NIGERIAN JOURNAL OF PAEDIATRICS

VOLUME 53 | NUMBER 3 | JULY - SEPTEMBER 2026

https://www.njpaediatrics.com

PRINT: ISSN 0302-4660

ONLINE: ISSN 2814-2985

SPECIAL ARTICLE

Transforming Nigeria's Health System to Address Contextual Challenges in Child Healthcare Training and Practice
Esangbedo Dorothy O

REVIEWS

A Narrative Review on the Diagnostic Features in Sickle Cell Nephropathy with a Focus on Urine Protein-Creatinine Ratio
Akinsete Adeseye M, Fakile Ugonna O, Ezeaka Nonye, West Timipah, Mbanefo Ngozi, Saleh Ahmed F, Ojika Blessing, Alakaloko Adebimpe, Damola-Okesiji Adebola, Temiye Edamisan

A Systematic Review of Superficial Fungal Infections in Nigerian Children and a Case for Inclusion in Neglected Tropical Diseases
Makarfi Hauwa'u U, Mohammed Tahir T

ORIGINAL ARTICLE

A Comparative Study of Socio-demographic Characteristics and Risk Factors of Epilepsy Between Children with and without Co-existing Cerebral Palsy in Sokoto, Northwest Nigeria
Mikailu Abubakar J, Ahmed Hamidu, Ahmad Murtala M, Jiya Fatima B, Yusuf Abduganiyyu, Waziri Usman, Ahmed Hadiza K, Ishaq Fatima A, Ibrahim Suleiman M, Surajo Ibrahim

Awareness, Knowledge and Attitude of Medical Students to Room Air Use in Neonatal Resuscitation at the Igbinedion University, Okada, Nigeria
Ibhanesebhor Samuel E, Umeh Evan I

Enhancing Immunisation Communication: Perspectives from Doctors and Vaccinators in Kano, Nigeria
Farouk Zubaida L, Ibrahim Hafsat U, Kabir Halima, Ali Aminu, Garba Maria A, Tabansi Petronila, Tagbo Beckie, Ogunrinde Olufemi G

Apolipoprotein B-100/Apolipoprotein A-I Ratio in overweight adolescents with or without metabolic syndrome
Barretto Neto Augusto C, Silva Vivianne SD, Lima Vera L, Alcides da Silva D

Comparative Assessment of the Nutritional Status of Institutionalised and Non-Institutionalised Nigerian Children Using Anthropometric Parameters
Oji-Onuoha Stella N, Ughasoro Maduka D, Izuka Mildred O, Chukwudi Ndubuisi K, Oji Onuoha, Jibrin Alkasim M

Caregivers' Voices: Experiences and Satisfaction with Paediatric Care in a Nigerian Tertiary Hospital
Mustapha Samaha S, Musa Aishatu Z, Musa Sulaiman A, Lawal Nurat O, Avong Olusola, Shuaibu Kaltimi

Association Between Sleep Quality and Overweight/Obesity Among Secondary School Adolescents in Yenagoa Local Government Area, Bayelsa State, Nigeria
Onyeka Chiemerie A, Okosun Ofure A, Akinbami Felix O

The Use of Middle Finger Length as a Predictor of Standing Height Among Adolescents in Yenagoa, Bayelsa State, Nigeria
Okumoko Maureen A, Binafeigha Ihekerenma J, Akinbami Felix O

Point of Admission Hypothermia and Its Correlates Among Hospitalized Neonates at the Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria
Abdulgafar Habeebllahi A, Adeyemo Ibrahim O, Adamu Asman, Onankpa Ben, Yusuf Tahir, Akpelu Echieme, Atusu Yasmine, Isezuo Khadijat

Social Determinants of Health Among Children and Adolescents with Sickle Cell Disease Attending Two Tertiary Hospitals in Southwest Nigeria
Olasinde Yetunde T, Adetoye Mayowa M, Olasinde Adeola, Afolayan Odunayo O, Agelebe Efeturi, Onigbinde Michael O, Adeola Samuel A, Adeagbo Victor O, Tijani Oluwadamilola E, Idowu Ajibola

Child Adoption Practices: Emerging Child Welfare Concerns in a Nigerian Community
Odita Amalachukwu O, Mbachu Chioma NP, Ezeasomba Fortress I, Anieto Ezinne C

Paediatric and Adolescent Breast Ultrasound in Ibadan, Nigeria: Imaging Findings and Correlation of BI-RADS with Histopathology
Adeniji-Sofoluwe Adenike T, Onyema Adaora, Oni Oluwatomi Y, Obajimi Millicent O

Association of Neck Circumference with Pulse Pressure Among School-aged Children in Ibadan, Nigeria: A Cross-Sectional Study
Orimadegun Adebola E, Okhuaihesuyi Osaruese

CASE REPORT

Severe Hypertriglyceridaemia with Acute Kidney Injury in Paediatric Diabetic Ketoacidosis: A Case Report
Ahmad Raji M, Nwalorzie Chinomso, Ononiwu Uche, Oguzie Chioma

Neonatal Diabetic Ketoacidosis Masquerading as Sepsis in a Nigerian Infant: A Case Report
Solomon Amos, Omachi Adah P, Eze Edith C, Abdullahi Usman, Mammud Abubakar, Abubakar Usman

Experience With Intra-Lesional MMR Vaccine in the Treatment of Anogenital Warts in Children: A Report of Three Cases
Lamina Amotunur B, Odusote Olatunde A, Ubuane Peter O

EDUCATIONAL SERIES

CLINICAL QUIZ
Senbanjo Idowu O.

