business/Petty trading	18.1
Farming	42.9
Vocational job	13.0
Civil servant (Grade level 7 and below)	15.8
Civil servant (Grade level 8 and above)	10.2

National Certificate of Education (NCE); Ordinary National Diploma (OND); Higher National Diploma (HND);
*One hundred and fifty Naira (N150) = one Dollar ($1)

the tape firmly round the frontal bones just superior to the supra-orbital ridges, passing it round the head at the same level on each side and laying it over the maximum occipital prominence at the back(60) (Meyers et al., 1998). The z-scores of body mass index (BMI), height for age z-score and head circumference for age z-score were calculated using standardised program software developed by WHO (ANTHRO version 1.01, 1990). Students were classified as underweight, stunted or wasted if their weight-for-age, height-for-age and weight-for-height scores were below –2 standard deviations (SD) of the WHO standards (World Health Organization. (1983). The body mass index was also calculated, with the children categorized as overweight/obese, normal and underweight according to age and gender-specific values (Cole et al., 2000).

Statistical analysis

Data was processed using the Statistical Package Software for Social Sciences (SPSS) - 15 computer software. The means of anthropometric measurements (i.e., height, weight and head circumference) were expressed in mean±SE. The descriptive values were also expressed as percentages of the study population. For the nutritional indices that is, height-for-age, head circumference-for-age and BMI-for-age) z-scores were

calculated and the distributions were expressed in percentage of the proportion. Chin square was used to determine level of significance between the categories of nutritional classifications and gender (male and female children).

Ethical approval/ informed consent

The study protocol was approved by the ethics committee of Federal University of Technology, Akure, Ondo State, Nigeria. The informed consent form was attached with the questionnaire for the parents of the children. The parents of the children were informed that their participation in the study was voluntary, the study would not cause them or their child any harm, and there was no penalty for those who declined.

RESULTS AND DISCUSSION

The study population was 1806 children (50.3% of the children were male; while the remaining children (49.7%) were female and the age range of the children was between 5 and 16 years. The socio-economic status of the children's parents is presented in Table 1. The result showed that large proportion of the parents completed secondary and primary education (62.4%) and 27.8%
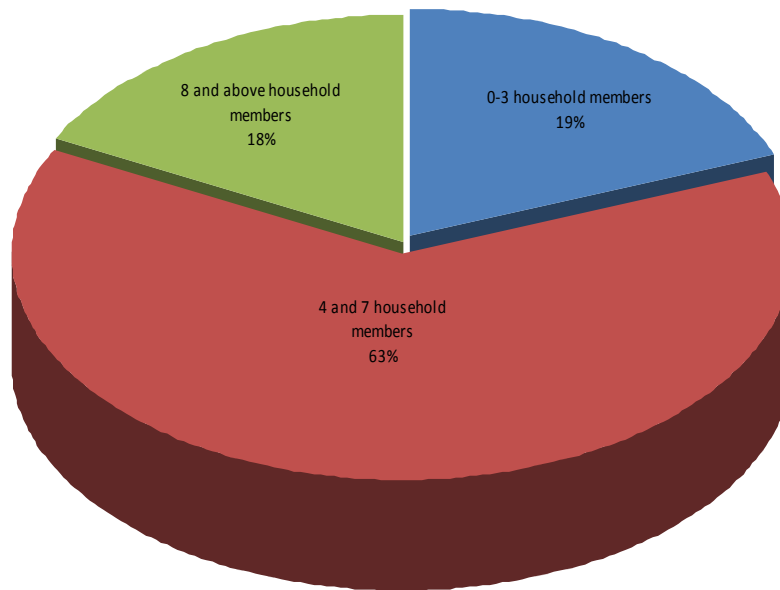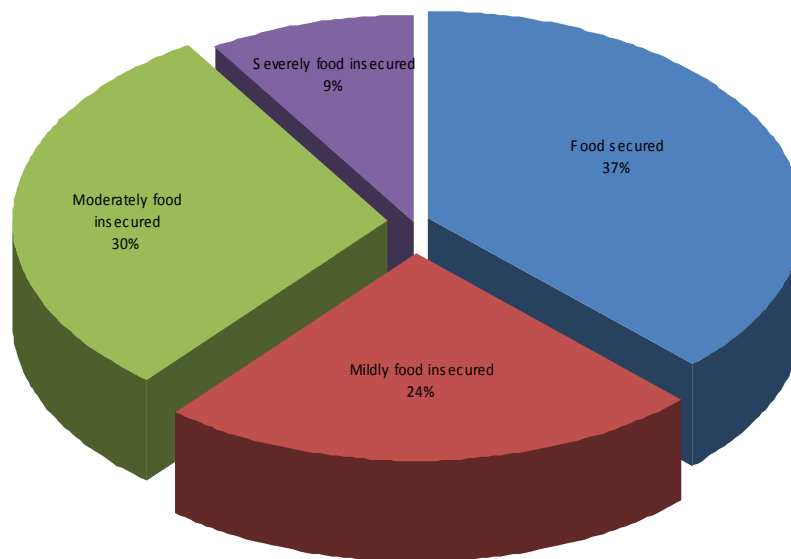
Figure 1. Proportion of Household members

