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Research Article

Assessment of Nutritional Status of Children under 5 Years in Enugu North Local Government, Enugu State Nigeria

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Abstract

Nutrition of pre-school children is of paramount importance because the foundation for lifetime health, strength and intellectual vitality is laid during this period. The study was aimed to assess the nutritional and socioeconomic status of children below five years of age. It was a cross-sectional study of children in Enugu North Local Government of Enugu State, Nigeria. Systematic random sampling was used to select 370 children below five years of age for the study. Every child was subjected to anthropometric measurements using standard technique. Data were collected using a well-structured and validated questionnaire to obtain information on socio-economic status and anthropometric measurements. Data were analyzed using WHO Anthropometric software and SPSS version 20. The respondents studied were 175 (47.3%) males and 195 (52.7%) females. Majority of children belonged to 7-12 months age group (21.4%), followed by 19-24 months (12.4%) and 46-52 months (11.4%). The prevalence of stunted, wasted and underweight children was 8.1%, 9.4%, and 6.5% respectively. A few (1.6%) of the children had a mid-upper arm circumference less than 12.5cm (severely malnourished) while 3.0% had between 12.5- 13.5cm (Moderately malnourished) and 95.4% had MUAC above 13.5cm. The results show that an improvement in societal infrastructure, good maternal education is needed to maintain the children's nutritional status.

Keywords: Nutritional Status; Assessment; Children Under 5 Years; Enugu North L.G.A; Enugu State; Nigeria

Introduction

Malnutrition is insufficient, excessive or imbalance consumption of dietary energy and nutrients. Malnutrition is an unbearable burden not only on the health systems, but the entire socio-cultural and economic status of the community [1]. Malnutrition is one of the major public health challenges in developing countries. It has devastating effects on children and society. Feeding practices during infancy are critical for the growth, development and health of a child during the first two years of life and of importance for the early prevention of chronic degenerative diseases [2]. Progress in improving infant and young child feeding practices in the developing world has been remarkably slow due to several factors like poverty and poor hygienic conditions [3]. 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 [4], with malnutrition being associated with more than half of all deaths of children worldwide [5]. Better nutrition means stronger immune systems, less illness, better health and a productive community. Freedom from hunger and malnutrition is a basic human right and their alleviation is a fundamental prerequisite for human and national development. In Nigeria, reports from the United Nations Children's Fund (UNICEF) [4] showed that the rate of children stunted is about 34.6%, wasting is about 18.1%, approximately 31.1% are underweight. There have been several efforts by the Government to improve the nutrition and health status of children through policies and programs such as the National guidelines for infant and young child feeding; all focused on improving the health of infants and young children. Therefore the thrust of the study was to assess the socioeconomic and nutritional status of children less than five years in Enugu North LGA, Enugu State, Nigeria.

Materials and Methods

Study design

A cross sectional study was carried out in various selected hospitals, health centers and schools in Enugu North of Enugu State, South East Nigeria.

Area of study

The survey was conducted in Enugu North Local Government Area of Enugu State Nigeria. According to the 2006 national cen-

sus, Enugu has a population of 245,852. Enugu North has an area of 106km2 and density of 2,308.92 inhabitants per km2. The LGA is predominately urban with some semi urban area. The people are mainly Igbo with a few other ethnic groups. The major religion is Christianity. Agricultural products in the LGA include yams, corn, cassava and palm produce. Coal mine is also located in the area.

Population of the study

The Study population consists of children 0-5 years selected from health facilities and schools in Enugu North Local Government Area.

Sampling and sampling techniques

Sample size

The prevalence of stunting (34.6%) in Nigeria, UNICEF (2015) was used for sample size calculation.

$$\text{Sample size (N)} = \frac{Z^2 \times P\ (100\text{-}P)}{X^2}$$

Where Z = 1.962

P = Prevalence of stunting in Nigeria = 34.6%

X= Estimated precision = 5

$$N = \frac{2^2 \times 34.6\ (100\text{-}34.6)}{5^2}$$

$$N = \frac{4 \times 34.6\ (65.4)}{25}$$

N = 362

The sample size was increased to 370 to make room for incorrectly filled questionnaires and dropout.

