

## A Study of the Nutritional Status of Under-5 Children of Low-Income Earners in a South-Western Nigerian Community

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**Abstract:** This descriptive cross-sectional study was carried out to assess the nutritional status of children aged 6-59 months, of low-income earners in Ipokia local government area of Ogun state, Nigeria, in order to establish and provide baseline information on the health and nutritional status of the target group. Nutritional status was assessed using anthropometric measurements of height, weight, chest and arm circumference, and was compared with NCHS standards. Dietary assessment was based on weighed inventory method and 24 h recall obtained from their mothers. The nutrient intakes were compared with the Recommended Dietary Allowance (RDA). A structured pretested questionnaire was utilised to gather information on the socio-demographic and economic characteristics, household food purchase and infant feeding practices of the children's mothers. Anthropometric measurements of height and weight of the subjects were used in calculating weight-for-age, height-for-age and weight-for-height. Data was analysed using SPSS version 12.0. There were no significant differences between the males and females except for males having a significant higher Lean Body Mass (LBM) than the females. Using weight-for-age, 82.13% of the Under-5 children were underweight, 33.52% were stunted while 85.15% were wasted. The intakes of protein, iron, calcium and vitamin A were inadequate in both males and females. Majority of mothers of the children were uneducated (80.7%) and earned a paltry monthly income in the range of N1, 500-N5, 900. The findings show that the nutritional status of Under-5 children in the study location which happens to be a rural area, was quite poor. Also from the results, it is evident that malnutrition is still a major public health problem among young children due to the poor socio-economic status (poverty and poor educational background) of their parents, and thus, there is a need for better nutrition of the Nigerian child.

**Key words:** Infant feeding practices, low-income earners, nutritional status, socio-economic status

### INTRODUCTION

Nutritional status is defined as the evident state of nutrition of an individual. A person is said to have a good nutritional status if he shows no evidence of malnutrition, whether open or latent. Nutrition is the aspect of science that interprets the relationship of food to the functioning of living organisms. It includes the uptake of food, liberation of energy, elimination of wastes and the biochemical synthesis that are essential for maintenance of normal growth and development (Laditan, 1983). The nutritional status of any person is his/her health as dictated by the quality of nutrients consumed, and the body's ability to utilize them for its metabolic needs. Thus, being nutritionally vulnerable, under-5 children's nutritional status is generally accepted as an indicator of the nutritional status of any particular community (Davidson *et al.*, 1975). This is due to their easy susceptibility to malnutrition and infection (Akinlosotu and Hussain, 1985; Uppal *et al.*, 2005). Children in this

age group require a high supply of nutrients since they are usually very active and their growth is rapid. Also during this period, under-nutrition in the form of kwashiorkor, marasmus, anaemia and xerophthalmia are not uncommon (Ene-Obong, 2001). It has been estimated that approximately one out of every three Under-5 children is chronically malnourished and thereby subjected to a pattern of ill health and poor development in early life (UNICEF, 1998), with malnutrition being associated with more than half of all deaths of children worldwide (Sobo and Oguntona, 2006).

Early childhood starts from in-utero to new birth and then through postnatal life. In intrauterine life, the nutritional status of the unborn foetus depends largely on the adequacy of the dietary intake of the mother and this determines the outcome of birth of the new born. Postnatal life is a continuum in human development. Normal growth and development depend largely upon the nutritional status of the new born which is in turn, related directly to the nutrition of the mother and inherited

characteristics, and to the dietary intake of the infant (Krauss and Mahan, 1982). In early childhood, nutritional status is of paramount importance for a child's later physical, mental and social development.

From birth to 4-6 months of life, breast milk is the sole or prime source of nutrients and optimal breastfeeding practice becomes a critical factor in child survival and development (Onyesili, 2000). Breast milk contains all nutrients, antibodies, hormones and antioxidants that an infant needs to thrive (UNICEF, 1998). Early initiation within half an hour of birth will ensure that the protective antibodies in the colostrum are available rapidly to the infant, because after 24 to 48 hours, the level of antibodies in breast milk diminishes.

Malnutrition arises from a complex of nutritional, social and biological deprivation and is manifested in various forms such as stunting (short stature), underweight, muscle wasting, growth retardation, diminished subcutaneous fat and ill health with high mortality rate (Onimawo *et al.*, 2006). Growth is an increase in size, its progress is mainly structural, and can be measured with some degree of reliability in terms of height, weight, age etc. (Apley, 1979). There are wide variations in the rates at which the height and weight of children are subsequently attained. This is as a result of several factors such as quality and quantity of food, family income, family size and genetic constitution which may contribute to these variations (Beaton *et al.*, 1990).

