NUTRITIONAL SURVEY OF CHILDREN AGED 0-59 MONTHS ATTENDING OUTPATIENT THERAPEUTIC PROGRAMME CENTERS OF KATSINA STATE, NIGERIA

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Abstract

Malnutrition is a major public health problem, especially in infants and children, with the United Nations Children's Emergency Fund's (UNICEF) report estimating that nearly half of all deaths in children under five are attributable to undernutrition. In this study, the nutritional assessment of children attending Outpatient Therapeutic Programme (OTP) centers of Katsina State was carried out from January 2021 to December 2022. Anthropometric measurements of height, weight, and mid-upper arm circumference were taken using standard anthropometric methods. Weight-for- Age (WA), Height-for-Age (HA), Weight-for-Height (WH), Body Mass Index for Age (BMI), and Mid Upper Arm Circumference for Age (MUAC) Z-scores were calculated using the WHO Anthro v3.2.2 software. Growth indicators and cut-off values were compared to the median of the WHO child growth Standards. The mean age, height/length, body weight, and mid-upper arm circumference were 18.0 ± 6.7 months, 69.63 ± 3.20 cm, 6.14 ± 1.19 kg, and 104 ± 8.9 mm respectively. The result of the survey revealed a prevalence of being underweight of 91.8%, stunting of 43.9%, and wasting of 40.4%. Moreover, severe acute malnutrition is indicated by 40.4% Weight-for-length/height, 34.2% BMI-for-age, and 90.3% mid-upper arm circumference for age. The findings of this study showed a high rate of undernutrition in the study population with underweight and low MUAC for age being the most prevalent form of malnutrition. The finding implies urgent nutritional interventions such as a community approach, the use of ready-to-use therapeutic foods, and integrated management of severe acute malnutrition in the study area.

Keywords: Malnutrition, Anthropometry, Growth standards, WHO

Introduction

The UNICEF/WHO/WB Global Child Malnutrition 2020 estimate states that 149.2 million children under the age of five are stunted, 45.4 million are wasted and 38.9 million are overweight (UNICEF/WHO/WB, 2021). According to the National Nutrition and Health Survey (NNHS, 2018), 32.0% of children aged 0-59 months in Nigeria were stunted, while 19.9% of these children were underweight. Nigeria is one of the African countries listed among the 20 countries that account for 80% of global malnutrition (Ajibuah *et al.,* 2018).

Assessing a child's nutritional status is important for early detection of malnutrition to assess long-term recovery, prognosis, treatment response, the effectiveness of prevention programs, and, finally to identify and extrapolate it at both ends of the malnutrition spectrum, namely under-nutrition and obesity (Phadke *et al.*, 2020). Although different methods are used to detect malnutrition, such as biochemical and clinical diagnosis and measurements based on dietary intake, anthropometry is the most universally applicable used, cheap, and non-invasive tool to assess nutritional status, and it presents quite satisfactory results (Ferreira, 2020).

The nutritional status of children is classified based on anthropometric measures (WHO, 2017). Anthropometric data on infants and children reflect general health status and nutritional adequacy and can therefore be used to monitor their growth and development over time (Ekechukwu *et al.,* 2022). Commonly used anthropometric indices or measurements for nutrition surveillance include weight-for-height/length (WFH/L), weight-for-age (WFA), height/length-for-age (L/HFA), Mid-Upper Arm Circumference (MUAC), and Oedema (Frison *et al.,* 2016). Measurement of these indices are expressed as standard deviations (SD or Z-scores), and based on the application of cut-off points, values below or above the WHO cut-off values for the child growth Standards are used to estimate the nutritional status. Table 1 presents the World Health Organization's (WHO) classification of the nutritional status of infants and children under five (WHO, 2006).