Sampling technique

The LGA has 31 private and public health facility. Enugu State School Census Report (2009-2010) states that there are 49 public schools in Enugu North. As at 2014 The State Ministry of Education estimated that the total number of approved Nursery schools in Enugu North was 46. Simple random sampling by balloting was used to select 2 health facilities from the 31 offering routine immunization services. Systematic sampling technique was used to select the subjects where every 3rd child was measured. Simple random sampling by balloting was used to select 2 nursery schools from the 46 approved schools that make up the LGA. Systematic sampling technique was used to select children from the school's register where every 3rd child was measured.

Ethical approval

The researchers informed the University of Nigeria Teaching Hospital, Enugu of the study and its objectives and got its approval for the study. The schools and parents of the children were also informed about the study and their cooperation was sought. They approved of the study and gave their consent.

Data collection

Questionnaire administration

Three hundred and seventy (370) structured questionnaires were administered to responsible household representatives. Data collected include: physical information of the respondent, gender, age and socioeconomic characteristics of parents. Anthropometric measurements (weight, height, head, chest and mid-arm circumference) for children below 60 months were also collected.

Anthropometric measurements

The children's ages were recorded and approximated in months. Anthropometric measurements of weights and standing heights for children 24-59 months of age or recumbent lengths for infants 0-23 months were taken. Mid upper arm circumference, head and chest circumferences were also taken.

- **Weight:** The weights of children 0-2 were measured using an infant weighing scale. The children were laid in the scale and they were naked to ensure adequate measurements were taken. The weights were read and measured in the nearest 0.1kg. The weights of the children 2-5 years were measured using a standard platform-type bathroom scale of 160 kg capacity. Care was taken to ensure that the children being measured were barefooted, wore light outfits and carried nothing in their pockets before standing at the center of the platform. The weights were read and recorded to the nearest 0.1 kg.

- **Height:** The standing heights of the children were also measured using the Stadiometer. The children measured were made to stand erect with feet at right angles, heels on the ground, back flat against the wall and eyes looking straight ahead and without shoes [6]. The 12-inch ruler will then be gently placed to make contact with the child's head touching the hair to make angle 90 degrees with the measuring ruler. The measurements of the height will be taken and recorded to the nearest 0.1 cm.

- **Length:** For measurement of recumbent length, the wooden length board was used. The children were laid on the board, with head positioned firmly against the fixed headboard and eyes looking vertically. The knees were extended by firm pressure and feet flexed at right angles to the lower legs [6]. Like the standing heights, recumbent lengths were also read and recorded to the nearest 0.1 cm.

- **Mid Upper Arm Circumference (MUAC):** To measure MUAC, a flexible measuring tape was wrapped around the mid-upper arm (between the shoulder and elbow). With the left arm bent, it is recommended to use a string to find the midpoint of the arm between the shoulder and the tip of the elbow. MUAC was then measured on the left upper arm while the arm was hanging down the side of the body and relaxed. The left arm and a pen were used to mark the olecranon process and acromion. The mid-point between these two marks was identified. With the arm hanging straight down, a MUAC tape was wrapped around the arm at the midpoint mark. Measurements were taken to the nearest 0.1 centimeter.

- **Head Circumference**: The child's hairstyle must allow for accurate measurement, hair adornments were removed. The measuring tape was looped and placed over the child's head. The tape was placed above the ears and midway between the eyebrows and the hairline to the occipital prominence at the back of the head [7]. The tape was pulled so that any hair was compressed. Measurement was taken appropriately and to the nearest 0.1 centimeter. The procedure was repeated three times and the average taken.

- **Chest Circumference:** A measuring tape was used and chest measurement was measured at the nipple line. The measurements were read to the nearest 0.1 centimeter.

Statistical analysis

The data obtained was analyzed using descriptive statistics, which was used to determine the socio-economic characteristics of the respondents. Descriptive statistics was also used to sort anthropometric characteristics of the respondents. Means and standard deviation of the parameters were calculated and presented by gender and age group. The Anthropometric status was categorized using the WHO [8] reference standards.The weight for height, height for age and weight for age z-scores were calculated using the WHO anthropometry software and values compared with the reference standards to determine the nutritional status of the infants. All statistical analysis was performed using the Statistical Packaged for Social Science (SPSS) version 20.

Results and Discussion

Table 1 shows that the respondents studied were 175 (47.3%) males and 195 (52.7%) females. Majority of children belong to 7-12 months age group (21.4%), followed by 19-24 months (12.4%) and 46-52 months (11.4%). The family sizes of respondents were recorded in groups, with the majority (55.1%) of respondents from a family of 4-6 people. Majority of the children (53%) drank sachet and bottled water. About 9.5% and 0.5% drank from stream and well respectively. Inadequate water and sanitation increases the risk of diarrhea in children. It is well known that socioeconomic and environmental conditions, in addition to the feeding patterns, are important determinants of malnutrition in developing Countries [9].

