Research Article

Food, Health Habits and Anthropometric Indices of Under-Five Aged Children in Imo State, Nigeria

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ABSTRACT

This study examined the food and health habits and anthropometric indices of under-5 aged children in Mbieri, Mbaitolu Local Government Area (L.G.A) in Imo State, Nigeria. Cross-sectional descriptive research design was used for the study. Research methodology included assessment of nutritional status by anthropometric measurements to determine the weight, height and age of children. Dietary intake and food habits assessment was determined using a 24-hour recall. The respondents were mothers with children under five years or caregivers where the mother did not live with the child. Using interviewer-administered questionnaire, information on socio-demographics, dietary history/pattern, food habits, health information and anthropometric measurements of selected pupils was obtained. Data collected were summarised and analysed using statistical package for social sciences (SPSS) programme. Results from analysed data were presented in frequencies, percentages and means. Findings of the study showed that 7.6% and 6.5% of the children were moderately and severely stunted, 1.1% and 5.4% were moderately and severely wasted, 10.9% and 7.6% were moderately and severely overweight and 6.5% and 1.1% were moderately and severely underweight. Spearman correlation coefficient tests were used to determine relationships between dietary intake, food habit, health and nutritional status of children under five years. A level of P≤0.05 was used to indicate statistical significance in all analysis.

Introduction

In West Africa, Nigeria has the largest territorial unit and currently with a population of 180,000,000 [1]. Women and children dominated the Nigerian population with 75% and they majorly reside in the rural areas. Within this huge rural population, particularly among the urban poor, Nigeria infant and child mortality rates are alarming. The rate is 100 per 1,000 births and mortality of 1,100 per 100,000 live births. Most of these deaths are due to lack of adequate intake of food (food habit) or inappropriate combinations of food (diet) [1]. A study by Akinyele showed that malnutrition among children is widespread in Nigeria in

high level with 56% and 84.3% in some rural area of South West and northern part respectively [2].

The major causes of children's death globally are inadequate diet and malnutrition. According to the report of High-Level Task Force on Global Food Crisis, every year over 3.5 million children are killed due to it [3]. Inadequate diet and malnutrition are resulted from inadequate dietary pattern [3]. In Nigeria, inadequate dietary pattern have emerged as a major development crisis facing the country today. The country's productivity may greatly be affected as the growth and health of individuals are been affected. The United Nations Development Programme Report (UNDP) stated that adequate diet and health of the

people are indicators of the country's socio-economic situation [4]. Apart from shelter and clothing as the basic needs of life, food remains the core or apex in the hierarchy of human needs. This is because of its importance not just to children but to the entire human existence. Over two thirds of child's deaths are associated with inappropriate feeding practices that occur within the first year of life. Malnourished children who survive are more frequently sick and suffer the lifelong consequences of impaired development [5].

Inadequate intake of food will continue to affect the nutritional status of households leading to malnutrition and consequently to poor health, poor livelihoods and poor productivity. This is very important and critical to life; adequate and appropriate dietary pattern should be the right of every individual. So, it is very important to monitor the nutritional status of any country to determine the productive rate of that nation [3]. The importance of good diet, food habit and health cannot be overlooked because food and eating well can make the difference between being alive or dead and being well or sick. Some researchers have shown that food or good diet can prolong life, well-being and promote human development [6, 7]. This is because a healthy population means healthy productive force. Individual nutritional status is dependent on the interaction between food that is eaten (food habit), the state of health and the physical environment. Many childhood deaths can be prevented if there is timely intervention for example; ensuring appropriate dietary pattern from birth, immunizing children against preventable diseases and making sure that children receive prompt and appropriate treatment when they become ill [5].