Growth assessment has been identified as the most important measure for evaluating the health and nutritional status of Under-5 children through anthropometric measurements (Apley, 1979). The reason for this is that anthropometric indicators of growth not only provide information on health and nutritional status, but is also an indirect measure of the quality of life of an entire population (Shetty and James, 1994).

Malnutrition is a pathological condition brought about by the inadequacy or over consumption of one or more of the essential nutrients necessary for survival, growth, reproduction as well as productivity at work (UNICEF and FGN, 2001).

The inadequate or excessive intake of nutrients may result from disease factors that affect digestion, absorption, transport, and utilization of nutrients (UNICEF, 1990). Malabsorption of nutrients may result from genetic cum environmental conditions or illness. The most critically vulnerable groups are the developing foetus, preschool children, women before and during pregnancy, and lactating women (UNICEF, 1998). Malnutrition affects all levels of development physically, mentally, socially, psychologically and physiologically. It thus multiplies the effect of prevailing disease or mortality in children and infants (Huffman and Marlin, 1994).

In the developing nations, malnutrition usually makes its greatest impact on preschoolers. Under-5 children mortality accounts for nearly 50% of total deaths, and careful examination has shown malnutrition as the major underlying factor (Whitehead and Rowland, 2002). Studies by many researchers have shown that it is during the preschool years that under-nutrition in the form of kwashiorkor and marasmus are most prevalent. This is because these children are in the state of life when growth is rapid, nutrient requirements are high and the diets likely to be given are inadequate. Also, at this stage of life, there is continuous stress from bacterial, viral and parasitic infections which contribute to malnutrition. The presence of malnutrition reduces the resistance of the child to infections and infectious diseases, resulting in reduced food intake and poor nutrient absorption, which in turn result in stunted growth depending on the severity of the malnutrition.

Children below 5 years of age have been specifically studied because their health status is a sensitive indicator of overall community health, particularly among the disadvantaged group in the population. The preschoolers especially those at the second year of life are 'transitional' as regards diet, immunity to infections and psychological dependency (Pyke, 1979). This period which is characterized by a high nutrient need, particularly that of protein for swiftly increasing muscle tissue, is also a period when several meals a day are required and when food should be easily masticable and digestible.

Also, psychological trauma which occurs as a result of the sudden separation from the mother after a prolonged period of continuous intimate contact, and permissive breast feeding frequently caused by another pregnancy is common (Pyke, 1979). Nutritional inadequacies, which prevent the growth of children to their genetic potential, are part of the reasons why those children are underweight, short or thin.

Anthropometric measurements, though difficult to apply to young children, are commonly used to determine the prevalence of Protein-Energy-Malnutrition (PEM). They provide the most valid indicator of a population's nutritional status and the most reliable indices for determining nutritional status, especially in rural African settlements. This technique is usually preferred because it is non-invasive, relatively simple and can be easily carried out and interpreted without requiring professional expertise. It deals with techniques highly useful on a widespread field basis, and rests on well adopted classification. It is the readily available method of assessing nutritional status. Through proper assessment, it can be employed to determine how well or how poor a particular group or individual feeds. Whatever knowledge gathered from such assessment will help the

group or individual to step up or lower food intake for better health.

Malnutrition does not often exert equal impact on all population groups. Certain factors and circumstances dictate the target of occurrence (Keke, 1990). The causes of malnutrition are multidimensional and include both food and non food factors such as low income, uneven household food distribution, poor sanitation, infection, inadequate food production, marketing and preservation as well as poor knowledge of nutrition (Chen and Dseusa, 1981). The adverse effect of the economic recession on the contemporary developing as well as the developed countries, have manifested in household food crisis, dietary inadequacies and infections especially among preschool children in various socio-economic groups.

Inadequate intake of food results in problems of malnutrition. Perspective field studies from several different regions of the world indicate that, as many as one third of death of children occurring between 6 months and 5 years of age in developing countries may be attributed to PEM (Hoorwag, 1976; Vander, 1988). Some of the reported effects of malnutrition and its various manifestations include stunted physical growth, retarded mental achievement, and low productivity, low resistance to diseases and infections with high morbidity and mortality rates especially in children (Nnayelugo, 1992).

