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Malnutrition: Prevalence and Associated Factors among School Age Children in Delta State, Nigeria

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ABSTRACT

Background:

Malnutrition continues to be a fundamental health problem across school-age children in poor resource countries, including Nigeria. Both undernutrition and overnutrition adversely affect physical and brain development, educational performance, and prospective health outputs.

Objective:

The objective of this research was to evaluate the frequency of malnutrition and identify factors influencing nutritional status of primary and secondary school children across Delta State.

Methodology:

Across Delta State, Nigeria, 201 primary and secondary school students between the ages of 6 and 17 participated in a cross-sectional survey. A multistage sampling process was employed to select study participants. Systematic questionnaire was employed to obtain information on dietary pattern and sociodemographic traits. Body Mass Index (BMI) percentile was computed using anthropometric data, such as height and weight. WHO growth references were used to categorize malnutrition based on age-for-height and sex. SPSS version 23 was utilized for data analysis. Chi-square test, multinomial logistic regression, and descriptive statistics were employed at 95% confidence threshold.

Results:

The study sample comprised 58.7% females and 41.3% males. Prevalence of thinness, overweight, stunting, and underweight was 14.9%, 5.0%, 7.0%, and 3.5%, respectively. Most respondents (80.1%) had normal nutritional status. Association between gender and nutritional status was statistically significant (χ^2 = 7.308, p = .026), prevalence of thinness was more common among males compared to females. Vegetable consumption was significantly associated with nutritional state (χ^2 =11.572, p = .003). Multinomial logistic regression showed that female gender was independently associated with reduce odds of thinness (AOR = .15, 95% CI: .024–0.951, p = .044).

Conclusion:

Despite the normal nutritional status of most school children, thinness and stunting remain important public health concerns. School-based nutritional interventions and health promotion of dietary consumption is recommended.

Malnutrition Nutritional status School-age children Thinness Undernutrition

INTRODUCTION

Malnutrition continues to be a fundamental health problem affecting children globally. It includes undernutrition, comprising micronutrient deficiencies, underweight, stunting, wasting, overweight and obesity. Worldwide, roughly 149 million children suffer from stunted growth (too short for their age), 45 million experience wasting (dangerously thin for their height), and over 37 million are overweight or obese.[1] Despite considerable progress in reducing childhood malnutrition, the burden continue to be unequally elevated in resource deprived nations, especially in South Asia and Sub-Saharan Africa, where endemic poverty, widespread hunger, along with inadequate healthcare services persist.[2] Malnutrition during childhood has immediate and prolong effects on health and developmental outcomes. Inadequate nutrition impairs physical growth, weakens immune function, increases susceptibility to infectious diseases, and contributes substantially to childhood morbidity and mortality.[3] Furthermore, poor nutritional status has negative effects on development of a child cognitive ability, educational performance, and prospective socioeconomic output. Children who experience undernutrition are more likely to have poor school performance, reduced adult earning capacity, as well as higher risk of acquiring chronic diseases manifestation in future.[4]

Conversely, childhood elevated body mass index (BMI) heightens susceptibility to hypertension, type 2 diabetes mellitus, cardiovascular diseases, including other non-communicable diseases in adulthood.[1] Although nutritional interventions have historically focused on children below five years of age, primary and secondary school children constitute an equally important but often neglected population group. School-age children undergo rapid physical, emotional, and cognitive development and require adequate nutrition to support optimal growth and learning. Nutritional deficiencies during this period can negatively affect school attendance, concentration, academic performance, and psychosocial well-being.[5] Furthermore, dietary habits established during childhood often persist into adulthood and influence lifelong health outcomes.[6]