Malnutrition is associated with an inadequate diet, poor health and sanitation services as well as inadequate care given to children. Malnutrition (poor nutritional status) constitutes a major public health problem in most developing countries including Nigeria [4, 5]. A lot of the population cannot afford enough to eat and most of them live in very poor environment. Vulnerable children with high nutritional needs and weak immune systems fall victims to diseases and subsequently to malnutrition. Eliminating hunger and malnutrition is one of the most fundamental challenges facing humanity. Malnutrition and its associated disease conditions can be caused by eating too little, eating too much or eating inadequate diet that lacks necessary nutrients. Malnutrition is one of the most devastating problems worldwide. It is inextricably linked with ignorance, illiteracy, poverty and lack of development [6]. Creating awareness and appropriate knowledge of food combination (adequate diet) will contribute to reducing the incidence of malnutrition. Dietary pattern becomes established in children from infancy and to a greater extent persist throughout life. Nutrition affects health throughout the life cycle, and it is best to prevent malnutrition early in life. The general objective of the study was to assess the effects of diet, food habit and health on the nutritional status of children under five years in Mbaitolu local government area Imo State, Nigeria (using Mbieri as case study). The specific objectives were to 1) assess the demographic and socio-economic characteristics of the Mothers/Caregivers, 2) assess the nutritional status of the under-5 children, 3) assess the food consumption pattern of mothers/caregivers and feeding and dietary habit of under-5 children, 4) assess the health status of the under-5 children and 5) determine the relationship between feeding practices and nutritional status of under-5 children.

Materials and Methods

I Area of Study

The study area is located at Mbieri in Mbaitoli Local Government Area of Imo state and 8 km form North of Owerri, the state capital. The town is made up of 18 villages and 7 autonomous communities. The people of the town are mostly Anglican though there are other Christian denomination followers among her people.

II Population of Study

The population of the study was 100 children under-5 i.e. children from the age of 12 months up to their fifth birthday taken from each of the villages from homes or children's care centers in Mbeiri Community in Mbaitolu L.G.A of Imo State.

III Study Design

The study design for this research was a cross sectional descriptive survey design [8].

IV Sample Selection

A stratified random sampling technique was used in selecting the sample individuals and size for this study to make up of children under-5 i.e. within the age of 1-4 years from day-care centers, churches and homes located in the 9 towns in Mbeiri Community of Imo State.

V Sample Size Determination

The formula as presented in equation (1) was used for the samples size determination of both the children from homes and day-care centers which are between the ages of 1-4 years [9].

$$n = \frac{N}{1+N(e^2)} \qquad\qquad (1)$$

Where n = sample size; N = population size = 100; 1 = constant; e= margin of error (5% or 0.05) and by solving the equation (1), n = 80.

VI Data Collection

Structured and validated questionnaire was used to collect information about their biodata, food habit, health and as well as knowledge about their diet and record of their anthropometric measurement. Data from the respondents selected throughout the study were analysed statistically.

VII Anthropometry

The anthropometric measurement is one of the methods used in gaining information on nutritional status. This involve taken the measurement of the participant such as weight with the use of bathroom-scale in kg (unit), height with the use of stadiometre in meters, waist and Hip circumference of the children (1-4 years) were measured using Tailors tape which is in cm (unit).The BMI was calculated using the relationship between current weight and current height (BMI=kg/m^2).

Anthropometric Measures of Weight and Height

i Weight Measurement

Weight measurement was done according to UNICEF method [10]. Weight of the subject was done using Hana's bathroom scale.

Standardized Procedure for Measurement of Weight

Weight is recorded with the subject wearing the minimum of clothing shorts only for male, light dress. For female, foot wearing removed. Weight is recorded in Kilogram (kg).

ii Height Measurement

Height measurements were taken according to UNICEF method with aid of a tape in centimetres which had 150cm capacity [9, 10]. The subject will be asked to remove their foot wears and stand erect against the wall (backing the wall), the back of their buttocks and back heads touching the wall while ensuring that heels were not raised. The readings were taken to the nearest 0.1cm.

a Standardized Procedure for Measuring Height

A ruler is fixed to the wall. The subject was made to stand as upright as possible while ensuring that heels are not raised from the ground without shoes on. A flat headpiece was used for accurate height measurement. Height was recorded to the nearest 0.1cm.

b The Body Mass Index (B.M.I) Calculation

The body mass index was used to calculate the weight by height or rather divide weight in kilograms by the square of height in meters [11].

