Socio-demographic and Nutritional Assessment of Under five Children in Benue State North Central Nigeria

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ABSTRACT

Background: Globally, malnutrition is a major public health concern. Under nutrition in Nigeria is a long standing problem since independence and the magnitude is on the increase. This is so because food consumption both in quantity and quality has decreased considerably due to unemployment and other harsh economic conditions. **Objectives:** The study aimed at assessing the socio-demographic and Nutritional status of under- five Children in Benue State North Central Nigeria. **Method**s: A cross sectional survey was conducted using quantitative data collection methods. The study involved interviews using questionnaires for socio-demographic variables, immunization, breast feeding practices and anthropometric measurements. Data were analyzed using SPSS version 21. Ninety five percent confidence interval was used while a p-value of ≤ 0.05 was considered statistically significant. **Results:** Two hundred and twenty three under five children and their mothers were assessed for nutritional status using selected and sensitive anthropometric methods. The results showed that children with mothers/caregivers without formal education had weight and height 36.4% and 70.5% below normal respectively. Mothers with income less than twenty thousand per annum had children with height 53.3% below normal while those earning above twenty thousand naira per year had weight 41.0% and height 62.9% below average respectively. Furthermore, children without appropriate immunization for age had 29.9%, 53.2%, and 36.9% below normal for weight, height and mid upper arm circumference respectively. There was a statistically significant relationship between weight, height and mid upper arm circumference with the age of children (p=0.00, 0.002, 0.001 respectively) with respect to their nutritional status. **Conclusion**: The nutritional need of a child is complex. There is need for proper nutritional education.

Keywords: Nutrition, Under-five, Malnutrition, Anthropometric, Benue State.

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Introduction

Children less than five years worldwide are known to be vulnerable and susceptible in many respects; especially on matters of health.[1] Nutritional deficiencies and malnutrition generally affect under-five children more than any other group. Poor nutrition occurs in developing countries, as well as in more prosperous areas of the world.[2,3] World Health Organization (WHO) Progress Report indicated that hunger and malnutrition remain the most devastating problems to the world's poor and needy.[3,5]As many as 800 million persons worldwide are affected by malnutrition.[4,5] More than half of the childhood deaths in developing countries

are related to malnutrition.[2,6] Nearly 30% of humanity suffers from one or more of the multiple forms of malnutrition.[7,8] The recent reports on child survival, the importance of addressing childhood malnutrition as a prerequisite for achieving internationally agreed goals to reduce malnutrition and child mortality was higntlighted.[9] Child growth is therefore internationally recognized as an important public health indicator.

Malnutrition refers to deficiencies, excesses or imbalances in person's intake of energy and/or nutrients.[9,10] In Nepal, nearly 37% of children are suffering from underweight, 41% from stunting and 11% from wasting.[10] These children are at a substantially greater risk of Severe Acute Malnutrition (SAM) and death. Food insecurity becomes increasingly worse in areas affected by armed conflicts. Children affected by conflicts or in war-torn settings face a disproportionate burden of malnutrition and poor health outcome.[8]

Malnutrition has long been associated with poverty, poor diet, infections (diarrheal diseases, measles and pertussis), inappropriate feeding of infant and young children such as lack of exclusive breastfeeding, early or late introduction of complimentary feeds which are often low in nutrient density, ignorance of how to utilize wide variety of locally available food stuff, large family size, inappropriate household food allocation and inadequate access to healthcare.[5,11] Malnutrition remains a key global health challenge that stems from and contributes to ill health, with 50% of childhood deaths due to underlying undernutrition.[3,8] Micronutrient deficiencies which often pass unnoticed are responsible for reduced body resilience and resistance to infections. They compromise early child development, negatively affect reproductive health and reduce work rate capacity.[5,12]

Under nutrition is the most prevalent type of malnutrition in the developing world where more than one-sixth of the population (about 800 million) has insufficient food and thus energy deficit.[12,13] Studies had shown that 150 million children in the developing world remain under weight (low weight for age)

and 182 million remain stunted (low height for age) with under nutrition accounting for over 50% of death in developing countries[14,15]. Some studies identified Severe Acute malnutrition (SAM) as one of the leading causes of death among Nigerian children[16]. Nutritional assessment involves a systematic collection, organization and interpretation of nutritional information about an individual. The essence of nutritional assessment is for early detection of marginal malnutrition or inappropriate dietary patterns, to monitor growth recovery from severe malnutrition or simply for evaluation of the effectiveness of intervention programmes.[1,3] It is particularly important in under 5's because this is a period of rapid growth and development especially brain growth. Optimal nutrition is necessary for optimal growth and development. Nutritional assessment procedures are aimed at describing nutritional status of populations on a national basis. The important relationship between nutritional status and health are well documented and awareness among health practitioners of the importance of nutritional assessment has increased since the 1950's.[10,11] New concepts and methods have been devised and used in developing regions of the world for the assessment of nutritional status. Many types of sophisticated equipments for assessing nutritional status have become available and these encouraged the development of a new concept of body composition. However further education of health workers, parents/guardians and the community at large is essential in detecting the early and subtle changes of malnutrition.[7,17]