Variables	No	(%)
Age		
0-6months	39	10.50
7-12 months	79	21.40
13-18months	30	8.10
19-24 months	46	12.40
25-31months	32	8.60
32-38 months	39	12.50
39-45 months	35	9.50
46-52 months	42	11.40
53-60 months	28	7.60
Total	**370**	**100.0**
Sex		
Male	175	47.30
Female	195	52.70
Total	**370**	**100.0**
Family Size		
1-3	143	38.60
4-6	204	55.10
7-9	8	2.20
10 and above	1	0.30
No response	14	3.80
Total	**370**	**100.0**
Source of drinking water		
Well	2	0.50
Tap	71	19.20
Stream	35	9.50
Borehole	20	5.40
Sachet/bottled water	197	53.20
Others	45	12.20
Total	**370**	**100.0**

Table 1: Characteristics of respondents studied.

Table 2 shows the Educational qualification and occupation of parents of children studied.

Variable	Mother		Father	
	No	%	No	%
Educational Qualification				
No formal Education	3	0.80	0	0
Primary Education	24	6.50	75	20.30
Secondary Education	122	33	108	29.20
Tertiary Education	221	59.70	187	50.50
Total	370	100.0	370	100.0
Occupation of parents				
Not employed	38	10.30	4	1.10
Civil servant	148	40	146	49.50
Farmer	4	1.10	15	4
Trader	52	14.10	41	11.10
Business	86	23.20	122	33
Artisan	41	11.10	42	10.80
No response	1	0.30	2	0.50
Total	370	100.0	370	100.0

Table 2: Educational qualification and occupation of parents of children**.**

About 59.7% of the mothers had tertiary education while 0.8% had no formal education. Half of the fathers (50.5%) had tertiary education while 20.3% had primary education. All the fathers had at least primary education. The occupation of the mothers revealed that 40.0% were civil servants, 23.2% were into business, 1.1% farmers while 10.3% were not employed. According to Mosley and Chen [10], maternal education affects children's health and nutritional outcomes through its effect on improving women's socio-economic status. A higher level of maternal education leads to increased knowledge about health and nutrition, which, in turn, leads to an increase in the quality of the diets consumed by children [11]. If maternal education is to play a significant role in reducing child malnutrition, women need to be educated beyond the primary school level.

Table 3 shows the nutritional status of the respondents. The weight- for- height of the children show that 9.4% were wasted. This is in line with the result of Oguizu and Nnadede [12]. The low prevalence of wasting identified in this study is a relatively fair development as this will pose no threat to the children if an intervention is staged in the studied population [13]. The height- for- age status of the children shows that 9.1% were stunted. This report is in contrast with the report by Oguizu and Nnadede [12] which indicated a higher rate of stunting in the children studied.

Variable	Classification	Total	
		No	%
Weight- for- height			
	Wasted	35	9.40
	Normal	178	47.80
	Above normal	157	42.80
	Total	370	100.0
Height -for- age			
	Stunted	30	8.10
	Normal	179	48.20
	Above Normal	161	43.80
	Total	370	100.0
Weight -for- age			
	Underweight	24	6.50
	Normal	192	51.70
	Above normal	154	41.80
	Total	370	100.0
MUAC			
	Malnourished	17	4.60
	Normal	353	95.40
	Total	370	100.0

Table 3: Nutritional status of the respondents.

For weight- for- age, 6.5% were underweight. The MUAC status shows that 4.6% of the children were malnourished. Recent studies have shown that children who are underweight are at a high risk of infection [14].

Table 4 shows the nutritional status of the respondents by sex; the weight- for- height (wasted) figures were almost equal i.e. 10.2% for males and 9.7% for females. Generally, the majority of the children were not wasted (89.7% males, 91.3% females), not stunted (92.6% males, 91.3% females) and not underweight (94.9% males, 92.3% females) this is probably indication of good dietary habits of parents in the study area. The findings on stunting (7.4% males, 8.7% females) are contrary to studies carried out

by Manyike., *et al.* [15] in which they concluded that males had higher preponderance to be stunted. A similar study by Ndanu [16] show that boys were more stunted, wasted and underweight compared to the girls. In Jayatissa., *et al.* [17] study on assessment of nutritional status and associated factors; there were no consistent differences between sexes regarding occurrence of stunting but a higher prevalence of wasting and underweight was seen among males. The MUAC also shows that 7.5% males and 2% females were severely malnourished. Akorede and Abiola [2] stated that since the present condition (nutritional status) have a lot of effect on the future then adequate care should be given to the children at that tender age. The best way to achieve optimal nutritional status is to improve on the socioeconomic conditions of children and teach nutrition education to mothers, most especially on the best practices to care for their children.