OFFICIAL JOURNAL OF THE PAEDIATRIC ASSOCIATION OF NIGERIA

CC-BY 4.0

ORIGINAL RESEARCH



Nigerian Journal of Paediatrics 2026 (September); Volume 53(3):373-384.
https://dx.doi.org/10.63270/njp.v53i3.2000077.

Comparative Assessment of the Nutritional Status of Institutionalised and Non-Institutionalised Nigerian Children Using Anthropometric Parameters

Oji-Onuoha Stella N[1], Ughasoro Maduka D[2], Izuka Mildred O[1], Chukwudi Ndubuisi K[1], Oji Onuoha[3], Jibrin Alkasim M[4]

[1]Department of Paediatrics, Federal Medical Centre, Umuahia, Abia State, Nigeria.
[2]Department of Paediatrics, University of Nigeria, Ituku-Ozalla Campus, Enugu State, Nigeria.
[3]Department of Otorhinolaryngology, Federal Medical Centre, Umuahia
[4]School of Public Health, Texila American University, Guyana.

Correspondence
Dr Oji-Onuoha Stella Ngozi, Department of Paediatrics, Federal Medical Centre, Umuahia, Abia State, Nigeria. E-mail: drojionuohastella@gmail.com ; ORCID – https://orcid.org/0009-0009-8224-6314.

Abstract

Background: Malnutrition impacts millions of children around the world, and institutionalisation appears to make children more susceptible to malnutrition when compared to their non-institutionalised counterparts.

Objective: To compare the use of anthropometric indices in the assessment of the nutritional status of institutionalised and non-institutionalised Nigerian children.

Methods: It was a school-based, cross-sectional comparative study conducted at 48 selected day schools and four residential care institutions (orphanages and special schools), all in Umuahia, Nigeria. Socio-demographic data of the subjects were collected with an interviewer-administered questionnaire. Weight and height measurements were computed using the WHO Anthro/AnthroPlus software.

Results: The prevalence of malnutrition was higher in institutionalised children, with stunting, wasting and underweight occurring in 37.5%, 24.3% and 12.5%, respectively and 17.1%, 13.8% and 7.2%, respectively, for non-institutionalised children. The differences in the rates of stunting, wasting, and underweight between the two study groups were statistically significant ($p < 0.001$, $p = 0.01$, and 0.03, respectively). A greater number of institutionalised children (62.7%) were acutely ill two weeks before the study than the non-institutionalised children (39.3%). Children in public-owned institutions were more malnourished than those in private institutions ($p = 0.009$).

Conclusion: The prevalence of malnutrition in institutionalised children was higher than that of their non-institutionalised peers. Periodic nutritional assessment of children in institutional care is essential for accurate planning and implementation of targeted intervention programmes to reduce morbidity and mortality associated with malnutrition.

Keywords: Institutionalised care, Malnutrition, Orphanage, Stunting, Wasting.

Introduction

Nutrition is crucial in the overall health and development of every child. It is the entire process of intake, absorption, and utilisation of food substances by the human body. [1,2] The influence this has on an individual can be described as nutritional status [3,4,] and its assessment can be based on anthropometric, biochemical, clinical, or dietary characteristics.[5,6]

Any deviation from the expected normal is best referred to as malnutrition, which affects millions of children globally and is responsible for about 20% of child deaths worldwide. [1,5,6] In 2016, the World Health Organisation estimated that 155 million children were stunted, 52 million were wasted, and 41 million were overweight, with a debilitating impact on the health of children. [5,6] The most recent National Demographic and Health Survey (2018) indicated that 37% of Nigerian children were stunted, 7% were wasted, and 22% were underweight.[7] Despite a slight improvement from the 2013 survey, Nigeria still ranked among the countries with the highest rates of malnutrition, particularly among institutionalised children.[7]

Recent studies revealed that the child's place of residence, whether in an institutionalised or non-institutionalised setting, influences their nutritional status. [8 - 16] An institution for children is defined as a group living arrangement for more than ten children, without parents or surrogate parents, where care is provided by paid adult carers. [9,17] This definition encompasses children in orphanages, special schools, summer camps, boarding schools, and juvenile detention centres. [17-19] Conversely, non-institutionalised children are those living with their parents or guardians in a usual home environment. [20, 21]