Sub-Saharan Africa bears one of the highest burdens of childhood malnutrition globally. The region accounts for about one-third of all stunted children worldwide, and the prevalence of undernutrition remains unacceptably high.[2] Persistent poverty, food insecurity, climate change, conflicts, and inadequate healthcare systems have contributed immensely to continued elevated prevalence of inadequate nutrition in the region.[7] Nigeria bears one of the highest burdens of childhood malnutrition globally. According to the Nigeria Demographic and Health Survey (NDHS), approximately 37% of children below age five experienced stunted growth, 22% were underweight, and 7% were wasted.[8] Recent economic downturn and rising food inflation in Nigeria have further worsened household food insecurity and childhood malnutrition.[6] Studies conducted among school-age children in Nigeria have reported varying prevalence rates of malnutrition. A systematic review by Iheme[9] reported considerable regional differences in proportion of undernutrition in Nigerian school children, with thinness ranging from 5% to 29% and stunting ranging from 7% to 43%. Umeokonkwo *et al*.[10] reported prevalence of 15.7% and 9.9% for thinness and stunting, respectively in Ebonyi State school children. Similarly, Ayogu *et al*.[11] reported that undernourishment is a fundamental health challenge across school children in southeastern Nigeria. Determinants of malnutrition are multifactorial and include poverty, food insecurity, low parental educational status, low dietary habits, reoccurring infections, poor hygiene, and restricted access to healthcare interventions.[3] Dietary diversity, particularly low fruits and vegetables intake, plays significant function in achieving optimal nutrient profile because these foods provide essential vitamins, minerals, antioxidants, and dietary fibre required for growth and development.[1] Studies have shown that inadequate fruits and vegetables intake are linked to deficient nutritional outcomes in children.[12]

Delta State is one of Nigeria's economically important states with considerable urban and rural populations. Despite its economic significance, disparities in income distribution and access to quality nutrition persist, especially among children. Data on nutritional state of school children in Delta State are limited, thereby hindering evidence-based interventions and policies.

Our study aimed to evaluate the frequency and identify factors linked with malnutrition in Delta State children. The findings will provide empirical evidence for policymakers, educators, and public health practitioners in designing appropriate school-based nutrition interventions and contribute toward accomplishing Sustainable Development Goal 2, of putting an end to hunger and all varieties of malnourishment in 2030.[13]

MATERIALS AND METHODS

Design, Area and Population of Study

This research employed descriptive cross-sectional design. Geographical setting for the study was Delta State, a prominent province in Nigeria's Southern geopolitical zone. The State comprises three senatorial districts and twenty-five local government areas. The state has both City Areas and Villages with diverse sociocultural and financial characteristics. The inhabitants are predominantly engaged in farming, fishing, trading, and civil service activities.[14] The study population comprised school children between the ages of 6 and 17 attending public schools within Delta State, Nigeria.

Sample Size Determination and Sampling Technique

We applied the sample size formula to establish the appropriate number of subjects required for the study[15]:

$$n = \frac{Z^2pq}{d^2} = \frac{1.96^2 \times 0.099 \times 0.901}{0.05^2} = 137$$

where, n was minimum number of subject; Z was standard normal deviate at 95% confidence interval (1.96); p was estimated prevalence of malnutrition from previous Nigerian studies (9.9%)[10], q was 1 − p; d was degree of precision (0.05).

After adjustment for non-response, altogether, 201 respondents participated in our research. Multistage sampling technique was employed in our study. Delta State was stratified into the three senatorial districts. In the first stage, one local government was selected by simple random sampling (balloting) from each of the three senatorial districts making a total of three (3) local government areas for the survey. The local government areas randomly selected were Warri South (Delta South), Ethiope East (Delta Central) and Ukwuani (Delta North). In the second stage, one public primary school and one public secondary school was selected by balloting using simple random sampling from each of the three local government areas earlier selected making a total of three (3) public secondary schools and three (3) public primary schools in the three senatorial districts of Delta State. The schools sampled for the study were Ogiame Primary School, Warri and Essi College I, Warri (Delta South), Iwen Primary School, Eku and Abraka Grammer School, Abraka (Delta Central), Morka Primary School, Obiaruku and Amai Mixed Secondary Commercial School, Amai (Delta North).[16,17] In the third stage, 33 respondents from primary and secondary schools were enumerated from each of the selected three (3) primary and three (3) secondary schools. Respondents received consent forms a day in advance to indicate their willingness to participate survey. The research team then collected the contact details of their parents or guardians and reached out via phone. During these calls, the researchers explained the study's objectives and formally requested parental permission. Eligible pupils and students that gave assents and whose parent/guardian gave informed consents were then recruited into the study. The first 33 respondents from each of the six (6) schools that came with their consent forms signed were randomly recruited into the study making a total of 198 respondents. A total of three more respondents had consent forms signed and were included in the study making a total of 201 respondents.