Knowledge of the nutritional status of an individual or target population is essential for understanding the effectiveness of nutritional care or intervention measures through dietary care and nutrition policies put in place, (Ferreira, 2020). Therefore, this work was carried out to assess the nutritional status of children aged 0-59 months attending outpatient therapeutic program centers in Katsina State, Nigeria. Results obtained will provide baseline data on the nutritional status and possibly a clue into the effectiveness of the therapeutic programs carried out in those centers.

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Table 1: World Health Organization (WHO) classification of the nutritional status of infants and children

Nutritional status	Indicator	Cut-off value compared to the median of the WHO child growth Standards
Obese	Weight-for-length/height or BMI-for-age	WFL/H or BMI for age > 3 SD of the median
Overweight	Weight-for-length/height or BMI-for-age	WFL/H or BMI for age >2 SD and ≤3 SD of the median
Moderately underweight	Weight-for-age	WFA <–2 SD and ≥–3 SD of the median
Severely underweight	Weight-for-age	WFA <–3 SD of the median
Moderate acute malnutrition	Weight-for-length/height or BMI-for-age or mid-upper arm circumference	WFL/H or BMI for age ≤–2 SD and ≥–3 SD of the median or MUAC ≥115 mm and <125 mm
Severe acute malnutrition	Weight-for-length/height or BMI-for-age or mid-upper arm circumference or bilateral pitting oedema	WFL/H or BMI for age <– 3 SD of the median or MUAC <115 mm
Moderately stunted (moderate chronic malnutrition)	Length/height-for-age	L/HFA ≤–2 SD and ≥–3 SD of the median
Severely stunted (severe chronic malnutrition)	Length/height-for-age	L/HFA <–3 SD of the median
Moderately wasted	Weight-for-length/height	WFL/H ≤–2 SD and ≥–3 SD of the median
Severely wasted	Weight-for-length/height	WFL/H <–3 SD of the median

WHO child growth standards, 2006

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Materials and Methods

Study population
The study population consisted of 386 children aged 0-59 months with severe acute malnutrition admitted at four (4) Outpatient Therapeutic Programme (OTPs) centers within Katsina State.

Ethical clearance
Ethical clearance was obtained from the Katsina State Ethical Committee of the State Ministry of Health.

Anthropometric measurements
Anthropometric measurements of height, weight, and mid-upper arm circumference were taken using standard anthropometric methods. Height was measured to the nearest 0.1 centimeters (cm) using a mounted measuring board, similarly, the weight was measured to the nearest 0.1 kilograms (kg) with participants lightly dressed using a portable digital scale (WHO, 2006). To minimize error, all measurements were done twice and the mean value was used for the analysis.

Evaluation of nutritional status
Nutritional status was assessed by anthropometric indices of Weight-for- Age (WA), Height-for-Age (HA), Weight-for-Height (WH), Body Mass Index for Age (BMI) and Mid Upper Arm Circumference for Age (MUAC). The measurements obtained were entered into the WHO anthropometric software version 3.2.2 and Z-scores (SD) were calculated. Growth indicators and cut-off values were compared to the WHO child growth standards median. The cut-off point of -2 Z-score was used to classify the nutritional status of the children. Weight-for-length/height or BMI-for-age of <-3 SD of the median or mid-upper arm circumference <115 mm indicates severe acute malnutrition (WHO, 2006).

Results and Discussion

Anthropometric characteristics
The mean age, height/length, and body weight of the children attending the OTP centers in Katsina State were 18.0±6.7 months, 69.63 ±3.20 cm, and 6.14±1.19 kg, respectively (Table 4.1). Moreover, table 2 presents the mean and standard deviation of the weight for age, length for age, weight for length, BMI for age, and MUAC for age of the children.