Poverty, ignorance and disease appear to be the heart of the problem of childhood malnutrition in Nigeria, and until there is significant improvement in the socio-economic status of the vast majority of Nigerians, malnutrition will continue to pose a serious threat to the growth and development of Nigerian children and to future national development.

Though a number of studies have tried to estimate the effect of socio-economic status on children (Feinstein, 1993; Marmot *et al.*, 1989), few studies estimated the effect of parental income on children's nutritional status while those that did, often used weak measures of income (Newacheck, 1994), or non-representative samples. This is partly because studies that included extensive information on income often did not ask about children's welfare while those that focused on children utilised weak measures of parental income.

In this study, a combination of anthropometry, dietary assessment and socioeconomic status were used to determine the nutritional status of Under-5 children, since they have been known to give fairly accurate results (Tanner and Whitehouse, 1962). The study was therefore designed to establish and provide baseline information on the health and nutritional status of the target group, by determining the impact of parental socio-economic status on the growth, nutritional status and the future outlook of Under-5 children in the study location.

## METHODOLOGY

This cross-sectional and descriptive study was carried out to assess the nutritional status of children between the ages of 6-59 months, of low-income earners in Ipokia, the headquarter of Ipokia local government area of Ogun state, Nigeria. The study was carried out in 2010, during the long school holiday period. Six hundred children between the ages of 6-59 months were randomly selected for the study. They were further separated into males (304) and females (296).

A consent form was made available for signature or thumb printing by each mother, and anyone who refused to sign the consent form after due explanation was excluded from the study. The ages of the children were obtained from their mothers since children aged 6-59 months could neither fill questionnaires nor recall dietary intake appropriately. Ethical clearance for the study was obtained from the Ogun state ministry of health, Abeokuta. Research assistants were recruited and trained to help in administering the questionnaires which were thereafter collected, sorted out and analysed using the SPSS package, version 12.0 (SPSS, 2003).

**Data collection:** Data collection was carried out with a pretested structured questionnaire and anthropometric measurements.

**Anthropometric measurements:** The age of each child was recorded with the help of the mother/care giver. The ages of children of illiterate mothers were calculated by asking them to name traditional festivals/ceremonies that took place around the period they gave birth to their children.

**Mid upper arm circumference (MUAC):** The MUAC was carried out to estimate skeletal muscle mass and fat stores using a flexible, non-elastic measuring tape. The measurement was taken in centimeters with the non-elastic tape measure placed firmly on the left mid upper arm, at the mid-point between the acromion process of the scapular and the olecranon process of the ulna bone (Jelliffe, 1996).

The body weight of each child in light clothing and without shoes was taken using a portable bathroom scale (Hanson model) to the nearest 0.2 kg (Jelliffe, 1996). In the case of infants, a weight balance with suspended bag was used. The infant was placed inside the bag with minimum clothing on and the weight was recorded. Standing height was measured using a constructed vertical wooden rod affixed with graduated fibre glass tape. Subjects stood bare footed and readings were taken to the nearest 0.1cm (Iohman *et al.*, 1991). For infants, a length board with a headpiece was used in determining their

lengths. They were placed in a lying position, ensuring that their heads touched the headpiece with their back, back of knees and heels touching the board and their hands relaxed by the side. The horizontal plane (head piece) was lowered firmly into the head until it is of the same height with the head while the subject inhaled and the readings were taken at an accuracy of 0.1 cm, and at observed eye level.

Head circumference was measured using a non-elastic measuring tape. The tape was placed firmly round the head and measurement taken to the nearest 0.1 cm. Chest circumference was then measured by placing the tape firmly round the chest at the nipple line and measurements taken to the nearest 0.1cm. Chest/head circumference ratio was then calculated by dividing the value for chest circumference by head circumference (Jelliffe, 1996).

Body fat was determined as follows:

$$\text{Body fat} = 0.491 \times \text{weight} - 6.918$$

(Dezenberg *et al.*, 1999)

Lean body Mass (LBM) was calculated thus:

$$\text{LBM} = \text{Body weight} - \text{body fat}$$

Body Mass Index (BMI) was calculated as:

$$\text{BMI} = \text{Body weight (kg)} / \text{Height (m)}^2$$

The recorded height, weight and arm circumference were compared with reference standards (NCHS, 1977). Nutritional status was assessed using weight-for-age, height-for-age and weight-for-height (<-2 s.d. NCHS standards).