Figure 2. Household Food Security Status of Families in Akure community with respect To coping strategies

had tertiary education; while the remaining parents (9.8%) did not have any formal education. About 56.9% of the children' parents engaged in different occupations like petty trading, farming, vocational job and civil servants; while their monthly income showed that 30.2% earned less than seven thousand and five hundred Naira ($50) per month.

The population size of the household showed that 19% had 0-3 members, 63% had 4-7 members and 18% had 8 and above members (Figure 1). The distribution of families into different household food security status using household coping strategies as described by Coates et al., 2006 and Maxwell et al., 1999 method is shown in Figure 2. The proportion of households falling into different categories of household food security status showed that 63% of the households were food insecure.
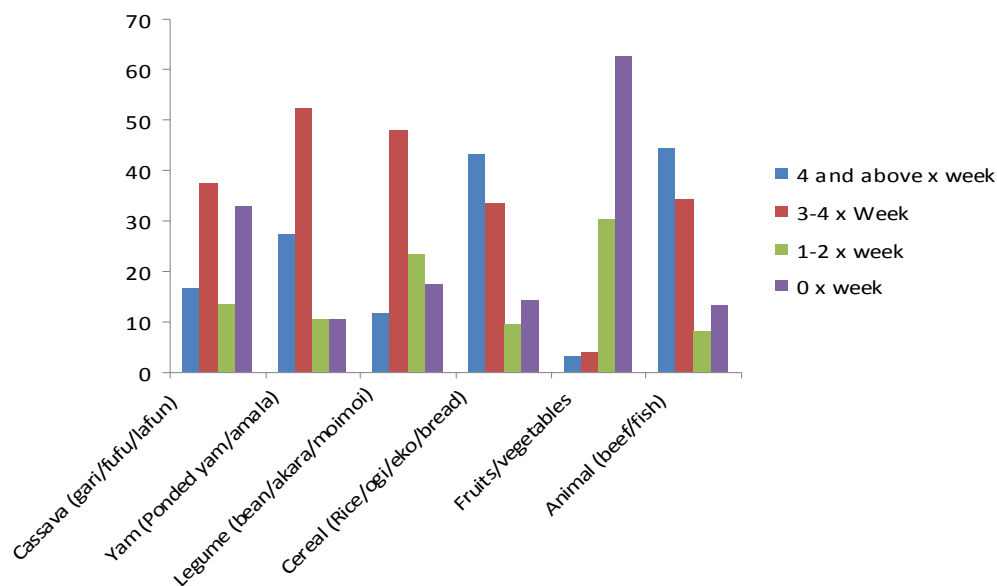
Figure 2. Frequency of food consumption patterns of the children per week

This observation could be attributed to low-income that characterized large proportion of the respondents. Scientific studies have reported that low-income is one of the factors that causes food insecurity and in turns food insecurity can lead to food intakes that are continuously insufficient to meet dietary requirements; and also, families with limited finances and food insecure are under pressure to consume low quality, insufficient and unhealthy foods that cannot promote growth and good health status (de Onis M. WHO 2006; Sanni, 2002). A scientific study has reported that children belonging to low socioeconomic groups and food insecure household commonly suffer from inadequate nutrition (de Onis M. WHO 2006).