Globally, there are notable variations in the prevalence of malnutrition between institutionalised and non-institutionalised children. [5, 20] An estimated 2.7 to 9 million children live in institutionalised care worldwide, with 5% to 79% being malnourished, varying across ages, sites, and countries. [5, 20] In Africa, Teferi *et al*. [22] reported a prevalence of 4.4% to 34.8% among institutionalised children in Ethiopia. In Nigeria, studies have shown that 3.3% to 28.6% of children in institutionalised care were malnourished. [5, 6, 10, 11.] However, these studies primarily focused on children under five years of age. Several studies have also assessed the nutritional status of institutionalised and non-institutionalised children. [10 - 16] However, most of these studies are not comparative and involved under-five children only. Therefore, the objective of the present study was to determine and compare the nutritional status of institutionalised and non-institutionalised Nigerian children aged 1-15 years using anthropometric indices (weight-for-age, weight-for-height, height-for-age, and BMI). The study sought to provide valuable information that supports advocacy for the implementation of age-appropriate interventional programs, especially in institutional care settings.

Methods

Study site

The study was conducted in Umuahia, the capital city of Abia State, Nigeria. It comprises two Local Government Areas (LGAs): Umuahia North and Umuahia South. According to the 2006 National Population Census, Umuahia has a population of 359,230, but is projected to be 947,000 in 2024. [23 - 25]

Study design

This was a comparative cross-sectional study conducted in schools and institutions.

Study population

The study involved institutionalised and non-institutionalised children aged 1 to 15 years living in Umuahia North and Umuahia South LGAs in Abia State.

Sample size determination

The formula for comparing two proportions was used to determine the minimum sample size of 152 participants.[26]

$$N = \frac{2(Z_{\alpha/2} + Z_{\beta})^2 P(1-P)}{(P_1-P_2)^2}$$

Using the prevalence rate of 25.6% [27] for stunting among children living in institutionalized homes and 41.6% [12] among school children in a rural community, both in southeast Nigeria, in South-

eastern Nigeria. The final calculated sample size was 137 in each arm of the study, and this was rounded off to 152 to accommodate 10% non-responses.

Inclusion criteria for institutionalised children

Apparently healthy, aged 1-15 years and living in institutional care for at least three completed months.

Inclusion criteria for non-institutionalised children

Apparently healthy children aged 1-15 years residing in individual homes, receiving home-based care and attending day schools in the same community hosting residential care facilities.

Exclusion criteria for both institutionalised and non-institutionalised children

History of medical conditions known to affect growth, such as congenital heart disease, HIV/AIDS, sickle cell disease, cleft lip/palate, and cerebral palsy; use of medications known to affect growth, such as steroids; and lower limb deformities.

Sampling method

Subjects who met the inclusion criteria were enrolled consecutively from orphanages, special schools, nursery, primary and secondary schools until the calculated sample size was achieved for each study group. Subjects were stratified into sex and age groups to ensure an evenly distributed selection in both study groups. A multistage sampling technique was used in selecting subjects enrolled in the study as described below:

Selection of institutionalised children

The institutionalised children were recruited first and then matched with their non-institutionalised counterparts using sex (males and females) and age (1-5 years, 6-10 years, 11-15 years) stratifications. The four government-accredited institutional facilities in Umuahia and the children who met the inclusion criteria were recruited consecutively until the desired number was achieved.

Selection of non-institutionalised children

First stage - Selection of wards: The twelve wards in Umuahia North and ten wards in Umuahia South were grouped into rural and urban categories and then alphabetically arranged and numbered. A total of twelve wards were randomly selected for the study: six from Umuahia North (three rural and three urban) and six from Umuahia South (all rural).

Second stage - Selection of schools: A comprehensive list of all the schools in the 12 selected wards in Umuahia North and Umuahia South was outlined alphabetically. Ten per cent (10%) of each of the public and private schools in Umuahia North and Umuahia South were selected, respectively, for this study. The ratio of public to private schools was 1:2. Therefore, schools were randomly selected using a ratio of 1:2 such that, when a public school was randomly selected, two private schools were similarly selected for both LGAs, respectively. This was done until the desired sample size of forty-eight schools was achieved.

Third stage - Selection of class: Classes were randomly selected from the different strata of pupils/students, i.e. pre-nursery, nursery, primary, junior secondary and senior secondary.

Fourth stage - Selection of pupils at the class level: Pupils were chosen from pre-nursery to senior secondary. With the aid of the class registers, the pupils were arranged in alphabetical order by their surnames. In schools where certain classes had more than one arm for the same class, the arms were pooled together before the selection of pupils. A systematic and simple random sampling technique was used. After selecting the first pupil by simple random sampling, systematic sampling using an interval

of 5 was used to select the other eligible subjects until the desired class sample size was reached.

Ethical approval

Ethical clearance was obtained from the Health Research Ethics Committee of the Federal Medical Centre, Umuahia (FMC/QEH/G.596/Vol.10/588) and the Ministry of Health, Abia State (ASMH/EC/22/011) before commencement of the study. Formal permission to recruit children in orphanages/special schools and school children was obtained from the Ministry of Women Affairs/Social Development, Abia State (MWASD/AD/23/TI/8) and the Ministry of Education, Abia State (MOE/S.402/T/9) respectively. The details of the study were explained to the parents, guardians, caregivers, teachers and proprietors of the various institutions/schools, and only those who gave their consent were enrolled for the study. An informed consent form written in English, Igbo, Yoruba and Hausa was filled and signed or thumb-printed by the consenting parents/caregivers. Assent was also obtained from children older than seven years.