The states in Northern Nigeria are the most affected by two forms of malnutrition – stunting and wasting.[10,12] In Benue state the rate of malnutrition among under five has being on the increase in recent times majorly due to conflicts between armed herdsmen and farmers in the Benue valley which had resulted in destruction of farmlands and displacement of families. This in turn had affected their income with attendant negative effect on nutrition. As a result of the increased recognition of the relevance of nutrition as a

basic pillar for social and economic development, monitoring trends in childhood malnutrition has gained increasing importance in assessing the progress made by nations in achieving internationally set goals, such as the Sustainable Development Goals (SDG).[5,8]

This work assessed the prevalence of malnutrition in under- five children in Kanshio, based on socio-demographic characteristics, infant feeding and immunization status.

Method and Materials
Study Area
Kanshio is a rural settlement about 10 kilometers from Makurdi. It has a population of about 2,150 people. The population consisted of small scale entrepreneurs, few civil servants and farmers. The settlement is devoid of social amenities with only one government primary school and one primary health care centre. Water supply in the community is dominated by shallow wells and a highly contaminated stream separating southern part of Makurdi from Kanshio. The community has poor drainage system with broken pipes and blocked culverts and gutters. The annual rainfall ranges from 1,200 to 1500mm making the environment favorable for the breeding of mosquitoes.

Study design
A cross sectional descriptive study design was employed in this study.

Study population
The study population consisted of children under-five years of age (0~59 months) in Kanshio. Children aged 0-59 months and who were present at the time of the study and whose parents/caregivers consented were included in the study.

Children who were very uncooperative and restless during anthropometric measurements, those with known sickle cell or other genetic and chronic disorders were excluded. Children 0-5 months were excluded from mid upper arm circumference measurement due to lack of data for meaningful comparison.

Anthropometric measurements
Anthropometric measurements such as weight and height of children were taken using the standard anthropometric measurement procedures outlined in the measurement guide prepared by the Food and Nutrition Technical Assistance (FANTA) project. Body weight was measured using a weighing scale in light clothing with no jackets or coats, shoes, and additional clothing to the nearest 0.1 kg on a new calibrated potable scale. Height of children was measured using a portable standiometer with no shoes, the shoulders, buttocks, and the heels touched the vertical stand with head in Frankfurt's position to the nearest 0.1m. Mid upper arm circumference (MUAC) was measured by marking midway between shoulder tip on the vertical axis of the upper arm with arm bent at right angle and between the lateral and medial surface of the left arm.[18]

Sample size determination
Sample size was determined using Taylor's formula $n=Z^2p\ (1-p)\ /d^2$), where n = minimum sample, z = standard normal deviate which corresponds to 1.96 at the 95th confidence interval, p= proportion of stunting from previous study, (1- p = proportion of non-stunting = q), d = degree of precision or accuracy usually set at 0.05, p = 40% studies from previous stunting, z = 1.96, d = precision = 0.05 of significance, n = 1.96^2x 0.4 x $0.60/0.05^2$ = 384. Giving that in Nigeria 20% of the population are stunted, Kanshio population is 2150, = 430(percentage of stunting), therefore correcting for population < 10,000 and attrition of 10% n = 223. The sample size for this study was 223.

Sampling technique
A systematic sampling technique was used to select the subjects after determining the sampling interval until the desired sample size was obtained.

The selection was based on the estimated population statistics obtained from the local government area head office before the commencement of the survey.

The community had already been mapped out and numbered by Makurdi local government immunization officials and a total of 1002 households were identified. The actual list of the households was used as the sampling frame. Sampling interval of 5 was calculated and used for the selection of the households. A household is defined as people eating from a common pot. A compound may include many households and in such situation all eligible children are include in the study. The first household was selected using the table of random numbers and the subsequent ones were selected by the calculated systematic intervals of 5. Once a household is selected, five households next to the surveyed one were excluded and movement maintained continuously to the right. In situations where the research assistants arrived at same house again, they turned to left and continued sampling until the minimum size was obtained. In households where eligible children were absent a repeat visit was conducted by the research assistants when they were presumed to be present. Such households were revisited at specific periods on three occasions before replacements were considered.