Method of Data Collection

An interviewer-guided structured questionnaire was utilized to collect comprehensive background information, parental educational parental, status employment status, household income, and dietary practices including fruit and vegetable consumption. Frequency of fruits and vegetables consumption < three times weekly were considered low, while ≥ three times weekly fruits and vegetables

consumption were considered as adequate.[22] The questionnaire was made up of close ended, pre-designed and pre-tested questions. A two-day training workshop was organized to ensure the investigators were proficient with the data collection instruments and methodological protocols.

Nutritional Status Anthropometry

Anthropometric data were collected following WHO guidelines. Weight was recorded to the nearest 0.1 kg on a calibrated scale, and height was taken to the nearest 0.1 cm with a stadiometer. Body Mass Index (BMI) was determined using the following formula:

$$\text{BMI Percentile} = \frac{weight\ (kg)}{H\ (m)^2}$$

Measurements were taken in triplicate for each sample, with the averaged results serving as the basis for the analysis. Furthermore, the entire dataset was converted and presented as Z-scores. Height for age (stunted), BMI (thinness, normal, overweight or obese), weight for age (underweight) for participants were evaluated and matched with WHO reference values as standard.[18] Scores within two standard deviations of the median are classified as normal.[19] Children falling below -2 SD are categorized as underweight. Meanwhile, overweight and obesity are identified by weight-for-height z-scores exceeding +2 SD and +3 SD, respectively.[20,21]

Ethical Consideration

Ethical approved was obtained from the Ethics Committee, Central Hospital, Warri (protocol number: CHW/ECC VOL 1/243) and Eku Government Hospital, Eku (reference number: EBGH/AD/112/REM/V/101), Delta State. Institutional approval for school access was granted by the Chairman of the Local Education Authority and the Chief Inspector of Education. Additionally, written informed consent was secured from parents or guardians of participants, with verbal or written assent provided by the children themselves.

Method of Data Analysis

Researchers utilized SPSS (version 23) to process and analyze the dataset. Socio-demographic characteristics, anthropometric measurements, dietary consumption patterns of respondents were presented in tables, specifically frequencies, percentages, means, and standard deviations. Nutritional status was assessed using anthropometric indices. Selected socio-demographic variables and dietary habits relationship with nutritional state was examined using Chi-square (χ^2) test. Multinomial logistic regression analysis was subsequently done to consider independent predictors of nutritional status. Variables entered into the model included gender, age group, parental educational status, parental employment status, monthly parental income, fruit consumption, and vegetable consumption. Statistical significance was determined at probability value of less than .05, and the results were presented as adjusted odds ratios (AORs) accompanied by 95% confidence intervals (CIs).

RESULTS

The research involved a group of 201 school children. Females constituted majority of respondents (58.7%), while males accounted for 41.3%. Most respondents (64.2%) were secondary school students aged 12–17 years, whereas 35.8% were in elementary school age group (6–11 years). Regarding parental educational status, 43.8% of parents attended secondary school, 35.8% attended tertiary institution, and 20.4% either did not attend school or primary education. The majority of parents (89.1%) were employed, and approximately three-quarters (77.1%) earned ≤ ₦50,000 monthly. Furthermore, 72.1% of respondents had low fruit consumption, whereas 52.7% reported adequate vegetable consumption. The survey participants had an average age of 12.30 ± 3.14 years and an average Body Mass Index (BMI) of 17.43 ± 3.46 kg/m². Participants' mean weight and height were 40.84 ± 13.92 kg and 1.51 ± 0.16 m, respectively (Table 1).