$$B.M.I = \frac{Weight\ in\ Kg}{Height\ in\ m^2} \qquad (2)$$

VIII Data Analysis

Data obtained from the household interview were entered and analysed using Statistical Package for Social Sciences (SPSS) version 11. Descriptive statistics such as frequencies, percentages, means and standard deviation were computed. Anthropometric data were analysed using EPI INFO 2000, Nutrition Package. The Z-scores were used to determine the nutritional status of children who were expressed as normal, stunted, wasted and underweight. Children minus 2SD in all categories were considered malnourished according to National Centre for Health Statistics. The NCHS standards are preferred for international comparisons. Data collected from the 24-hour recall were computed and analysed using FAO nutrient database to establish the total amount of selected nutrients in the meals consumed per day [12]. These were compared with the RDA to establish whether there was adequate food consumption. Anova test was used to determine relationship between variables such as dietary intake, morbidity among children's microbiological quality of food, water and nutritional status of children under five years. Pearson product-moment correlation (r) was used to determine the presence and strength of relationship between dietary

intake and nutritional status of children under five years. A level of $p<0.05$ was used to indicate statistical significance in all analysis.

Result

I Personal Characteristics of Mother/Caregiver

The personal characteristics of mothers/caregivers are presented in (Table 1). The demographic characteristics of mother/caregiver showed that almost all 92.1% of the respondent were mothers, 72.3% were married, 62.4% had 4 person and above in their households.

Table 1: Personal Characteristics of Mothers/Caregivers.

Variable	Frequency	Percentage
Relationship of respondent with child		
Mother	93	92.1
Caregiver	6	5.9
No response	2	2.0
Total	101	100
Marital status of respondent		
Single	15	14.9
`married	73	72.3
Separated	9	8.9
Widowed	2	2.0
No response	2	2.0
Total	101	100.0
Number of people living in the household		
2 persons and below	11	10.9
3 persons	27	26.7
4 persons and above	63	62.4
Total	101	100

Table 2: Mean Age of Mothers and Caregivers in year.

Variable	Mother $\bar{x}\pm$ SD	Caregiver $\bar{x}\pm$ SD	t value	R value
Age in years of respondent	27 ± 4	55 ± 12	-10.390	0.000

The descriptive statistics for age of mothers and caregivers are presented in (Table 2). The mean age of mothers and caregivers in year showed mothers 27±4 and caregivers 55±12 respectively. The caregivers are significantly older than the mothers.

II Socio/Economic Characteristics of the Respondents

In (Table 3), the socio/economic characteristics of the respondent show the socio/economic characteristics of the respondents. More than half (51.5%) of the respondents had not completed their secondary education, 29.7% of the respondents husbands were casual labourers, 66% of the respondents were businesswomen\traders.

Table 3: Economic Characteristics of the Respondents.

Variable	Frequency	Percentage
Highest education level		
None	3	3.0
Primary education not completed	7	6.9
Primary education completed	6	5.9
Secondary education not completed	52	51.5
Secondary education completed	22	21.8
College education	8	7.9
University education	3	3.0
Total	101	100
Husbands occupation		
Civil servant	12	11.9
Private sector	21	20.8
Casual labourer	30	29.7
Business trader	25	24.8
Artisan	2	2.0
No response	11	10.9
Total	101	100
Wife's occupation		
Civil servant	4	4.0
Private sector	12	11.9
Casual labourer	8	7.9
Business trader	66	65.3
Artisan	10	9.9
No response	1	1.0
Total	101	100

III Food Consumption Pattern of the Respondents

Table 4 shows the food consumption frequency of the respondents. Majority 79% of the respondents consumes rice daily, 30.3% consumes agidi monthly, 62% consumes bread daily, 37% never consumes oat, 38.4% consumes cornflakes monthly, 60.6% consumes indomie daily, 56.1% consumes pap weekly, 32% each consumes spaghetti daily and weekly,34.4% never consumes custard,64% consumes oranges daily, 69% consumes banana daily,66% consumes pineapple daily, 58% consumes pawpaw daily, 59% consumes waterleaf weekly, 55.6% consumes okro weekly, 46% consumes yam weekly, 73% consumes cassava daily, 50.5% consumes plaintain weekly, 40.4% consumes potatoes monthly, 39.4% consumes soybean weekly, 69% consumes beans daily, 36.4% consumes groundnut weekly, 44% consumes akara weekly, 55.4% consumes poultry foods weekly, 59% consumes egg daily, 90% consumes fish daily, 82% consumes milk daily, 35% consumes yoghurt weekly, 55% consumes ice cream weekly, 40% consumes honey weekly and 68.4% consumes sugar daily.