Data collection
Data were collected using semi structured interviewer administered questionnaires. The questionnaires were divided into five sections: Socio-demographics of the mothers/caregivers, child's identity, and anthropometry, child immunization, and nutrition.

Statistical analysis
Data consistency and completeness were ensured and data analyzed by means of statistical package SPSS version 21. Descriptive statistics were represented by tables and frequencies while Chi square test was used for associations at 0.05 level of significance.

Ethical Issues
Ethical approval was obtained from the ethical committee of Benue State University Teaching Hospital Makurdi, Benue State, North Central Nigeria. Verbal consent from the respondents was also obtained.

Results

Table 1: Socio-demographic Characteristics of Respondents (n=223)

Characteristics	Frequency	Percent
Age group (years)	12	5.4
15-20	26	11.7
21-25	91	40.8
26-30	25	11.2
31-35	35	15.7
36-40	10	4.5
41-45	12	5.4
46-50	12	4.4
Above 50		
Sex	32	14.3
Male	191	85.7
Female		
Marital Status	192	86.1
Married	16	7.2
Single	7	3.1
Widowed	8	3.6
Separated		
Ethnic groups	166	74.4
Tiv	14	6.3
Idoma	20	9.0
Igede	15	6.7
Igbo	8	3.6
Others		
Religion	223	100.0
Christianity		
Educational Status	44	19.7
No formal Education	16	7.2
Primary	102	45.7
Secondary	61	27.4
Tertiary		
Occupation	144	64.6
Trader/Business	24	10.8
Artisan	16	7.2
Farming	31	13.9
Civil servant		
Estimated Income per year (Naira)		
Less than 20,000	137	61.4
20,001-40,000	62	27.8
40,000-60,000	12	5.4
60,000 and above	12	5.4
	223	100.0

Tables 1 showed that majority of the respondents (40.8%) were within the age group of 26-30years. This was followed by those within the age group of 36-40years (15.7%), and above 50years (4.4%). One hundred and ninety two (86.1%) of the respondents were married while 7.2%, 3.1% and 3.6% of the respondents were single, widowed and separated respectively. Tivs were the majority (74.4%), followed by the Idomas 6.3%, while other tribes constituted 19.3%. In terms of educational status, 102(45.7%) of the respondents had secondary education, 27.4% from tertiary institutions while 19.7% primary education and 7.2% had no formal education. Also, 64.4% of the respondents were traders/business people, 10.8% were artisans, and 7.2% were farmers while 13.9% were civil servants. Respondents who earned less than 20,000 naira per annum represented 61.4% while those who earned 60,000 naira and above constituted 5.4%.

Table 2: Influence of Socio-economic factors on the Nutritional Status of under Five Children

Variable	Weight			Height			MUAC		
Education	Below normal n(%)	Normal n(%)	Above Normal n(%)	Below Normal n(%)	Normal n(%)	Above Normal n(%)	Below Normal n(%)	Normal n(%)	Above Normal n(%)
No formal Education	16(36.4)	27(61.4)	1(2.3)	31(70.5)	7(15.9)	6(13.6)	0(0.0)	40(90.9)	4(9.1)
Primary	1(6.3)	15(93.8)	0(0.0)	10(62.5)	6(37.5)	0(0.0)	2(12.5)	14(87.5)	0(0.0)
Secondary	26(25.5)	63(61.8)	13(12.7)	57(55.9)	33(32.4)	12(11.8)	1(1.0)	89(87.3)	12(11.8)
Tertiary	12(19.7)	47(77.0)	2(3.3)	22(36.1)	27(44.3)	12(19.7)	1(1.6)	52(85.2)	8(13.1)
	χ^2=16.76	P=0.01		χ^2=16.61	P=0.01		χ^2=13.74	P=0.03	
Income (naira)									
<20,000	19(13.9)	104(75.9)	14(10.2)	73(53.3)	52(38.0)	12(8.8)	2(1.5)	124(90.5)	11(8.0)
20,001-40,000	26(41.9)	34(54.8)	2(3.2)	39(62.9)	16(25.8)	7(11.3)	2(3.2)	51(82.3)	9(14.5)
40,001-60,000	4(33.3)	8(66.7)	0(0.0)	8(66.7)	1(8.3)	3(25.0)	0(0.0)	12(100.0)	0(0.0)
60,000 and above	6(50.0)	6(50.0)	0(0.0)	0(0.0)	4(33.3)	8(66.7)	0(0.0)	12(100.0)	0(0.0)
	χ^2=25.70	P=0.00		χ^2=40.92	P=0.00		χ^2=11.11	P=0.08	
Total	**55(24.7)**	**152(68.2)**	**16(7.2)**	**120(53.8)**	**73(32.7)**	**30(13.5)**	**4(1.8)**	**195(87.4)**	**24(10.8)**