Table 2: Mean anthropometric characteristics of children aged 0-5 years in Katsina State, Nigeria

Anthropometric Indices	Mean Value
Age	18.0±6.7 months
Length	69.63±3.20 cm
Weight	6.14±1.19 kg
Mid-upper arm circumference	104±8.9 mm
Weight-for-age	-4.27±0.99
Length-for-age	-2.63±1.78
Weight-for-length	-1.80±2.51
BMI-for-age	-1.56±2.35
Mid-upper arm circumference-for-age	-3.92 ±0.64

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Nutritional status

Comparison of the weight-for-age Z-scores of the children with the WHO reference growth standards showed that 91.8% had Weight-for-age scores of < -3SD indicating severely underweight while 97% were moderately underweight with <–2 SD and ≥–3 SD of the median (table 2.0). The prevalence of stunting (table 3.0) showed 43.9% were severely stunted (< -3SD) and 67.2% were moderately stunted (≤–2 SD and ≥–3 SD). While table 4.0 presents the prevalence of wasting, 40.4% of the children were severely wasted having weight for length scores of <–3 SD of the median while only 16.9% had normal weight for length scores (+1SD). The finding of this study reflects a high prevalence of malnutrition among the children in the study area and this appears to be a matter of public health concern. In this study, being underweight was the most prevalent (91.8%) nutritional problem identified. The higher prevalence of underweight observed in this study as compared to other indicators of undernutrition may be explained by the fact that it reflects both past (chronic) and present (acute) undernutrition among children. This is in agreement with the findings of Goon et al, (2011) in Makurdi where they found underweight among the children studied to be the most prevalent (52.7%) among other indicators. However, the prevalence of underweight in this study is much higher than 39.2% among 1-4-year-old children in an urban slum in the Mushin Local Government Area of Lagos State (Abidoye and Ihebuzor, 2001) and 17.9% underweight among under-5 preschool children Benue state Nigeria (Kpurkpur, 2017).

Wasting, defined as low weight-for-height, is an indicator of severe acute malnutrition. In this study, 40.4 percent of the children were severely wasted. It is the most visible and deadly form of malnutrition. Globally, at least 13.6 million children under the age of 5 suffer from severe wasting, which is responsible for 1 in 5 deaths among children under age 5, making it one of the top threats to child survival. A severely wasted child is up to 11 times more likely than a healthy child to die of common childhood illnesses such as pneumonia, the single largest infectious cause of death in children worldwide (UNICEF, 2021).

The prevalence of stunting (43.9%) reported in this study is higher than the National estimate of 32.0%, however, it is consistent with the report of Seer-Uke, (2021), where 44% of children were stunted among under-five children in Benue State, Nigeria. Nigeria has the second highest burden of stunted children in the world, with a national prevalence rate of 32 percent of children under five (UNICEF, 2021). Stunting, which is an indicator of chronic malnutrition, implies a long-term nutritional problem among children

Table 2.0: Prevalence of Underweight (Weight-for-age)

Age group	N	% < -3SD	% < -2SD	Mean	SD
(0-6)	8	87.5	100	-4.69	1.21
(7-12)	113	79.6	91.2	-3.83	1.18
(13-18)	66	97	100	-4.38	0.77
(19-24)	156	97.4	99.4	-4.41	0.81
(25-36)	24	100	100	-4.98	0.62
Total	**368**	**91.8**	**97**	**-4.27**	**0.99**

NOTE: %<-2SD includes %<-3SD

%> +2SD includes %> +3SD

%> +1SD includes %> +2SD and %> +3SD

Table 3.0: Prevalence of stunting (Length/height-for-age)

Age group	N	% < -3SD	% < -2SD	Mean	SD
(0-6)	8	100	100	-3.09	0
(7-12)	113	55.2	74.6	-3.15	1.92
(13-18)	66	56.7	78.3	-3.23	1.54
(19-24)	156	37.3	64.1	-2.37	1.63
(25-36)	24	21.7	39.1	-1.3	1.94
Total	**368**	**43.9**	**67.2**	**-2.63**	**1.78**

Table 4.0: Prevalence of wasting (Weight-for-length/height)