Table 4: Food consumption pattern of the respondents.

Foods	Daily		Weekly		Monthly		Never		Total	
	N	%	N	%	N	%	N	%	N	%
Rice	79	79.0	21	21.0	00	00.0	00	00.0	100	100.0
Agidi	15	15.2	25	25.3	30	30.3	29	29.3	99	100.0
Bread	62	62.0	37	37.0	01	01.0	00	00.0	100	100.0
Oat	12	12.0	13	13.0	18	18.0	57	57.0	100	100.0
Cornflakes	24	24.2	22	22.2	38	38.4	15	15.2	99	100.0
Indomie	60	60.6	31	31.3	08	08.1	00	00.0	99	100.0
Pap	29	29.6	55	56.1	14	14.3	00	00.0	98	100.0
Spaghetti	32	32.0	32	32.0	30	30.0	06	06.0	100	100.0
Custard	21	21.9	25	26.0	17	17.7	33	34.4	96	100.0
Orange	64	64.0	24	24.0	12	12.0	00	00.0	100	100.0
Banana	69	69.0	28	28.0	03	03.0	00	00.0	100	100.0
Pineapple	66	66.0	19	19.0	15	15.0	00	00.0	100	100.0
Pawpaw	58	58.0	23	23.0	15	15.0	04	04.0	100	100.0
Waterleaf	24	24.0	59	59.0	16	16.0	01	01.0	100	100.0
Okro	42	42.4	55	55.6	02	02.0	00	00.0	99	100.0
Yam	39	39.0	46	46.0	13	13.0	02	02.0	100	100.0
Cassava	73	73.0	17	17.0	08	08.0	02	02.0	100	100.0
Plantain	43	43.4	50	50.5	06	06.1	00	00.0	99	100.0
Potatoes	26	26.3	25	25.3	40	40.4	08	08.1	99	100.0
Soyabean	36	36.4	39	39.4	19	19.2	05	05.1	99	100.0
Beans	69	69.0	27	27.0	04	04.0	00	00.0	100	100.0
Groundnut	26	26.3	36	36.4	27	27.3	10	10.1	99	100.0
Akara bean	32	32.0	44	44.0	24	24.0	00	00.0	100	100.0
Poultry	18	21.7	46	55.4	19	22.9	00	00.0	83	100.0
Egg	59	59.0	22	22.0	19	19.0	00	00.0	100	100.0
Fish	90	90.0	10	10.0	00	00.0	00	00.0	100	100.0

Milk	82	82.0	17	17.0	01	01.0	00	00.0	100	100.0
Yoghurt	11	11.0	35	35.0	23	23.0	31	31.0	100	100.0
Ice cream	14	14.0	55	55.0	27	27.0	04	04.0	100	100.0
Honey	09	9.0	40	40.0	30	30.0	21	21.0	100	100.0
Sugar	67	68.4	25	25.5	06	06.1	00	00.0	98	100.0

IV Nutritional Status of Under Five Children Using Anthropometric Indices

Table 5 shows the nutritional status of under five children using anthropometric indices. The result shows that 10.9% and 7.6% of children were moderately and severely overweight respectively while 1.1% and 5.4% were moderately and severely wasted respectively based on their weight for height indices,7.6% and 6.5% were moderately and severely stunted respectively based on their height for age indices,6.5% were moderately overweight while 6.5% and 1.1% were moderately and severely underweight respectively based on their weight for age indices,12.0% and 7.6% were moderately and severely over weight respectively while 2.2% and 5.4% were moderately and severely wasted respectively based on their body mass index for age.

Table 5: Anthropometric indices of respondents.