The food consumption pattern of the children is shown in Figure 3. The dietary intakes of the children were mainly traditional foods, such as cassava products (gari, fufu and lafun), yam products (pounded yam and amala), legume products (cooked beans, akara and moimoi) and cereal (rice, eko and bread); while others were fruits/vegetables and animal based food. However, it was observed in this present study that large proportion of the children' dietary intakes were carbohydrate based foods that are low in vital nutrients like protein, minerals and vitamins. Quite a number of studies have reported that diets in populations are starch based (Sanni, 2002) and frequently deficient in protein, micronutrients (electrolytes, minerals and vitamins, leading to specific micronutrient deficiencies) or both (Pinstrup–Andersen et al., 1993; Levin et al., 1993; 68. Brabin and Coulter, 2003; FAO (1997). The frequency of consumption of present study. This could be attributed to the cultural belief of the people concerning the consumption of fruits fruits and vegetables of the children were very low in this and vegetables. Culturally, the Yoruba ethnic group where the study took place consumed less of fruits and vegetables when compared with other tribes like Ibo (Olarinde and Kuponiyi, 2005). This showed that culture has a lot of influence on the kind of foods that the people eat in each community and that this food habits have been inherited from generation to generation.

The percentage of nutrient intakes relatively to Dietary reference intakes (DRI) was calculated as shown in Figure 4. The energy, protein and fiber intakes of the children were low. The results showed that the percentage of DRI met of energy intakes of the children was less than 60%; while that of protein and fiber were less than 40% and 20% respectively. These observations could be attributed to the fact that most of the staple foods in the locality where the study took place were low in protein and energy-dense, couple with the food crises that are currently prevailing in Nigeria, which has further led to low nutrient intakes of many homes, particularly children. Olarinde and Kuponiyi, 2005 reported that common staple foods in most Nigerian homes are insufficient due to inflation in food prices (Ijarotimi and Oyeneyin, 2005); hence protein-energy and micronutrient malnutrition is increasing in many homes. The poor intake of mineral as observed in this study could be attributed to poor intakes of fruits and vegetables among the study population. Culturally, the Yorubas belief that fruits and vegetables are meant for ruminants; hence, they consume less of fruits and vegetables (Adedoyin and Taylor, 2007). Cultural beliefs and practices con-
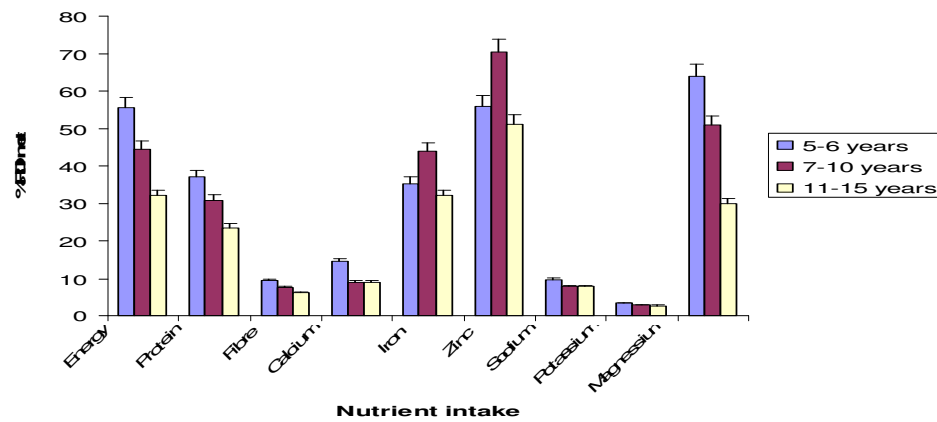
Figure 3. Percentage of Dietary reference intakes (DRI) (WHO 2006) met of the nutrient intakes of the children
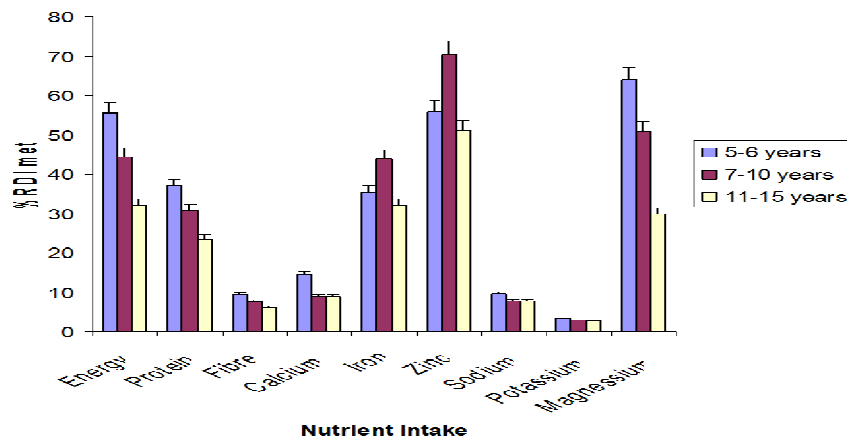