Variable	Classification	Male		Female		Total	
		No	%	No	%	No	%
Weight- for- height							
	Wasted	18	10.20	17	8.70	35	9.40
	Normal	73	41.70	105	53.80	178	47.80
	Above normal	84	48	73	37.50	157	42.80
	Total	175	100.0	195	100.0	370	100.0
Height -for- age							
	Stunted	13	7.40	17	8.70	30	8.10
	Normal	78	44.60	101	51.80	179	48.20
	Above Normal	84	48	77	39.50	161	43.80
	Total	175	100.0	195	100.0	370	100.0
Weight -for- age							
	Underweight	9	5.10	15	7.70	24	6.50
	Normal	82	46.90	110	56.40	192	51.70
	Above normal	84	48	70	35.90	154	41.80
	Total	175	100.0	195	100.0	370	100.0
MUAC							
	Malnourished	13	7.50	4	2.00	17	4.60
	Normal	162	92.60	191	97.90	353	95.40
	Total	175	100.0	195	100.0	370	100.0

Table 4: Nutritional status of the respondents by sex.

Table 5 shows the Mean and standard deviation for Anthropometric measurements of the children. It also shows the age of the children, height, weight, MUAC and their head and chest circumference for different age groups. The mean age in months of the male children (27.23 ± 17.6) compared with the standard deviation is higher than that of the female children (26.64 ± 15.7). The mean weights of the male children (13.38 ± 7.99) were also higher than that of the females (12.19 ± 3.97). Consequently, the head circumference, chest circumference and MUAC of the males (48.46 ± 5.12), (51.59 ± 5.71) and (16.16 ± 2.44) respectively were found to be higher than that of the females (48.34 ± 4.19), (51.21 ± 4.79) and (15.95 ± 2.00) respectively [18,19].

Conclusions

In general, wasting, stunting and underweight were all identified in this study. On the assessment of nutritional status by gender, there was no much difference between sexes. Before now there has been a wide gap in the nutritional status of male and fe-

		Age in months	Weight (kg)	Length/ Height (cm)	Head circumference (cm)	Chest circumference (cm)	MUAC (cm)
Sex	Male	27.23 ± 17.60	13.38 ± 7.99	86.91 ± 18.00	48.46 ± 5.12	51.59 ± 5.71	16.16 ± 2.44
	Female	26.64 ± 15.70	12.19 ± 3.97	86.34 ± 15.20	48.32 ± 4.19	51.21 ± 4.79	15.95 ± 2.00
	Total =	**26.93 ± 16.60**	**12.75 ± 6.23**	**86.61 ± 16.50**	**48.39 ± 4.65**	**51.38 ± 5.24**	**16.05 ± 2.22**
Age group (months)							
	0-6	3.692 ± 2.14	6.195 ± 1.65	60.90 ± 6.51	40.50 ± 4.27	42.81 ± 4.49	13.47 ± 2.00
	7-12	10.89 ± 1.63	9.451 ± 1.41	73.30 ± 3.59	45.91 ± 2.43	48.04 ± 2.94	14.86 ± 1.61
	13-18	16.05 ± 2.21	10.55 ± 1.70	78.27 ± 5.45	47.80 ± 2.80	49.77 ± 1.91	15.26 ± 1.75
	19-24	23.06 ± 1.85	12.42 ± 2.32	86.02 ± 7.37	50.63 ± 4.00	53.11 ± 4.62	16.05 ± 2.28
	25-31	29.18 ± 1.67	12.46 ± 2.27	90.09 ± 6.86	50.39 ± 3.54	53.64 ± 3.29	16.28 ± 1.70
	32-38	35.83 ± 1.81	14.88 ± 2.15	96.90 ± 5.08	51.53 ± 3.72	54.64 ± 3.34	16.97 ± 1.56
	39-45	42.05 ± 1.88	17.41 ± 14.1	98.60 ± 16.2	50.31 ± 2.82	55.06 ± 3.26	17.17 ± 1.64
	46-52	49.10 ± 1.64	17.97 ± 4.28	105.3 ± 7.75	50.48 ± 2.85	54.54 ± 3.40	18.30 ± 1.52
	53-59	55.50 ± 2.65	17.84 ± 3.53	108.7 ± 7.93	51.15 ± 2.48	55.29 ± 2.39	17.51 ± 1.00
	Total	**26.93 ± 16.60**	**12.75 ± 6.22**	**86.61 ± 16.50**	**48.39 ± 4.65**	**51.39 ± 5.24**	**16.05 ± 2.22**