Variables	Frequency	Percentage
Weight for height		
Severe overweight	7	7.6
Moderate overweight	10	10.9
Normal	69	75.0
Moderate wasting	1	1.1
Severe wasting	5	5.4
Total	92	100.0
Height for age		
Severe overgrowth	6	6.5
Moderate overgrowth	4	4.3
Normal	69	75.0
Moderate stunting	7	7.6
Severe stunting	6	6.5
Total	92	100.0
Weight for age		
Moderate overweight	6	6.5
Healthy bodyweight	79	85.9
Moderate underweight	6	6.5
Severe underweight	1	1.1
Total	92	100.0
Body mass index for age		
Severe overweight	7	7.6
Moderate overweight	11	12.0
Healthy weight for height	67	72.8
Moderate wasting	2	2.2
Severe wasting	5	5.4
Total	92	100.0

V Dietary and Feeding Practice of the Respondent

Table 6 shows the dietary and feeding practice of the respondents. More than half (61.4%) eat three times a day with few (4%) that eat twice a day, 76.2% had food stored, 43.5% reported that they expect their food to last for weeks, 91% gave no response to the episodes of failure and food shortage, 47.5% have no special food for children under-five years within the family, 47.6% acquire food through farm produce and purchased from the market, 79.2% responded to the food being enough.

Table 6: Dietary Habits of the Respondents.

Variables	Frequency	Percentage
How many meals do you eat in a day		
Two	41	4.0
Three	62	61.4
Four	31	30.7
No response	4	4.0
Total	101	100.0
Do you have any stored food now		
Yes	77	76.2
No	22	21.8
No response	2	2.0
Total	101	100.0
How long do you expect it to last		
1/5 days	15	15.0
6/29 (weeks	44	43.5
30/60 (month	19	18.9
No response	23	22.8
Total	101	100.0
During the episodes of failure and food shortage, how do you provide for the family		
There is always food in the house	2	2.0
From the garden and farm produce	1	1.0
Cut down the portion size	5	5.0
Ask for help from family	1	1.0
No response	92	91.0
Total	101	100.0
Do you have special food to children under five years within the family		
Yes	21	20.8
No	48	47.5
No response	32	31.7
Total	101	100.0
How do you acquire food to meet the household food needs		
Purchase from market	42	41.6
Farm produce and purchase from market	48	47.6
Food aid	1	1.0
No response	4	4.0
Farm produce	6	5.9
Total	101	100.0
Is the food in the household enough		
Yes	80	79.2
Sometimes	17	16.8
No	2	2.0
No response	2	2.0
Total	101	100.0

VI Health Status of the Respondent

Table 7 shows the health status of the respondent has received all the immunisation according to their age, 51.5% have no record of sickness in the last two weeks, 83.2% of the children bath twice a day, 46.5% brush their teeth once, 27.7% of children sleep three times per day, 54.5% were often taken out for tourism and recreation.

Table 7: Health habits of the respondents.

Variable	frequency	Percentage
Has the child received all the immunisation according to the age		
Yes	80	79.2
No	5	5.0
No response	16	15.8
Total	101	100.0
Do you have any record of sickness of the child in the last two weeks		
Yes	30	29.7
No	52	51.5
No response	19	18.8
Total	101	100.0
Number of times child is bathed		
Once	5	5.0
Twice	84	83.2
No response	12	11.9
Total	101	100.0
Number of times child brushes teeth		
Once	47	46.5
Twice	42	41.6
No response	12	11.9
Total	101	100.0
Number of times the child sleeps per day		
Once	18	17.8
Two	25	24.8
Three	28	27.7
Four	15	14.9
No response	15	14.9
Total	101	100.0
Are children taken out for tourism and recreation		
Steadily	18	17.8
Often	55	54.5
No	16	15.8
No response	12	11.9
Total	101	100.0

VII Correlation between Feeding Practices and Nutritional Status of Under-Five Children

Table 8 correlation between feeding practices and nutritional status of under five children. There is significant (p<0.05) but negative correlation between weight of children and feeding practice options such as if there is enough food and if there is available stored food but there is no significant correlation between weight of children, how food is acquired to meet household food needs, number of meals eaten a day, duration of expected food stored, provision of food during episodes of failure and food shortage and children on special food in the family. There is no significant (p>0.05) but positive correlation between height of the children and feeding practice options such as how food I acquired to meet household food needs, how many meals eaten a day but there is no significant but negative correlation between height and if there is enough food, if there is any stored food, duration of expected food stored, provision of food during episodes of failure and food shortage and children on special foods in the family. There is no significant (p>0.05 but positive correlation between weight for height indices of the children and feeding practice options such as how food is acquired to meet the household food needs, duration of expected food stored, provision of food during episodes of failure and food shortage and children on special foods, but there is no significant but negative correlation between weight for height indices and if there is any food stored now.