Age group	N	% < -3SD	% < -2SD	% < +1SD	% < +2SD	% < +3SD	Mean	SD
(0-6)	8	0	0	60	30	30	1.54	1.34
(7-12)	113	14.8	20.5	35.2	22.7	11.4	0	2.41
(13-18)	66	47.1	58.8	7.8	2	0	-2.46	1.93
(19-24)	156	60.8	81.4	2.1	1	1	-3.25	1.55
(25-36)	24	77.8	88.9	0	0	0	-3.69	1.18
Total	**368**	**40.4**	**52.9**	**16.9**	**9.8**	**5.5**	**-1.8**	**2.51**

The prevalence of severe acute malnutrition as indicated by BMI-for-age was 34.2%, with moderate acute malnutrition of 45.2% while 15.8% were normal with SD values < +1SD (Table 5.0). The prevalence of MUAC-based severe acute malnutrition was 90.3%, with a moderate acute malnutrition rate of 99.7% as presented in table 6.0.

About 90.3% of the children in this study were classified as being severely acutely malnourished using the MUAC for age index. According to the WHO standards, a mid-upper arm circumference of <115 mm and MUAC for age Z-score of < -3SD implies severe acute malnutrition (WHO, 2006).
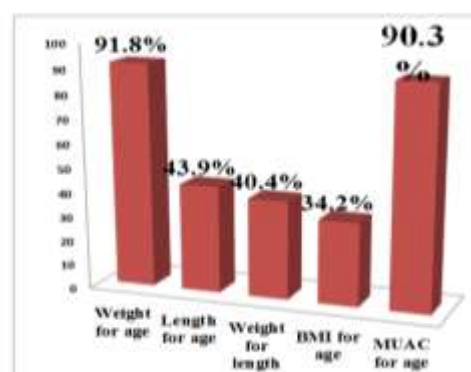
Table 5.0: Prevalence of Severe acute malnutrition as indicated by BMI-for-age

Age group	N	% < -3SD	% < -2SD	% < +1SD	% < +2SD	% < +3SD	Mean	SD
(0-6)	8	5.6	16.7	38.9	27.8	11.1	0.34	2.18
(7-12)	113	10.3	19.6	29.9	17.5	5.2	-0.25	2.08
(13-18)	66	48.2	53.6	7.1	3.6	3.6	-2.15	2.2
(19-24)	156	53.8	69.9	3.2	2.2	1.1	-2.81	1.82
(25-36)	24	62.5	75	0	0	0	-3.14	1.55
Total	**368**	**34.2**	**45.2**	**15.8**	**9.6**	**3.7**	**-1.56**	**2.35**

Table 6.0: Prevalence of Severe acute malnutrition as indicated by Mid-upper arm circumference-for-age

Age groups	N	% < -3SD	% < -2SD	% > +1SD	% > +2SD	% > +3SD	Mean	SD
(0-5)	3	66.7	100	0	0	0	-3.31	0.47
(6-11)	99	83.8	99	0	0	0	-3.68	0.69
(12-23)	189	93.1	100	0	0	0	-4.03	0.58
(24-36)	18	100	100	0	0	0	-4.23	0.47
Total	**309**	**90.3**	**99.7**	**0**	**0**	**0**	**-3.92**	**0.64**

Figure 1 presents the summary of the anthropometric indices and the nutritional status of children aged 0-59 months in Katsina State, Nigeria. About 91.8% had low weight-for-age scores (underweight), 43.9% low height-for-age (stunted) and 40.4% had low weight-for-height scores (wasted). Moreover, 34.2% had low BMI for age scores and 90.3% had low MUAC for age scores.

Figure 1: Nutritional status of children aged 0-59 months in Katsina State, Nigeria

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Conclusion

The present study has demonstrated a high prevalence of malnutrition in children attending OTP centers in Katsina State Nigeria, with underweight and MUAC (an indicator of severe acute malnutrition) being the most recognized form of malnutrition. Therefore, there is a need for urgent nutritional interventions such as a community approach, the use of ready-to-use therapeutic foods, and integrated management of severe acute malnutrition in the study area.

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