Table 2 showed the prevalence of malnutrition of the under five children based on some socio-demographic characteristics. Children with caregivers without education had prevalence of underweight of 36.4% while those with primary education had 62.5%. In the secondary school level category prevalence of malnutrition involving weight and height ranged from 12.5%-25.5% and 11.8%-55.9% respectively. Amongst children with caregivers attaining tertiary education the prevalence of underweight was 19.7% and that of height was between 19.7% and 36.1%. There was a statistically significant relationship between the parent's level of education and the nutritional status of their height, weight and MUAC (p=0.01, 0.01 and 0.03) respectively.

On the level of income of respondents and the nutritional status of their children the average prevalence in respect of weight was 12.1% and height 31.1% in those earning 20,000 naira per annum. The result also showed that the average prevalence of malnutrition in those earning above 20,000 naira were for weight 41.9% and height 62.9%. Anthropometric measurements in weight, height and MUAC in children with parents earning above 40,000 naira showed underweight 33.3% and height below normal 66.7%. The results also showed a significant relationship between income with height (p= 0.00) and weight (p=0.00). There was however no significant association between income and MUAC (p=0.08).

Table 3: Influence of Immunization on the nutritional Status of under Five Children

	Weight			Height			MUAC		
Immunization	Below normal n(%)	Normal n(%)	Above Normal n(%)	Below Normal n(%	Normal n(%)	Above Normal n(%)	Below Normal n(%)	Normal n(%)	Above Normal n(%)
Appropriately immunized for age	15(6.7)	199(89.4)	9(3.9)	13(5.8)	205(92.2)	5(2.8)	1(2.0)	47(95.9)	1(2.0)
Not appropriately immunized for age	46(29.9)	99(64.3)	9(5.8)	82(53.2)	55(35.7)	17(11.0)	72(36.9)	111(49.8)	30(13.3)
Not Immunized	116(52.3)	84(37.9)	9(9.8)	100(45.0)	66(30.0)	57(25.0)	72(32.4)	96(42.9)	55(24.7)
	χ^2=10.29	**P=0.03**		χ^2=4.99	**P=0.28**		χ^2=6.38	**P=0.17**	
Total	**55(24.7)**	**152(68.2)**	**16(7.2)**	**120(53.8)**	**73(32.7)**	**30(13.5)**	**4(1.8)**	**195(87.4)**	**24(10.8)**

Table 3 showed prevalence of malnutrition in relation to child's immunization status. Children that were appropriately immunized had a prevalence involving weight as 6.7% under weight and 3.9% above the normal while that of height ranged from 2.8% to 5.7%. In the case of those not properly immunized, prevalence of malnutrition in respect of weight was between 5.8% and 29.9% while height was between 11.0% and 53.2%. For those not immunized at all, weight was between 52.3% for underweight and 45.0% above normal. For height it was 45.0% below normal height and 25.0% above normal. There was statistically significant association between immunization status of under five children and nutrition for weight (p=0.03), however there was no statistical significant relationship between immunization status and anthropometric measures of height and MUAC (p=0.28 and 0.17 respectively).

Table 4: Prevalence of Malnutrition in relation to infant Feeding Practices

Feeding	Weight			Height			MUAC		
	Below normal n(%)	Normal n(%)	Above Normal n(%)	Below Normal n(%)	Normal n(%)	Above Normal n(%)	Below Normal n(%)	Normal n(%)	Above Normal n(%)
Exclusively Breastfed	30(13.6)	179(80.1)	14(6.3)	16(7.3)	198(88.7)	9(4.0)	1(0.9)	97(91.5)	8(7.5)
Not exclusively breastfed	55(24.7.0)	134(60)	34(15.0)	55(25.0)	159(71.3)	9(3.7)	23(10.4)	167(75.0)	32(14.6)
Not Breastfed	41(18.7)	151(68.1)	31(13.1)	39(17.7)	134(60.1)	50(22.2)	54(23.5)	139(62.5)	30(14.0)
	χ^2=6.64	P=0.01		χ^2=5.41	P=0.02		χ^2=31.26	P=0.001	
Total	**55(24.7)**	**152(68.2)**	**16(7.2)**	**120(53.8)**	**73(32.7)**	**30(13.5)**	**4(1.8)**	**195(87.4)**	**24(10.8)**