There is significant (p<0.05) but positive correlation between height for age indices of the children and feeding practices options such as how many meals eaten in a day, but there is no significant (p>0.05) but positive correlation between height for age indices and feeding practice options such as how food is acquired to meet household food needs, if there is enough food, if there is any stored food, children on special foods in the family, while there is no significant but negative correlation between height for age and duration of expected food stored and provision of food during episodes of failure and food shortage. There is no significant (p>0.05) but positive correlation between weight for age indices and feeding practice options such as how food is acquired to meet the household food needs, number of meals eaten a day, duration of expected food stored, children on special foods in the family but there is no significant but negative correlation between weight for age indices and if there is enough food, if there is any food stored and provision of food during episodes of failure and food shortage. There is no significant (p>0.05) but positive correlation between BMI for age indices and feeding practice options such as how food is acquired to meet household food needs, duration of expected food stored, provision of food during episodes of failure and food shortage, children on special foods but there is no significant but negative correlation between BMI for age indices and if there is enough food, number of meals eaten a day, if there is any stored food.

Table 8: Correlation between feeding practices and nutritional status of under-five children.

		Waist	Height	WHZ	HAZ	WAZ	BAZ
How do you acquire food to meet the household food needs	r-value	0.088	0.087	0.054	0.159	0.166	0.034
	p-value	0.414	0.421	0.619	0.140	0.122	0.756
	N	88	88	88	88	88	88
If the food were enough	r-value	-0.226	-0.186	-0.073	0.054	-0.018	-0.069
	p-value	0.032	0.079	0.493	0.611	0.865	0.520
	N	90	90	90	90	90	90

How many meals do they eat in a day	r-value	0.127	0.198	-0.095	0.211	0.079	-0.106
	p-value	0.237	0.064	0.378	0.049	0.466	0.325
	N	88	88	88	88	88	88
Do you have any stored food now	r-value	-0.0208	-0.108	-0.162	0.061	-0.091	-0.147
	p-value	0.049	0.310	0.126	0.566	0.392	0.165
	N	99	90	90	90	90	90
For how long do you expect it to last in days	r-value	0.065	-0.037	0.180	-0.038	0.148	0.187
	p-value	0.593	0.758	0.133	0.756	0.218	0.119
	N	71	71	71	71	71	71
During the episode of failure and food shortage how do you provide for the family	r-value	-0.289	-0.334	0.110	-0.135	-0.050	0.137
	p-value	0.450	0.380	0.778	0.730	0.898	0.724
	N	9	9	9	9	9	9
Do you have special food for children under five years in the family	r-value	0.060	-0.026	0.127	0.020	0.143	0.107
	p-value	0.638	0.838	0.317	0.878	0.261	0.399
	N	64	64	64	64	64	64

Discussion

This study was carried out to determine the effects of diet, food habit, and health on the nutritional status of under 5 aged children in Mbeiri town, Mbaitoli Local Government Area of Imo State. Adequate nutrition promotes good nutritional status and thus satisfies the requirement for good physical health hence the risk of malnutrition is increased with unhealthy dietary habits and practices [4]. Nutritional status has a great impact on the learning capacity of children, on their productivity as adults as well as and on their quality of life in general [13]. The results in (Tables 1 & 2) shows demographic characteristics of mother/caregiver and their mean age which revealed that almost all 92.1% of the respondent were mothers, 72.3% were married, 62.4% had 4 person and above in their households and the mean age revealed that the caregivers are significantly older than the mothers (respondents) used in the study.

The socio-economic characteristics of the respondent show the socio/economic characteristics of the respondents. More than half (51.5%) of the respondents had not completed their secondary education, 29.7% of the respondents husbands were casual labourers, 66% of the respondents were businesswomen\traders. This result is in line with NDHS which reported that many Nigerians have no formal education [14]. Educated mothers are better, well informed to use health care facilities to ensure nutrition security, practice child spacing, give birth to fewer children and have better opportunities to pursue work outside the home to generate additional household income [5].