**Food intake measurement:** The food intake was measured using 24 h dietary recall and weighed inventory method. The interviewers visited the respondents' homes during lunch time and recorded the type and quantity of food consumed by the children using a Salter weighing food scale. The 24 h dietary recall was administered on the mothers for three consecutive days, since the Under-5 children were not able to recall appropriately. The interviewers used standardized pre-tested questionnaires to administer the 24 h dietary recall. Mothers/care givers, the primary source of recall were asked to recall all foods consumed by the child during the last 24 h. Food models, measuring spoons and cups were used for quantification of foods. The food and nutrient intake were calculated from the consumption table compiled by earlier researchers (Oguntona and Akinyele, 1995). The food and nutrient intake were then compared with their respective suggestive dietary intake (FNB *et al.*, 1989), while the percent adequacy of the food and nutrient intake was later calculated.

**Socio-economic status:** The background characteristics of socio-economic status, family size, income and availability of basic requirements/nutrients were obtained from the administered pretested questionnaires.

**Data analysis:** The data obtained from the questionnaires were analysed using Statistical Package for Social Sciences (SPSS) version 12.0 (SPSS, 2003), for all descriptive statistics such as frequencies, percentages, means and standard deviations. The t-test was used to differentiate between males and females in the various parameters at 95% confidence level (Steel and Torrie, 1991). Results were also compared with FNB and NRC (FNB *et al.*, 1989) standards for weight, height and various nutrients.

## RESULTS

### Socio-demographic characteristics of respondents:

Majority of the parents, 80.7%, were illiterates, 92.7% of them were married, 2% divorced, 3.3% were separated, 1.3% were widowed, while 0.7% never got married. Also, 46.23% of these parents were petty traders, 10.67% were low cadre civil servants/primary school teachers and 4.7% were artisans. Also, 31.3% were engaged in farming while 7.1% were unemployed. 34% of the respondents were Christians, 32% were Muslims, while 34% were traditional religion worshippers.

Out of the children studied, 50.7% and 49.3% were boys and girls respectively, 67% of them were between the ages of 6 to 12 months, 22% between 13 to 24 months, 25.3% between 25 to 36 months, and 27.3% in the age category of 37 to 48 months, while the remaining 18.7% were in the 49 to 59 months age group. Information about the link of child to respondents was 98.7% for child to mother link and 1.3% for others.

Table 1: Household facilities available to the parents

	Frequency	%
<b>Source of cooking</b>		
Fire wood	201	33.5
Kerosene stove	326	54.3
Charcoal stove	73	12.2
<b>Source of energy</b>		
Electricity	350	58.3
Others	250	41.7
<b>House type</b>		
Bricks with corrugated iron sheet roofing	600	100
<b>Refuse disposal method</b>		
Refuse dump	600	100
<b>Source of water</b>		
Pipe borne water	-	-
Deep well	476	79.3
River/ stream	124	20.7
<b>Type of toilet</b>		
Water system	280	46.7
Pit latrine	320	53.3

Table 2: Household food pattern/food purchase

Food purchase/pattern	Yes		No	
	N	%	N	%
Do you skip meals?	448	74.7	152	25.3
Do you always have enough money to buy food?	340	56.7	260	43.3
Do you buy the type of food you desire?	268	44.7	332	55.3
Do you have enough food you require?	292	48.7	308	51.3
Do you always have enough but not always the kind you desire?	392	65.3	208	34.7
Do you always buy food in bulk?	336	56.0	264	44.0
Whenever the food in the house finishes, do you always have enough money to buy more?	244	40.7	356	59.3
Can you afford to provide a balanced diet?	288	48.0	312	52.0
Do you go for low cost/cheap food items?	572	95.3	28	4.7
	Frequency N		Percentage (%)	
<b>How often were meals skipped</b>				
Almost every month	64		14.0	
Some months but not every month	236		39.3	
Only one or two months	128		21.3	
No response	152		25.3	
<b>% income spent on food</b>				
< 50	136		22.7	
50	276		46.0	
75	136		22.7	
>75	52		8.7	

Table 3: Infant feeding practices

Frequency of Infant feeding	Yes		No			
	N	%	N	%		
Did you practice exclusive breast feeding?	312	52.0	288	48.8		
Did you use locally available foods for complementary feeding?	380	63.3	220	36.7		
Did you and still feed your child on demand?	324	54.0	276	46.0		
Did you continue feeding your child during illness?	368	61.3	232	38.7		
			Between 4-5 months	> 6 months		
	N	%	N	%	N	%
Introduced complementary feeding	232	38.7	224	37.3	144	24
Introduced water	372	62.0	164	27.3	64	10.7

Table 1 shows the respondents' access to services. All of the respondents live in brick houses with corrugated iron sheet roofing. Their sources of water are mainly from deep wells, rivers and streams. Majority of the respondents, 54.3% cook with kerosene stove, 12.2% with charcoal stove while 33.5% use fire wood for cooking.