Data collection

The socio-demographic characteristics of the study participants were obtained using an interviewer-based questionnaire. All anthropometric measurements were obtained by the researcher and the trained assistants using standard protocols. Each child was weighed with minimal clothing, without shoes and standing on a portable digital clinical weighing scale (SECA 881 digital scale, Germany), calibrated in 5g units with an accuracy of greater than +0.15% and a maximum weight of 150kg.[28] The height was measured using a stadiometer (SECA 213 stadiometer, Germany), with a maximum height of 205cm and an accuracy of 0.5cm.[28] The length was measured using an infantometer for children aged <2 years, with a measuring scale of up to 99cm (SECA 417 Mobile measuring board, Germany).[28] The measurements were taken twice for each subject, and the mean of the two readings was recorded. If any pair of readings exceeded the maximum allowable difference for a given variable (weight > 100 g, height/length> 0.7 cm), the variable was measured again; if necessary, the third set of readings for the affected variable was obtained.

Data analysis

The data were analysed using the Statistical Package for Social Sciences (IBM SPSS version 27). The mean and standard deviations were calculated for each anthropometric index. Weight-for-height (WHZ), height-for-age (HAZ), weight-for-age (WAZ) and BMI-for-age (BAZ) Z-scores were computed from the WHO Growth Reference using the WHO Anthro software version 3.2.2 (for children <5years) and WHO Anthroplus version 1.0.4 (for children 5-19years). [29]

With reference to WHO Multi-centre Growth Standard/reference,[29] stunting was defined as height/length-for-age < -2SD, wasting as Weight for height/length (for < 5years) or BMI for age (for $\geq$ 5years) < -2SD, underweight as weight for age < -2SD, overweight as weight for height/length > +2SD while obesity was defined as weight for height > +3SD and normal if z scores was between -2 to +1SD.[30]

Comparisons between calculated mean values of the anthropometric measurements were made between the two groups of children using the Student's t-test, while Chi-Square and Fisher's Exact tests were used to compare the prevalence of underweight, wasting, stunting, overweight, and obesity. All the statistical tests were two-tailed, with $p < 0.05$ considered significant.

Results

A total of 320 children were recruited for this study. After excluding 16 children due to unavailability (7) and incomplete data entry (9), 304 children were enrolled.

Among the 152 institutionalised study participants, 75 (49.3%) were males, and 77 (50.7%) were females. The non-institutionalised group also had an equal distribution of males and females, with 76 (50.0%) each, resulting in a male-to-female ratio of 1:1 in both study groups. The median age of institutionalised children was 8 years, which was compared with that of non-institutionalised children (9 years). There was a significant difference in the socioeconomic classes of institutionalised children compared to non-institutionalised children, as shown in Table I.

Table I: Socio-demographic characteristics of the study participants

Variables	Institutionalised n (%)	Non- institutionalized n (%)
Age group (years)		
1 to 5	47 (30.9)	49 (32.2)
6 to 10	52 (34.2)	50 (32.9)
11 to 15	53 (34.9)	53 (34.9)
Sex		
Male	75 (49.3)	76 (50.0)
Female	77 (50.7)	76 (50.0)
Tribe		
Igbo	143 (94.1)	144 (94.7)
Others (Yoruba, Hausa, Efik, Ibibio)	9 (5.9)	8 (5.3)
Social Class		
Upper	27 (17.8)	35 (23.0)
Middle	102 (67.1)	55 (36.2)
Lower	23 (15.1)	62 (40.8)
Local Government Area		
Umuahia North (Urban)	125 (82.2)	76 (50.0)
Umuahia South (Rural)	27 (17.8)	76 (50.0)
School type		
Private	60 (39.5)	100 (65.8)
Public	71 (46.7)	52 (34.2)
Mission	21 (13.8)	0 (0.0)
Class		
Not in school	5 (3.3)	0 (0.0)
Nursery	37 (24.3)	48 (31.6)
Primary	106 (69.7)	39 (25.7)
Secondary	4 (2.6)	65 (42.8)

There was a significant variation ($p = 0.03$) in the weight-for-age Z-scores between institutionalised and non-institutionalised children (Table II). There was no significant variation ($p = 1.0$) in weight-for-height Z-scores between the two groups (Table II), while there

was a significant difference (p = 0.01) in the Body-Mass-Index Z-scores of the two groups.
The reasons for institutionalising a child were as follows: special education needs and disability (visual impairment) (46.7%), special education only (21.7), poverty and orphaning (9.9%), as shown in Table III.