The result on the food consumption frequency of the respondents revealed that the majority 79% of the respondents consumes rice daily, 30.3% consumes agidimontly, 62% consumes bread daily, 37% never consumes oat, 38.4% consumes cornflakes monthly, 60.6% consumes indomie daily, 56.1% consumes pap weekly, 32% each consumes spaghetti daily and weekly, 34.4% never consumes custard, 64% consumes oranges daily, 69% consumes banana daily, 66% consumes pineapple daily, 58% consumes pawpaw daily, 59% consumes waterleaf weekly, 55.6% consumes okro weekly, 46% consumes yam weekly,73% consumes cassava daily, 50.5% consumes plantain weekly, 40.4% consumes potatoes monthly, 39.4% consumes soybean weekly, 69% consumes beans daily, 36.4 consumes groundnut weekly, 44% consumes akara weekly, 55.4%consumes poultry foods weekly, 59% consumes egg daily, 90% consumes fish daily, 82% consumes milk daily, 35%

consumes yoghurt weekly, 55% consumes ice cream weekly, 40% consumes honey weekly and 68.4% consumes sugar daily. This was contrary to the findings of Wang obtained among African-Americans where he found low consumption of soft drinks [15]. Egg and milk consumption by pupils in the rural area was poor as only a tenth of the pupils reportedly consume egg regularly (at least 4-7 days/week) and just a little over half consume milk regularly. This is not encouraging as these are protein of animal sources which are readily available and essential for the growth and development of children.

The result on nutritional status of under five children using anthropometric indices revealed that 10.9% and 7.6% of children were moderately and severely overweight respectively while 1.1% and 5.4% were moderately and severely wasted respectively based on their weight for height indices, 7.6% and 6.5% were moderately and severely stunted respectively based on their height for age indices, 6.5% were moderately overweight while 6.5% and 1.1% were moderately and severely underweight respectively based on their weight for age indices, 12.0% and 7.6% were moderately and severely over weight respectively while 2.2% and 5.4% were moderately and severely wasted respectively based on their body mass index for age. This finding is in line with the previous findings which established 22.2% of the under five children with severe malnutrition and several national and international organizations reported similar scenario [11, 16].

On the dietary and feeding practice of the respondents, the result showed that more than half (61.4%) eat three times a day with few (4%) that eat twice a day, 76.2% had food stored, 43.5% reported that they expect their food to last for weeks, 91% gave no response to the episodes of failure and food shortage, 47.5% have no special food for children under-five years within the family, 47.6% acquire food through farm produce and purchased from the market, 79.2% responded to the food being enough.

The result on the health status of the respondent showed that the respondents had received all the immunization according to their age, 51.5% have no record of sickness in the last two weeks, 83.2% of the children bath twice a day, 46.5% brush their teeth once, 27.7% of children sleep three times per day, 54.5% were often taken out for tourism and recreation. Therefore, the Immunization record of the children showed that not all the children had a full completed immunization. This is in a way agreed with Nigerian food consumption

survey national report, which indicated that only 21% of the children surveyed had all or 'complete' immunization prescribed against vaccine-preventable childhood illnesses (BCG, DPT, oral polio and measles), thirty-six percent had "no immunization" at all, while 43% had had 'some' [17]. The full benefits of childhood immunization are best achieved when all the prescribed immunization is given to the child [10]. According to the World Health Organization, a child is considered fully vaccinated if he or she has received a BCG vaccination against tuberculosis; three doses of DPT vaccine to prevent Diphtheria, pertussis, and tetanus (DPT); at least three doses of polio vaccine; and one dose of measles [11].

The result of the correlation analysis showed that there is significant (p<0.05) but negative correlation between weight of children and feeding practice and there is no significant (p>0.05) but positive correlation between height of the children and feeding practice. The result also showed that there is no significant (p>0.05) but positive correlation between weight for height indices of the children and feeding practice and there is significant (p<0.05) but positive correlation between height for age indices of the children and feeding practices, but there is no significant (p>0.05) but positive correlation between height for age indices and feeding practice. There is no significant (p>0.05) but positive correlation between weight for age indices and feeding practice, but there is no significant but negative correlation between weight for age indices. There is no significant (p>0.05) but positive correlation between BMI for age indices and feeding practice, but there is no significant but negative correlation between BMI for age indices.