Figure 4: Percentage of Dietary reference intakes (DRI) (WHO 2006) met of the nutrient intakes of the children

cerning food intakes determine to some extend the nutritional and health wellbeing of individual (Jelliffe and Jelliffe, 1989). Some are helpful and supportive of positive nutrition and health, but some can be detrimental to nutritional status (Oniang'o et al., 2003). For instance, Intra-family food distribution is often related to hierarchical position with the head of the family receiving priority in eating, while mothers and children receive a smaller share of the family's food, relative to their nutritional needs (Oniang'o et al., 2003). Food is a basic necessity of life. Its importance is seen in the fact that it is a basic means of sustenance and an adequate food intake, in terms of quantity and quality, is a key for healthy and normal growth rate. The importance of food is also shown in the fact that it accounts for a substantial part of a typical Nigerian household budget (Omonona and Agoi, 2007). Finding has shown that prolonged or severe nutrient depletion leads to malnutrition, which in turns affects linear (skeletal) growth in children and to loss of, or failure to accumulate, muscle mass and fat in both children and adults (WHO 1990; Aneja, 1997).

The mean height, weight and head circumference of male and female of the study population is presented in Table 2. The mean heights of male and female respondents were almost the same between the ages 5

to 9 years; however, the mean height of the female was significantly higher than the male counterpart from age 10 to 14 years (p < 0.001). Also, the mean weights of male respondents at age 8 years was higher than the female counterparts and there were no significant different at age 9 and 10 years. However, between age 11 to 15 years the mean weights of the female respondents were significantly higher than the male counterparts (p< 0.001). This observation could be attributed to the early beginning of pubertal growth spurt in girls than boys (Aneja, 1997). In comparison, it was observed that the mean heights and weights of male and female children in this study were within the same ranges of other findings (Mukherjee et al., 2008; Medhi et al., 2007; Panda et al., 2000). For instance, the mean heights of both male and female school aged children from Nigeria were higher than those children from Pune and India (Dibrugarh and Assam communities), but the weights of both male and female children from Pune were higher than Nigerian children, while those of India were lower (Medhi et al., 2007; Panda et al., 2000). However, both the heights and weights of Nigerian children were low when compared with the WHO/NCHS standards in all age groups. The mean head circumferences of the male children between

Table 2. Mean (±SEM) of weight, height and head circumference of Nigerian primary school children

Age (Year)	Sex	Sample Size	Weight (kg)	Height (cm)	Head circum. (cm)
8	M	52	25.5±0.5	124.9±1.2	52.1±0.3
	F	55	24.9±0.5	124.9±0.4	51.2±0.2
9	M	103	26.7±0.3	128.7±0.6	52.3±0.1
	F	131	26.7±0.4	129.1±0.5	51.7±0.1
10	M	111	29.7±1.2	133.9±0.7	52.8±0.1
	F	145	29.3±0.4	134.1±0.4	51.9±0.1
11	M	141	30.0±0.5	136.1±0.8	52.5±0.2
	F	119	32.6±0.9	138.9±0.4	52.2±0.2
12	M	93	32.2±0.5	140.2±0.6	53.1±0.1
	F	77	34.0±0.6	141.9±0.9	53.4±0.2
13	M	47	36.4±1.0	144.9±1.4	53.1±0.3
	F	44	40.7±1.2	150.6±0.6	53.2±0.3
14	M	26	36.7±1.2	145.9±2.3	52.8±0.5
	F	9	43.2±2.1	149.5±1.2	52.0±0.5
15	M	11	42.2±2.6	154.8±3.6	53.5±0.5
	F	15	46.8±2.2	155.5±2.2	59.2±0.7

Table 3. Classifications of nutritional status of the children

Classification	Males (909)		Females (897)		Overall (1806)		Statistic
	Size	%	Size	%	Size	%	
BMI-age z-score							
Obese	142	15.6	109	12.2	251	13.9	χ =5.099
Normal	360	39.6	355	39.5	715	39.6	df=2
Underweight	407	44.8	433	48.3	840	46.5	P=0.078
Ht-for-age z-score							
Normal	484	53.2	542	60.4	1026	56.8	χ =9.308
Stunted	425	46.8	356	39.6	781	43.2	df=1
							P=0.002
Head circumference-for-age z-score							
Normal	473	52	479	53.4	952	52.7	χ=0.337
Underdeveloped	436	48	418	46.6	854	47.3	df=1
							P=0.561