Observation in Table 2 shows that 74.7% of the respondents skipped meals while others did not, 56.7% always had enough money to buy food while only 44.7% bought the type of food they desired. Among the respondents, 48.7% had enough food to eat, 65.3% of them always had enough but not always the kind of food they desired, while 56% always purchased food in bulk. Also, 40.7% had enough to buy more when food got finished while only 48.0% could afford to eat balanced diets. In addition, 14.0% skipped meals almost every month, 39.3% skipped meals some months but not every month while 95.3% would go for low cost/cheap food items. The percentage of income spent on food by the household revealed that 22.7% spent less than 50.0% of

their income on food, 46.0% spent 50.0%, 22.7% spent 75% while only 8.7% spent more than 75% of their income on food.

Table 3 shows that 52% of the respondents practiced exclusive breast feeding, 63.3% used locally available foods for complementary feeding, 54% fed the child on demand while 61.3% continued feeding during illness. Complementary feeding was introduced by 38.7% of the mothers at less than 4 months, 37.3% between 5-6 months and 24% at above 6 months of age. In addition, 62% introduced water at less than 4 months, 27.3% between 5-6 months while 10.7% introduced water after 6 months.

**Anthropometry:** The mean anthropometric indices of the Under-5 children studied are presented in Table 4. There were no significant differences in the various measured and calculated parameters for the children studied except for LBM in which the males had significantly higher ( $p < 0.05$ ) value than the females. All other parameters were not significant. The chest/head circumferences ratio was normal in both males and females ( $> 1.0$ ). Observation

Table 4: Mean anthropometric indices of the male and female Under-5 children

Parameters	Male N = 304	Females N =2 96
Age (Months)	48.6+0.84	47.9+0.79
Weight (kg)	15.94+2.44	13.74+1.76
Height (cm)	105.83+8.33	100.91+12.39
Arm Circumference (cm)	15.47+1.15	15.37+1.04
BMI kg/m <sup>2</sup>	15.04+1.34	15.04+1.07
Head circumference (cm)	49.93+1.98	49.37+1.89
Chest circumference (cm)	51.55+3.93	52.71+4.53
Chest/head circumference (cm)	1.04+0.07	1.08+0.09
Lean body mass	14.84+14.0	12.02+2.1
Body fat (kg)	1.26+0.37	1.94+0.61

Table 5: Percentage of children in different categories according to NCHS standards

Variable	N	<2 S.D	<2 S.D	<2 S.D
		Weight for age	Height for age	Weight for height
Males	304	77.73%	22.47%	85.47%
Females	296	86.52%	44.56%	84.83%
Males And Females	600	82.13%	33.52%	85.15%

Table 6: Socio economic status of the mothers

Variable	Classification	%
<b>Family size</b>	1-3	11.34
	4-6	33.10
	6 and above	55.56
<b>Monthly income</b>	N1,500-N3,500	31.78
	N3,600-N5,900	47.10
	N6,000 and above	15.32
<b>Mothers occupation</b>	Subsistence farming	31.30
	Low cadre civil servants/ primary school teachers	10.67
	Petty traders	46.23
	Artisans	4.70
	Unemployed	7.10

Table 7: Mean nutrient intake as percentage (%) of the \*RDA for the Under-5 children

Variable	RDA	Intake	%RDA
Energy (kcal)	1800	1291.84	71.77
Protein (g)	24	10.42	43.42
Fat (g)	-	35.7	-
Carbohydrate (g)	-	252.38	-
Iron (mg)	10	6.91	69.1
Calcium (mg)	400-800	328	54.70
Vitamin C (mg)	45	49.58	110.21
Vitamin A (ug)	500	308.15	61.63
Niacin (mg)	8	5.27	65.88

\*RDA: FNB *et al.* (1989)

in Table 5 revealed that 82.13% of the children were underweight, while 33.52% of both sexes were stunted.