Conclusion

Nutritional status of children under five years in Mbieri, Mbaitoli Local government area of Imo State was not too poor as depicted by the low levels of malnutrition; overweight (7.6%), wasting (5.4%), stunt (6.5%) and underweight (1.1%). Consumption of foods below the recommended dietary allowance exposed the children to high risk occurrence of malnutrition though the majority of children consume adequate food hence it reduced the problem of malnutrition among them. Food consumption (diet) which determines the health of a child was shown to influence child nutritional status. Diarrhea diseases resulted in poor growth through decreased absorption of nutrients and increased requirements thereby contributing to general protein – energy malnutrition. Results from the study showed that there was a significant relationship between diet, food habit, health and the nutritional status of children under five years in Mbieri. Therefore, in summary, from all indication the study have succeeded in showing that, there is malnutrition among under- five children in the area of study but the rate was low.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflicts of Interest

None.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

REFERENCES

1. NDHS (2008) Nigeria Demographic and Health Survey. National Population Commission Federal Republic of Nigeria Abuja. *Nigeria* 62-74.

2. Akinyele IO (2009) Ensuring food and nutrition security in rural Nigeria. *Int Food Policy Res Inst (IFPRI)* 37.

3. FAO (2008) The state of food insecurity in the world, 2008: High food prices and food security, threats and opportunities. *Rome: FAO.*

4. Adamu A, Adjei NG, Kubuga CK (2012) Effects of Dietary Patterns on the Nutritional Status of Upper Primary School Children in Tamale Metropolis. *Pakistan J Nutr* 11: 591-609.

5. Alderman H, Hoogeveen H, Rossi M (2006) Reducing child malnutrition in Tanzania: Combined effects of income growth and program interventions. *Econ Hum Biol* 4: 1-23. [Crossref]

6. Bryce JC, Coitinho D, Darnton Hill H, Pelletier ID, Pinsrup Anderson P (2008) Maternal and child under nutrition: effective action at National level. *Lancet* 371: 510-526. [Crossref]

7. Caulfield LE, De Onis M, Blossner M, Robert EB (2004) Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. *Am J Clin Nutr* 80: 193-198. [Crossref]

8. Schmidt H, Kohlmann T (2008) When to use the odds ratio or the relative risk? *Int J Pubic Health* 53: 165-167. [Crossref]

9. Onyeneke EN (2020) Anthropometric Indices, Nutritional Status and Feeding Habits of Pensioners In Mbaise, Imo State. *Int J Nutri Heal Fo Saf* 2: 1-14.

10. UNICEF/MI (2004) United Nations Children's Fund and the Micronutrient Initiative. 2004.Vitamin and mineral deficiency: A global damage assessment report. *New York Ottawa.*

11. WHO (2007) WHO Multicentre growth reference study group: WHO child growth standards based on length/height, weight and age. *ACTA* 95: 76-85.

12. FAO (2000) Agriculture: Towards 2015/30. *Tech Interim Report Rome* 1.

13. Flynn MA, McNeil DA, Maloff B, Mutasingwa D, Wu M et al. (2006) Reducing obesity and chronic disease risk in children and youth: a synthesis of evidence with 'best practice' recommendations. *Obes Rev* 7: 7-66. [Crossref]

14. NDHS (2013) Nigeria Demographic and Health Survey. National Population Commission Federal Republic of Nigeria Abuja. Nigeria.

15. Wang Y, Bentley ME, Zhai F, Popkin BM (2002) Tracking of dietary intake patterns of Chinese from childhood to adolescence over a six-year follow-up period. *J Nutr* 132: 430-438. [Crossref]

16. UNICEF'S (2009) State of the World's Children Report.

17. Maziya Dixon B, Akinyele IO, Oguntona EB, Nokoe S, Sanusi RA et al. (2004) Nigeria Food Consumption and Nutrition Survey 2001-2003 Summary. Int Inst Tropical Agricul (IITA) 1-67.