Table 1: Socio-demographic Characteristics and Weekly Consumption of Fruits and Vegetables

Variables	Options	Frequency (n)	Percent (%)
Gender	Male	83	41.3
	Female	118	58.7
Age Group	Primary (6 - 11 years)	72	35.8
	Secondary (12 - 17 years)	129	64.2
Educational Status of Parent	None/Primary School	41	20.4
	Secondary School	88	43.8
	Tertiary School	72	35.8
Employment Status of Parent	Unemployed	22	10.9
	Employed	179	89.1
Income of Parents Per Month (Naira)	≤ 50,000	155	77.1
	> 50,000	46	22.9
Fruit consumption	Low fruit consumption	145	72.1
	Adequate fruit consumption	56	27.9
Vegetable consumption	Low Vegetable Consumption	95	47.3
	Adequate Vegetable Consumption	106	52.7

From Table 2, the prevalence of stunting among the respondents was 7.0%, while 93.0% had normal height-for-age. Among children aged 10 years and below, the prevalence of underweight was 3.5%, whereas 20.9% had normal weight-for-age. Based on BMI classification, 14.9% of respondents were thin, 80.1% had normal nutritional status, and 5.0% were overweight. These findings indicate that most children had optimal nutritional state, although considerable percentage experienced undernutrition.

Table 2: Prevalence of Malnutrition Parameters of Respondents

Variables	Options	Frequency (n)	Percent (%)
Stunting (height for age)	Stunting	14	7.0
	Normal	187	93.0
Underweight (weight for age ≤ 10 Years)	Underweight	7	3.5
	Normal	42	20.9
Body Mass Index (BMI)	Thinness	30	14.9
	Normal	161	80.1
	Overweight	10	5.0

Table 3 demonstrates the correlation between participants' nutritional status and their socio-demographic and dietary Characteristics. The data revealed a meaningful link between a person's gender and their nutritional well-being ($\chi^2 = 7.308$, $p = 0.026$). A greater proportion of males were thin compared with females (22.9% versus 9.3%), while overweight was slightly higher among females (5.9%) than males (3.6%). Vegetable consumption was significantly linked with nutritional state ($\chi^2 = 11.572$, $p = 0.003$). Respondents with low vegetable consumption had a higher prevalence of overweight (8.4%) than those with adequate vegetable intake (1.9%). No meaningful associations were noticed between nutritional status with age group ($p = 0.523$), parental educational status ($p = 0.053$), parental employment state ($p = 0.062$), parental income per month ($p = 0.335$), or fruit consumption ($p = 0.978$).

Table 3: Association between Malnutrition and Socio-demographic and Dietary Habits

Variables	Options	BMI (%)			χ^2	P-Value
		Thinness	Normal	Overweight		
Gender	Male	19 (22.9)	61 (73.5)	3 (3.6)	7.308	0.026
	Female	11 (9.3)	100 (84.8)	7 (5.9)		
Age Group (years)	Primary (6 - 11)	12 (16.7)	55 (76.4)	5 (6.9)	1.295	0.523
	Secondary (12 - 17)	18 (14.0)	106 (82.1)	5 (3.9)		
Educational Status of Parent	None/Primary School	6 (14.6)	33 (80.5)	2 (4.9)	9.324	0.053
	Secondary School	7 (8.0)	78 (88.6)	3 (3.4)		
	Tertiary School	17 (23.6)	50 (69.5)	5 (6.9)		
Employment Status of Parent	unemployed	7 (31.8)	14 (63.6)	1 (4.6)	5.568	0.062
	employed	23 (12.8)	147 (82.1)	9 (5.1)		
Income of Parents per Month (Naira)	≤ 50,000	20 (12.9)	127 (81.9)	8 (5.2)	2.188	0.335
	> 50,000	10 (21.8)	34 (73.9)	2 (4.3)		
Fruit consumption	Low fruit consumption	22 (15.2)	116 (80.0)	7 (4.8)	.045	0.978
	Adequate fruit consumption	8 (14.2)	45 (80.4)	3 (5.4)		
Vegetable consumption	Low Vegetable Consumption	7 (7.4)	80 (84.2)	8 (8.4)	11.572	0.003
	Adequate Vegetable Consumption	23 (21.7)	81 (76.4)	2 (1.9)		