Table II: Comparison of the nutritional status of children in the institutionalised and non-institutionalised settings

Variables	Institutionalised	Non-institutionalized	Statistics	COR	p-value
	n (%)	n (%)		(95CI)	
Weight-for-Age Z-score criterion					
Normal	88 (88.9)	92 (92.9)	FT = 9.69	1	0.03*
Moderate Underweight	6 (6.0)	4 (4.1)		14.19	
Severe Underweight	5 (5.1)	3 (3.0)		8.51	
Weight-for-Height Z-score criterion					
Normal			FT = 0.21	-	1
Moderate Wasting	41 (87.2)	42 (85.7)			
Severe Wasting	3 (6.4)	4 (8.2)			
	3 (6.4)	3 (6.1)			
Height/length-for-Age Z-score criterion					
Normal					
Moderate Stunting	95 (62.5)	126 (82.9)	FT = 25.93	1	<0.001
Severe Stunting	42 (27.6)	24 (15.8)		1.14	
	15 (9.9)	2 (1.3)		0.86	
BMI-for-age z-score criterion					
Normal	60 (57.2)	79 (76.7)	FT = 11.93	1	
Underweight	8 (7.6)	4 (3.9)		2.73	0.01
Moderate Wasting	20 (19.0)	10 (9.7)		1.42	
Severe Wasting	11 (10.5)	4 (3.9)		1.42	
Overweight	6 (5.7)	5 (4.8)		0.39	
Obesity	0 (0.0)	1 (1.0)			

FT = Fisher's Exact Test; COR - Crude Odd Ratio; CI - Confidence Interval;
WFA for children <10yrs. WFH for children <5yrs (ICh n = 47, NICh n = 49). HFA for children 0 to 19 years. BFA for children >5yrs (ICh n = 105, NICh n = 103).

Disability had the highest association with malnutrition among other reasons for institutionalisation, as shown in Table IV. Children in public-owned institutions were more malnourished than children in non-public institutions. The variation in their height-for-age

Z-scores was statistically significant (p = 0.009), as shown in Table V.

A significant number of institutionalised children had a history of acute illness two weeks before the study, as shown in Table VI.

Table III: Reasons for institutionalisation among institutionalised children

Reasons for institutionalisation	Institutionalised
	n (%)
Special education and disability (visually impaired)	71 (46.7)
Education alone	33 (21.7)
Poverty and orphaned	15 (9.9)
Disability alone	3 (2.0)
Others (Abandonment, deprivation)	30 (19.7)

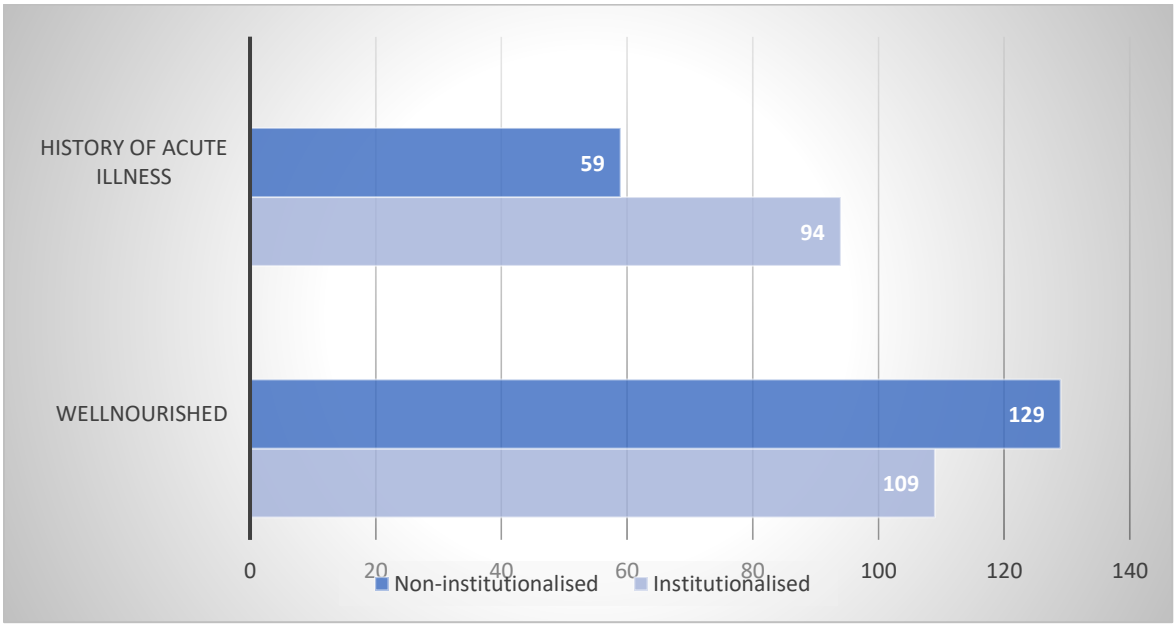


Figure 1: Nutritional status and history of acute illness among institutionalised and non-institutionalised children.