Table 4 showed prevalence of malnutrition in relation to infant feeding practices. Children that were exclusively breast fed had a prevalence of malnutrition for underweight as 13.6% and that of height was 7.3% while that of not exclusively breast were 24.7% and 25.0% for weight and height respectively. There was a significant statistical association between infant feeding practices and their nutritional status using anthropometric measures of weight, height and MUAC (p= 0.00, 0.02 and 0.001 respectively).

Discussion

This study examined a number of socio-demographic characteristics as they relate to malnutrition in a semi-urban area of Benue State.

Socio-demographic characteristics of respondents showed that majority of the respondents were within the age group of 26-30years while the age group of 50 years and above had the least number of respondents. The age group of 26-30years had younger children than any group in this study. This agreed with some studies done in Zambia, Nigeria and Ghana .[11, 19, 20] The above studies also showed that most of the respondents were married in this age group. There is a general believe in the society that married women are the only ones supposed to have children.[19,]

This study showed that children of parents with no formal education and low income recorded the highest prevalence of malnutrition in terms of underweight and stunting. This agreed with some studies done in Turkey and India where it was found that low economic status was a significant risk factor of malnutrition.[26, 27] It was also shown that the severity and distribution of malnutrition depended on the political and economic situation, the level of education and sanitation, production and quality of health services and so in general monthly income of family is in close correlation with prevalence of malnutrition.[26, 27] Furthermore the study indicated that there was a twofold increase in under nutrition among children with low standard households than among those with high standards.[3] Other studies done in Ghana compared favorably with this work which indicated that high prevalence of malnutrition in relation to educational qualification could be also be attributed to

low knowledge base of parents without a formal education.[6,20]

The findings that immunization influenced the nutritional status of under five children agreed with a study done in Tanzania which showed that appropriate immunization for age decreased childhood illnesses which had an effect on a child's nutrition.[23] The study further indicated that child immunization did not completely determine the extent of child nutritional status rather it is the appropriateness of immunization with respect to the age of a child that determined the nutritional status of the child.[20,21] This work is also similar to other works done in under five children in Papua New Guinea were the prevalence of malnutrition was more in children with incomplete immunization compared with children with complete and appropriate for age.[4,7]

The findings in this study were infant feeding practices played a major role in determining the prevalence of malnutrition in under- five children compared favorably with a study done in Allahabad in India were it was observed that a significant proportions of underweight and stunted children were observed during infancy, which were attributed to sub optimal breast feeding practices.[28]. This showed that breastfeeding determined a child's nutritional status to a significant proportion.[8,12] Height of children who were not breastfed was below average and stunting occurred more in them. Despite correlations in stunting and underweight with factors of immunization and breastfeeding, MUAC was relatively unaffected since majority of the children in the study had normal middle upper arm circumference.[8,12] Malnutrition in relation to breastfeeding had been reported by National Demographic Survey (NDHS) which stated that baby friendly hospital Initiative (BFHI) promoted health of babies to a great extent by ensuring that the protective antibodies in colostrums were available for the infant babies.[24]

This study showed that there was a statistically significant relationship between weight, height and MUAC and the age of children (p=0.00, 0.002, 0.001 respectively) with respect to their nutritional status. It had been shown that different ages in children tended to have different weight, height and MUAC. Growth rate varies according to the ages of children and poor nutrition could affect the factor irrespective of the child's age[5,6]. Furthermore educational level and income of parents have a significant effect on the nutritional status of their children with respect to weight and height (p= 0.00 and 0.0 respectively). This indicated that that the more educated a parent and the higher his/her level of income the better the nutrition of the child.[5,6] This is similar to a study that was done in Ethiopia[25]. This study also showed that there was a significant relationship between the immunization status of a child and their weight. This is due to the fact that a good number of the children were not appropriately immunized for age. They were easily affected with common childhood illnesses that affect their nutrition and by extension their health. These findings were similar to some studies done in Northwest Ethiopia.[25]

Conclusion

Nutritional assessment is an effective way of detecting nutritional abnormalities in a community. It also enables governments to plan nutritional programmes in a particular community and evaluation. The study brought out the need for effective health services, regular home visits, and supplementary feeding programmes for school children and an effective health

education campaign on the importance of immunization for rural people.

Interest: The authors have no interest to declare

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