**Socio-economic status:** In Table 6, the socioeconomic status of the mothers revealed that majority of these low income mothers of the Under-5 children under study, were petty traders (46.23%), 31.3% were engaged in subsistence farming, 10.67% were either low cadre civil servants or primary school teachers, 4.7% were artisans (hair dressers, tailors) while 7.1% were unemployed. It was also observed that over 6 members were present in many of the households (55.56%) while about 47.1% of the mothers of these children earned a monthly income of between N3, 600 - N5, 900.

**Dietary intake:** Table 7 reveals the observed nutrient intake as percentage of the recommended dietary allowances for the children. The energy intake of both the male and female children was below the recommended dietary allowances (71.77%). Also the mean protein intake was grossly inadequate for these children (10.42 ) being below the RDA of 24. The vitamin A and Iron intake of the children was below the RDA by 61.63% and 69.1%, respectively. Calcium intake was also found to be low, being 54.7% below the RDA.

## DISCUSSION

The nutritional status of Under-5 children of low income mothers in Ipokia local government area of Ogun state, Nigeria, was assessed. This assessment is expected to reflect a number of variables that might influence early growth and development. However, anthropometry as the method of assessment of the nutritional status of individuals has some limitations. These include the absence of local standards for comparison and the difficulty in obtaining the actual age of the studied subjects. If these limitations are taken care of however, anthropometric measurements can be used to assess the stage of general undernourishment, since height and weight are not usually affected in pure protein malnutrition (Jelliffe, 1996).

In this study, losses in weight, height, arm circumference and head circumference due to ill health and genetic factors were not accounted for. Another source of error could result from not knowing the actual ages of the children under study, a factor which was used as a reference point. There is therefore, the possibility of underestimation of their ages during data collection.

The results revealed that generally, the children studied met 96.1% of their recommended height as well as 92.5% of the recommended weight for both the males

and females respectively. The males were taller and heavier than females and also had higher LBM and slightly higher values for arm circumference. Arm circumference which is a useful tool for fast assessment of nutritional status, and also an easy way to detect childhood malnutrition in developing countries was adequate in both males and females, with only about 4% of them having mild malnutrition using this index (arm circumference <12.5 cm). The chest/head circumference ratio was also within normal range for both sexes (>1.0). There was a prevalence of underweight (82.13%), stunting (33.52%) and wasting (85.15%) among the children by NCHS standards (NCHS, 1977).

Based on dietary intake assessment which is considered as the most important determinant of nutritional status, the mean daily energy intake was lower than the recommended value. This low energy intake of the children is reflected in their having a reduced body weight and body fat. The food composition pattern assessed using 24 h dietary recall showed that corn flour pottage (*ogi*) was the staple food consumed by the Under-5 children in the study location. Others were *garri* (made from cassava), *cocoyam*, beans and sweet potato, with beans which has a low biological value, as their main source of protein. It has been reported that well over 80% of protein consumed by school aged children in Nigeria came from plant foods (Onimawo *et al.*, 2006).

Milk consumption was also found to be virtually non-existent in the studied children. It was also observed in the food intake assessment that carbohydrate contributed a larger percentage to their total energy intake. This is in line with results from previous studies where legumes, roots and tubers were observed as the commonest locally available and cheap staple foods in Nigeria (Sobo and Oguntona, 2006; Onimawo *et al.*, 2006). The vitamin C consumption of the children was found to be slightly higher than the RDA, showing that the subjects consumed more fruits and vegetables which are good sources of vitamin C. The low calcium intake of the children might be due to their poor consumption of foods of animal origin.

The poor socioeco-nomic status of the mothers where 46.23 and 31.3% of them were petty traders and subsistence farmers respectively, with monthly income ranging between N1,500 - N5,900, must have impacted on the macro- and micro-nutrient intake of the subjects which were lower than the prescribed limits (FNB *et al.*, 1989). About 80.7% of the children's mothers are mere illiterates with little or no formal education. This poor educational background could have contributed to their having poor knowledge about the nutritional requirements of their children, while their low economic status makes it difficult for them to contribute meaningfully to the family income, with the consequent inability to purchase some of the basic food needs of their children.

## CONCLUSION

In conclusion, we found that malnutrition was prevalent among the Under-5 children studied with only a few of them being well nourished. The extent of poverty and under education of the mothers could have resulted in the gross under-nutrition observed in this study. The fact that poor people in many societies lack the basic requirements necessary for adequate nutritional well being has therefore made it imperative, that efforts must be geared up at improving the nutritional status of Under-5 children, by incorporating them into the existing school feeding program.

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