Multinomial logistic regression model was employed to isolate independent predictors linked with nutritional status (Table 4). Female respondents had significantly lower odds of being thin compared with males (AOR = 0.15, 95% CI: 0.024–0.951, $p = 0.044$). The findings implies that females were approximately 85% less likely to experience thinness than males. Similarly, respondents with low vegetable consumption had significantly reduced odds of being thin (AOR = 0.053, 95% CI: 0.008–0.363, $p = 0.003$) in contrast to participants who consumed vegetables adequately. Age group, parental educational status, parental employment status, parental income, and fruit consumption did not significantly predict nutritional status ($p > 0.05$). Additionally, none of the independent variables significantly predicted the normal BMI category relative to the reference category. Furthermore, the multinomial logistic regression model was significant statistically (Likelihood Ratio $\chi^2 = 36.096$, df = 16, $p = 0.003$), indicating that the model significantly improved prediction of nutritional status compared with the intercept-only model. The pseudo-R^2 values showed that the independent variables explained between 14.7% and 23.3% of the variation in nutritional status (Cox and Snell $R^2 = 0.164$, Nagelkerke $R^2 = 0.233$, and McFadden $R^2 = 0.147$).

Table 4: Multinomial Logistic Regression Analysis to Identify Predictors of Malnutrition

BMI Percentile		B	Std. Error	Wald	P - Value	Exp(B)	95% CI for Exp(B)	
							Lower Bound	Upper Bound
Thinness	Intercept	3.810	1.413	7.276	.007			
	Gender (Female)	-1.896	.942	4.054	.044	.150	.024	.951
	Age Group [Primary (6 - 11)]	-1.207	.952	1.607	.205	.299	.046	1.933
	Parents Education (None/Primary)	-.630	1.148	.301	.583	.533	.056	5.053
	Parents Education (Secondary)	-.751	1.116	.453	.501	.472	.053	4.205
	Parents Employment Status (unemploy)	.725	1.256	.333	.564	2.065	.176	24.217
	Parents Income (≤ 30,000)	.049	1.075	.002	.964	1.050	.128	8.625
	Low Fruit Consumed (< 3x)	.696	.901	.597	.440	2.006	.343	11.741
	Low Vegetable Consumed (< 3x)	-2.936	.981	8.959	.003	.053	.008	.363
Normal	Intercept	3.712	1.308	8.055	.005			
	Gender (Female)	-.748	.822	.827	.363	.473	.095	2.372
	Age Group [Primary (6 - 11)]	-.573	.829	.478	.489	.564	.111	2.861
	Parents Education (None/Primary)	.280	1.001	.078	.780	1.323	.186	9.402
	Parents Education (Secondary)	.851	.972	.766	.381	2.343	.348	15.754
	Parents Employment Status (unemploy)	-.512	1.174	.190	.663	.599	.060	5.982
	Parents Income (≤ 30,000)	.004	.953	.000	.996	1.004	.155	6.499
	Low Fruit Consumed (< 3x)	.605	.778	.604	.437	1.831	.398	8.414
	Low Vegetable Consumed (< 3x)	-1.478	.863	2.932	.087	.228	.042	1.238