Discussion

The findings revealed that institutionalised children are more stunted, wasted and underweight when compared to non-institutionalised children. This is similar to what has been reported by several studies. [18,27,30,31] However, it varied with what Izuka *et al.* [10] reported in Lagos, where children in non-institutionalised settings were found to be more underweight. It is important to note that the study in Lagos was restricted to children under five years of age, and only one of the twenty-seven orphanages in the study is owned by the Lagos State government, while the rest were privately-owned. The study has shown that most institutionalised children were in public institutions. In addition, children in public institutions, especially under-fives, tend to be more underweight when compared to those in

private institutions, which tend to be more obese.[33,34]

Children who are underweight experience suboptimal growth, poor psychological development, compromised immune functions, and are at greater risk of long-term health complications. Inadequate nutritional intake and increased vulnerability to infections are consequences of psychosocial deprivation, a high children-to-caregiver ratio and a lack of consistent, responsive care, which limit individualised attention to nutritional needs, hence the risk of underweight. Improving their nutritional intake, environmental sanitation and caregiver-to-child ratio will positively impact their nutritional status.

Table IV: Comparison between selected reasons for institutionalisation in relation to the types of malnutrition among institutionalised children

Variables	Poverty/orphanhood n (%)	Education n (%)	Disability n (%)	Abandonment n (%)	p-value
Height-for-age					
Normal	13 (86.6)	29 (87.9)	48 (64.9)	25 (83.3)	N/A
Moderate stunting	1 (6.7)	4 (12.1)	24 (32.4)	3 (10.0)	
Severe stunting	1 (6.7)	0 (0.0)	2 (2.7)	2 (6.7)	
BMI-for-age					
Normal	14 (93.3)	26 (78.8)	49 (66.2)	22 (73.3)	N/A
Moderate wasting	1 (6.7)	4 (12.1)	17 (23.0)	1 (3.3)	
Severe wasting	0 (0.0)	2 (6.1)	8 (10.8)	2 (6.7)	
Overweight	0 (0.0)	1 (3.0)	0 (0.0)	5 (16.7)	

NA – Not applicable.

Table V: Comparison between the types of institutions in relation to the types of malnutrition among institutionalised children

Variables	Private n (%)	Public n (%)	Mission n (%)	p-value
Height-for-age				
Normal	51 (85.0)	45 (63.4)	19 (90.4)	0.009
Moderate stunting	7 (11.7)	24 (33.8)	1 (4.8)	
Severe stunting	2 (3.3)	2 (2.8)	1 (4.8)	
BMI-for-age				
Normal	46 (76.7)	46 (64.8)	19 (90.4)	N/A
Moderate wasting	5 (8.3)	17 (23.9)	1 (4.8)	
Severe wasting	3 (5.0)	8 (11.3)	1 (4.8)	
Overweight	6 (10.0)	0 (0.0)	0 (0.0)	

Wasting often indicates acute malnutrition, typically resulting from acute significant food shortage and/or disease that affects nutritional intake. In this study, the children in institutional care exhibited higher rates of wasting compared to those living outside institutions. A comparable

higher prevalence was observed in other studies across the world among institutionalised children. [13, 16, 18, 22, 27, 31] This may be because the overall impact of institutionalisation on the growth and development of children is generally negative due to their vulnerability to acute infections, which have been linked to wasting. [19,35] In the present survey, notably higher cases of acute illnesses were observed among institutionalised children two weeks before the study compared to the non-institutionalised children, which may have negatively impacted their nutritional status. Children presenting with acute illness in institutional settings frequently exhibit wasting due to limited access to health facilities, delayed healthcare-seeking when the children are ill, reduced nutritional intake due to ill-health and presence of co-morbidities, highlighting the need for timely intervention.

Table VI: History of acute illness among institutionalised and non-institutionalised participants

Variables	Institutionalized	Non-institutionalized	Statistics	p-value
	n (%)	n (%)	χ^2	
History of acute illness				
Yes	94 (61.8)	59 (39.1)	31.2	<0.001
No	58 (38.2)	93 (60.9)		
Common symptoms				
Fever	30 (31.9)	19 (32.2)		
Cough	12 (12.8)	9 (15.3)		
Catarrh	33 (35.1)	21 (35.6)		
Diarrhoea	7 (7.4)	3 (5.1)		
Vomiting	12 (12.8)	7 (11.8)		

This study also reported worse nutritional indices among children with disabilities compared to those without disabilities within the same institutionalised care. Similar findings were reported by Ukegbu *et al.* among blind adolescents in Abia State. [16] Thus, the need for greater focus on improving nutrition for children in institutions, especially those with disabilities, as reported in the present study. [3]

Stunting, an indicator of chronic malnutrition, was higher among institutionalised children. Similar findings had been documented in Owerri. [27] The prevalence of stunting (37.5%) in the index study among institutionalised children is, however, lower than the findings in Kenya (59.0%). [18] Whereas the present study excluded all children with chronic illnesses, Braitstein and coworkers in Kenya involved institutionalised subjects with diseases such as HIV and TB, which are known to affect growth and development, hence may account for the higher prevalence of stunting. Stunting is triggered by long-term deficiency of nutrient intake, and it is an indicator of prolonged malnutrition and linear growth failure. The latter consequently has a significant effect on the cognitive development and other aspects of growth in children. Stunting, which had the highest prevalence in the present study among both the institutionalised and non-institutionalised children, is known to increase the risk of death, poor cognitive function and lower productivity in adulthood. Stunting in institutionalised children is a critical indicator of systemic neglect and chronic deprivation. It reflects not only inadequate nutrition but also

poor psychosocial care, limited stimulation, and repeated illness. The effects are long-term, often irreversible, and extend well into adulthood, affecting health, productivity, and quality of life. [36] Thus, interventions by the government and NGOs towards sustained food availability and food security are necessary to ensure optimal physical growth and development.