Table 5: Means and standard deviation for Anthropometric measurements of the children.

male children in Nigeria. There is still an urgent need to improve the nutritional status of children in Nigeria. A few percentages of the children drank from streams and wells; this is unacceptable. Poor Socioeconomic and environmental conditions are important determinants of nutritional status. Educated and employed mothers have control over the purchase of the dietary items and will be more qualified and capable of taking care for their children properly. Maternal education plays a significant role in reducing child malnutrition in Nigeria, women need to be educated.

Bibliography

1. Alemu A., *et al*. "Prevalence of Wasting and Its Associated Factors of Children among 6-59months of Age in Gutogida District, Oromia Regional State, Ethiopia". *Journal of Food Processing and Technology* 24 (2014): 51-60.

2. Akorede QJ and Abiola OM. "Assessment of nutritional status of Under-five children in Akure South Local Government, Ondo State, Nigeria". *IJRRAS* 14.3 (2013): 24.

3. Nigeria Demographic and Health Survey. National Population Commission. (2013).

4. United Nations Children's Fund (UNICEF). The State of the World's Children. UNICEF, New York. (2015).

5. Sobo RA and Oguntona CRB. "Nutritional assessment of children of market women in Abeokuta, Nigeria". *Nigerian Journal of Nutritional Sciences* 1.2 (2006): 62-66.

6. Cerdeña CM., *et al*. "Updating of nutritional status of Filipino children at the regional level". Food and Nutrition Research Institute (FNRI), Metro Manila, Philippines methodanthro. (2001).

7. Batrum JL and Baxter PS. "The Lasso-o tape: stretchability and observe reliability in head circumference measurement". Archives of Disease in Childhood 90.8 (2005): 820 -821.

8. World Health Organization (WHO). "Nutrition Essential: A guide for health management of exclusive breastfeeding". (2006): 10-15.

9. Kenya National Bureau of Statistics (KNBS) and ICF Macro. Kenya Demographic and Health Survey 2008-09. Calverton, Maryland: KNBS and ICF Macro. (2010).

10. Mosley WH and Chen LC. "An Analytical Framework for the Study of Child Survival in Developing Countries". *Population and Development Review* 10 (1984): 25–45.

11. Variyam JN., *et al*. "Mother's nutrition knowledge and children's dietary intakes". *American Journal of Agricultural Economics* 81 (1999): 373-387.

12. Oguizu AD and Nnadede LU. "Nutritional Status of Children (2-5 Years) in Isiala Ngwa North L.G.A, Abia State, Nigeria". *The Indian Journal of Nutrition and Dietetics* 53.1 (2016): 30-46.

13. Kearney M., *et al*. "Perceived need to alter eating habits among representative samples of adults from all member states of the European Union". *European Journal of Clinical Nutrition* 51 (1997): 30-35.

14. Popkin B., *et al*. "A comparison of dietary trends among racial and socio economic groups in the United States". *The New England Journal of Medicine* 335 (1996): 716-720.

15. Manyike PC., *et al*. Italian Journal of Pediatrics. 40 (2014): 75.

16. Ndanu MM. Feeding practices and nutritional status of children aged 0-59 months accompanying incarcerated mothers in selected women's prisons in Kenya. M.Sc. Thesis, Department of Food Nutrition and Dietetics, Kenyatta University, Kenya. (2013).

17. Jayatissa R., *et al*. "Assessment of nutritional status and associated factors in Northern Province". Medical Research Institute In collaboration with UNICEF and WFP. Ministry of Health, Sri Lanka. (2012).

18. Ruel M., *et al*. "Good care practices can mitigate the negative effect of poverty and low maternal schooling on children's nutritional status: evidence from Accra". *World Development* (1999).

19. Smith LC and Haddad L. "Explaining child malnutrition in developing countries". FCND discussion papers 60, International Food Policy Research Institute (IFPRI) (1999).

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