Reference Category: BMI (severe), Gender (male), Age Group [Secondary (12 - 17)], Parents Educational status (Tertiary), Parents Employment status (Employed), Parents Income (> 50,000), Adequate Fruit Consumed (> 3x), Adequate Vegetable Consumed (> 3x)

DISCUSSION

This research assessed the nutritional state and underlying factors in primary and secondary students across Delta State, Nigeria. Findings showed that although the majority of respondents had normal nutritional status, thinness, stunting, underweight, and overweight remain important public health concerns. The prevalence of thinness observed in our survey (14.9%) implies that approximately one out of every seven school-age children in the study area suffers from undernutrition. This prevalence is

comparable to the 15.7% recorded in the pediatric population attending schools in Ebonyi State, southeastern Nigeria[10] and is similar to findings reported in rural communities of southeastern Nigeria by Ayogu *et al*.[11] However, the prevalence is lower than the 20–30% reported among school children in some northern Nigerian communities.[23] The differences may be attributable to variations in socioeconomic status, dietary practices, food security, and geographical disparities.

The study found that 7.0% of the participants were stunted, which is lower than the national prevalence estimates among Nigerian children reported by the NDHS.[8] The lower prevalence may suggest some improvements in nutritional awareness and access to healthcare services in the study area. Nevertheless, stunting remains a concern because it reflects chronic poor nutrition. This condition is linked to delayed brain development, lower academic success, and reduced earning potential in adulthood.[4] Similar prevalence rates had been documented in poor resource countries among school-age children[24]

The study discovery of 5.0% participants with overweight supports emerging evidence of nutritional health transition in poor resource countries, where undernutrition and overnutrition coexist. Similar prevalence rates were documented among pupils across Ghana and Ethiopia.[25] However, the prevalence is lower than reports from urbanized areas of South Africa and developed countries, where childhood overweight and obesity exceed 15%.[1] This study demonstrates double burden of malnourishment, evidenced in both low body weight (thinness) and excessive weight coexistence in the population, phenomenon increasingly reported in many developing countries undergoing rapid urbanization and dietary transition.[2]

There was a statistically significant correlation between gender and nutrition, as males showed a markedly higher rate of thinness than females. Furthermore, multinomial logistic regression analysis showed that female respondents were approximately 85% less likely to be thin compared with males. This agrees with previous studies from Ethiopia and northern Nigeria that reported higher levels of undernutrition among boys than girls.[25,26] The higher prevalence of thinness among males may be due to increased energy expenditure, differences in growth patterns, and behavioural factors that predispose boys to greater nutritional demands.

Vegetable consumption was significantly associated with nutritional status. Children with adequate vegetable intake demonstrated better nutritional outcomes than those with low intake. Vegetables provide essential micronutrients like vitamins A, C, E, folate, along with minerals necessary for growth, immunity, and cellular function.[1] Several studies have reported that inadequate intake of fruits and vegetables puts school-age children at a higher danger of suffering from undernutrition and essential vitamin or mineral shortages.[6,12] This finding underscores the importance of promoting dietary diversity and increasing vegetable intake among school-age children.

Contrary to expectations, parental educational status, parental employment status, monthly income, and fruit consumption did not significantly associate with nutritional status. Corresponding results have been documented by Ayogu *et al.*,[11] who found that socioeconomic indicators were not independently linked with nutritional outcomes following adjustment for other variables. The lack of significant associations may suggest that nutritional status in this population is influenced by other unmeasured factors such as household food allocation patterns, dietary quality, nutritional knowledge, and recurrent childhood illnesses.

The insights from this research have significant impacts for shaping health policy. Firstly, the relatively high proportion of thinness indicates the need for routine nutritional screening and monitoring of school-age children. Secondly, the coexistence of undernutrition and overweight emphasizes the necessity for policies that will simultaneously address both types of nutritional abnormality. Thirdly, school-based nutrition programmes and health education interventions that promote healthy dietary practices and adequate daily intake of fruits and vegetables should be strengthened.