Limitations

The study was carried out in four government-approved institutions in Umuahia, potentially limiting the generalizability of observed nutritional status to the over twenty other institutions in the state.

Conclusion

Institutionalised children demonstrated poorer nutritional status when compared to non-institutionalised children using anthropometry such as weight and height/length measurements. The comparative analysis reveals significant differences in anthropometric indices of both study groups, highlighting the influence of the institutional care environment on the growth and development of children. These findings underscore the need for routine growth monitoring for children in institutional care, targeted programs and policies to promote optimal growth in all children, regardless of their living arrangement.

Acknowledgement: The authors appreciate all the children who participated in the study.

Authors' Contributions: OOSN, UDM and IOM conceived and designed the research and did data analysis and interpretation. NKC and AMJ drafted the manuscript, while OO and AMJ revised the draft for sound intellectual content. All the authors approved the final version of the manuscript.

Conflicts of Interest: None declared.

Financial support: The authors did not receive any financial support for this research or for the preparation of the manuscript.

Accepted for publication: 18th May 2026.

References

1. Ebenebe J, Ulasi O. Nutrition and Nutritional Assessment: Essence and scope of clinical nutrition. In: Azubuike JC, Nkanginieme KEO (editors): *Paediatrics and Child Health in a Tropical Region.* 3rd ed. Lagos: Educational Printing and Publishing. 2016. p691-700.
2. World Health Organisation. Nutrition [Internet]. Geneva: WHO; Oct. 2021. Accessed July 2022. Available from: www.who.int/health-topics/nutrition#tab_2
3. Food and Agriculture Organisation of the United Nations. Nutritional status and food security. *Food Agric Organ* (2007). Available online at: https://elearning.fao.org/course/view.php?id=189. Accessed 12th October 2020.
4. World Health Organisation. Guideline: Assessing and managing children at primary health-care facilities to prevent overweight and obesity in the context of the double burden of malnutrition. Updates for the Integrated Management of Childhood Illness (IMCI). Geneva. 2017.
5. UNICEF. Malnutrition. 2021. Available at https://data.unicef.org/topic/nutrition/malnutrition/. Accessed October 2022.
6. WHO malnutrition 2020. Available from: htpps://www.who.int/news-room/fact-sheets/detail/malnutrition. Accessed June 2021.
7. National Nutrition and Health Survey (NNHS). Report on the nutrition and health situation of Nigeria. Abuja: NBS. 2018.
8. United Nations General Assembly. Guidelines for the alternative care of children. Geneva: United Nations Digital Library. 2009. Cited July 2021. Available from https://digitallibrary.un.org/record/673583?ln=en.
9. Browne E. Children in care institutions. *K4D Helpdesk Report*. Brighton, UK: Institute of Development Studies. 2017;18:1. Available from https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/13208 Accessed in January 2022.