BMI = Obese/overweight (>1), normal (>-1), underweight (>-2); Normal (>-1), stunted (>-2); Normal (>-1), underdeveloped brain (>-2).

the ages 6 years and above were significantly higher than the female children (p < 0.001). The head circumference values showed a progressive increase in all age intervals for both sexes. On comparison with other findings the mean head circumferences of both sexes were either equal, above or lower than their results (Zaki et al., 2008). For instance, head circumferences of Nigerian male children were higher than the Egyptian's male children, but lower for the female children (Zaki et al., 2008).

The distribution of the children into different classes of nutritional status using body mass index-for-age, height-for-age and head circumference-for-age z-score is presented in Table 3. For the body mass index (BMI) the result showed that 13.9% of the children were obese 39.6% were normal; while the remaining, 46.5% were underweight. This observation could be attributed to the

food crisis being experienced in the country and also decrease in purchasing power of many families due to economic meltdown. (UNICEF (1990) reported that household food security, care, and access to health services, along with a healthy environment were the necessary ingredients to promote good nutrition in children. The proportion of male children that were underweight (44.8%) was insignificantly higher than the female counterparts (48.3%) (p = 0.078). This could be ascribed to the disparity between the male and female child that characterized many families in developing countries, Nigeria inclusive.

For the height-for-age, an index of past nutritional status (stunting), the result showed that 56.8% of the children were normal, while the remaining children (43.3%) were stunted. The proportion of stunted male children was significantly higher when compared with the

Table 4. Comparison of prevalence of childhood malnutrition in Nigeria

	[1]FOSN (1990)	[2]UNICEF/FGN (1994)	[3]Opara etal. (2010)	Present study (2011)
Stunting (%)	43.1	52.3	25.3	43.2
Underweight (%)	36.0	28.3	39.4	46.5

Sources: [1]Federal Office of Statistics Nigeria (FOSN) (1990)); [2]UNICEF/Federal Government of Nigeria (1994); [3]Opara et al. (2010).

female counterparts (p = 0.002). In comparing the proportion of stunted (43.2%) and underweight (46.5%) children in this study, one could inferred that the prevalence of malnutrition was high in both cases, however, the nutritional status of the children in the past was better than the present. This implies that the children have more access to adequate foods in the past than present as a result of increase in poverty level and hike in the prices of common staple food materials. Scientific data have reported that low economic development is a prerequisite to low purchasing power and food insecurity, which in turns has negative effects on quality of dietary intakes, health, physical growth and cognitive development of children (Osei et al., 2010; Alaimo et al., 2001). The comparison of nutritional status of children in the present study with other findings (Federal Office of Statistics Nigeria, 1990; UNICEF/Federal Government of Nigeria, 1994; Opara et al., 2010) showed that the proportion of stunted children in the present study was higher when compared with the report of Opara et al. (2010), but lower than the report of UNICEF/Federal Government of Nigeria (1994). Also, the proportion of underweight children was higher when compared with the findings of UNICEF/ Federal Government of Nigeria ((1994) and Opara et al. (2010) (Table 4). This finding further established increase in the prevalence of household food insecurity in Nigeria.

The head circumference-for-age classification of the children showed that 52.7% of the children have normal brain size, while 47.3% were underdeveloped. The comparison of the brain size development of male and female respondents showed that there was no significant difference between the brain size development of the children (p = 0.561). However, there was high prevalence of underdeveloped brain size among the children under study and this could also be attributed to the poor feeding practices that characterized many homes in developing countries, Nigeria inclusive. Epidemiological findings have shown that head circumference of school-aged children may prove a useful anthropometric tools in deciding early nutritional history (Opara et al., 2010; Spurr et al., 1983), future academic performance and achievement (Ivanovic et al., 2000; Ivanovic et al., 2002; Anzo et al., 2002; Chang et al., 2002; Liu et al., 2003).

CONCLUSION

The study investigated household food security status, dietary intakes and prevalence of malnutrition among the school-aged children. The study concluded that the prevalence of household food insecurity and child malnutrition among the study population were relatively high. In view of these, there is a need for nutrition intervention programmes such as school feedings in all primary schools in order to complement the food intakes of the children at home. This would go a long way in promoting good nutrition and health status of the children, hence economic development of the country.

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