10. Izuka MO, Olatona FA, Adeniyi OF, Onajole AT. Nutritional status of under-five children living in orphanages compared with their counterparts living with their families in host communities in Lagos State. *J Comm Med Prim Health Care* 2021;33(1):76-88. https://doi.org/10.4314/jcmphc.v33i1.7
11. Brown B, Oladokun R. Health status of children in institutionalised homes in Southwest Nigeria. *Niger Postgrad Med J* 2013;20(3):168-73.
12. Ayogu RN, Afiaenyi IC, Madukwe EU. Prevalence and predictors of undernutrition among school children in a rural South-eastern Nigerian community: A cross-sectional study. *BMC Pub Health* 2018; 18:587. https://doi.org/10.1186/s12889-018-5479-5
13. Mwaniki EW, Makokha AN, Muttunga JN. Nutrition status and associated morbidity risk factors among orphanage and non-orphanage children in selected Public primary schools within Dagoretti, Nairobi, Kenya. *East Afri Med J* 2014;91(9):289-97.
14. Kolawole SE, Agofure O, Edeta R. Nutritional status of day and boarding female adolescent secondary school students in Warri South LGA of Delta State. *J Food Nutr Sci.* 2017;5(3):131-9. https://doi.org/10.11648/j.jfns.20170503.20
15. Olugbemi TB, Uthman MMB, Ahmed A, Oladiji F, Uthman AO, Osinubi MO. Nutritional status of day and boarding students attending school for special needs in North-Central Nigeria. *Res J Health Sci* 2019;7(1):19-27. https://doi.org/10.4314/rejhs.v7i1.3
16. Ukegbu PO, Ukegbu AU. Assessment of nutritional and health status of institutionalised blind adolescent students in Umuahia, Abia State. *Sky J Med Sci* 2014;2(9):79-84.
17. Petrowski N, Cappa C, Gross P. Estimating the number of children in formal alternative care: Challenges and results. *Child Abuse Negl* 2017;70:388-98. https://doi.org/10.1016/j.chiabu.2016.11.026
18. Braitstein P, Ayaya S, Nyandiko WM, Kamanda A, Koech J, Gisore P, *et al*. Nutritional Status of Orphaned and Separated Children and Adolescents Living in Community and Institutional Environments in Uasin Gishu County, Kenya. *PLoS ONE* 2013;8(7):e70054. https://doi.org/10.1371/journal.pone.0070054
19. Gudyanga E, Moyo S, Gudyanga A, Susa R. A comparative analysis of institutionalised and non-institutionalized orphaned children with reference to their well-being. *Int J Curr Res* 2015;7(6):17546-54.
20. Landale NS, Thomas KJA, Van Hook J. The Living Arrangements of Children of Immigrants. *Future Child* 2011;21(1):43-70. https://doi.org/10.1353/foc.2011.0003
21. Dahal M, Baral K. Health-seeking behaviour on child morbidity among the minority group of people of Chandranighapur VDC, Rautahat district, Nepal. *Al Ameen J Med Sci* 2015;8(3):184-8.
22. Teferi H, Teshome T. Magnitude and associated factors of undernutrition among children aged 6–59 months in Ethiopian Orphanage Centres. *Pediatr Health Med Ther* 2021;12:141-50. https://doi.org/10.2147/PHMT.S289809
23. National Population Commission. Report of Nigeria's National Population Commission on the 2006 census. *Pop Dev Rev* 2007;33:206-10.
24. National Bureau of Statistics. Annual Abstract of Statistics, Federal Republic of Nigeria 2011:17-23.
25. United Nations – World Population Prospects 2024 on Umuahia, Nigeria Metro Area Population 1950-2024. Available from www.macrotrends.net. Retrieved 22nd December 2024.
26. Charan J, Biswas T. How to calculate sample size for different study designs in medical research? *Indian J Psychol Med* 2013;35(2):121-6. https://doi.org/10.4103/0253-7176.116232
27. Obiakor-Okeke NP, Nnadi BC. Nutritional status, care-giving and feeding practices of

infant and pre-school children (0-5 years) in motherless babies' homes in Owerri metropolis. *J Biol Agric Healthcare* 2014;4(17):190-8.

28. World Health Organisation. Training course on child growth assessment. Geneva. 2008. Accessed 12th September 2022. Available from: https://www.who.int/publications/i/item/9789241595070
29. Nsabimana E, Rutembesa E, Wilhelm P, Martin-Soelch C. Effects of Institutionalisation and Parental Living Status on Children's Self-Esteem, and Externalising and Internalising Problems in Rwanda. *Front Psychiatry* 2019;10:442. https://doi.org/10.3389/fpsyt.2019.00442
30. World Health Organisation and United Nations Children's Fund. WHO child growth standards and the identification of Severe Acute Malnutrition in infants and children. Geneva. 2018. Accessed May 2022. Available from: www.who.int/nutrition/publication/severemalnutrition/9789241598163_engpdf
31. Ali Z, Abu N, Ankamah IA, Gyinde EA, Seidu AS, Abizari AR. Nutritional status and dietary diversity of orphan and non-orphan children under five years: A comparative study in the Brong Ahafo region of Ghana. *BMC Nutr* 2018;4:32. https://doi.org/10.1186/s40795-018-0240-0
32. Subedi S, Baral K, Dahal M, Khatiwada R, Khadgi M. Nutritional status of children living in an orphanage home of Kathmandu district, Nepal. *Int J Res Med Sci* 2019;1**(2)**:11-5.
33. Pangani IN, Kiplamai FK, Kamau JW, Onywera VO. Prevalence of Overweight and Obesity among Primary School Children Aged 8-13 Years in Dar es Salaam City, Tanzania. *Adv Prev Med* 2016;2016:1345017. https://doi.org/10.1155/2016/1345017.
34. Zayed AA, Beano AM, Haddadin FI. Prevalence of short stature, underweight, overweight, and obesity among school children in Jordan. *BMC Public Health* 16,1040(2016). https://doi.org/10.1186/s12889-016-3687-4
35. Mohammed F, Musa I, Fage SG, Tura AK, Weldegebreal F. Undernutrition among institutionalised school-age orphans in Harari Regional State, Eastern Ethiopia: A cross-sectional study. *Nutr Metab Insights* 2021;14:1-6. https://doi.org/10.1177/11786388211006445
36. DeLacey E, Tann C, Groce N, Kett M, Quiring M, Bergman E, *et al.* The nutritional status of children living within institutionalised care: a systematic review. *Peer J.* 2020;8:e8484. https://doi.org/10.7717/peerj.8484.