Furthermore, the findings support the implementation of comprehensive school health programmes, including periodic anthropometric assessment, nutrition counselling, and school feeding initiatives. Such interventions have the capacity to enhance nutritional outcomes, educational attainment, along with future productivity of children.

This research adds to the sparse data regarding the nutritional status of children attending primary and secondary school across Delta State, and provides baseline information for policymakers and public health practitioners. However, because this study used a cross-sectional design, we cannot determine cause and effect. In addition, behavioural as well as clinical elements like physical exercise, recurrent infections, and micronutrient profile were not evaluated. Future longitudinal studies incorporating dietary diversity indices, physical activity, and biochemical assessments are therefore recommended.

LIMITATIONS OF STUDY

This study has some limitations. The relatively small sample size and the inclusion of only one primary and one secondary schools from each senatorial district (three primary and three secondary schools in total) may limit the representativeness of the findings and reduce their generalizability to all school-age children in Delta State. In addition, although nutritional status was assessed using WHO-recommended anthropometric indicators, including BMI-for-age, height-for-age, and weight-for-age, other important dimensions of malnutrition, such as dietary diversity (apart from fruits and vegetables), micronutrient status (e.g., iron, vitamin A, zinc, and iodine), biochemical indices, body composition, household food security, and clinical assessment of nutritional deficiencies, were not evaluated. Future studies should include these complementary measures and larger, more representative samples to provide a more comprehensive assessment of malnutrition among school-age children in Delta State.

CONCLUSION

The majority of school-age children in Delta State had normal nutritional status; however, thinness, stunting, and underweight remain important public health concerns. Gender and vegetable consumption were significantly associated with nutritional status, and female gender emerged as an independent protective factor against thinness. Sociodemographic and socioeconomic characteristics such as parental educational status, parental employment status, monthly income, and fruit consumption were not significantly associated with nutritional status. There is a need for school-based nutrition interventions, health education programmes, and policies aimed at improving dietary practices among school-age children.

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References

26 sources

1 World Health Organization. Malnutrition Fact Sheet. Geneva, Switz WHO Available https//www.who.int/news-room/fact-sheets/detail/malnutrition. 2024;

2 Marume A, Kasanzu S, Chirenda J. Socio-economic and rural-urban disparities in the double burden of childhood malnutrition in sub-Saharan Africa. J Heal Popul Nutr [Internet]. 2025;44(1):335. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC12487389/

3 Black R, Victora C, Walker S, Bhutta Z, Christian P, De Onis M, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet [Internet]. 2013;382(9890):427–51. Available from: https://pubmed.ncbi.nlm.nih.gov/23746772/

4 Victora C, Christian P, Vidaletti L, Gatica-Domínguez G, Menon P, Black R. Revisiting maternal and child undernutrition in low-income and middle-income countries: variable progress towards an unfinished agenda. Lancet [Internet]. 2021;397(10282):1388–99. Available from: https://pubmed.ncbi.nlm.nih.gov/33691094/

5 Best C, Neufingerl N, van Geel L, van den Briel T, Osendarp S. The nutritional status of school-aged children: why should we care? Food Nutr Bull [Internet]. 2010;31(3):400–17. Available from: https://pubmed.ncbi.nlm.nih.gov/20973461/

6 United Nations Children's Fund. The State of the World's Children 2023: For Every Child, Nutrition. New York, NY UNICEF Available https//www.unicef.org/reports/state-worlds-children-2023. 2023;

7 Akseer N, Al-Gashm S, Mehta S, Mokdad A, Bhutta Z. Global and regional trends in the nutritional status of young people: a critical and neglected age group. Ann N Y Acad Sci [Internet]. 2017;1393(1):3–20. Available from: https://pubmed.ncbi.nlm.nih.gov/28436100/

8 National Population Commission (NPC) & ICF. Nigeria demographic and health survey 2018. Abuja, Niger NPC; Rockville, Maryland, USA ICF Available https//ngfrepository.org.ng8443/bitstream/123456789/3145/1/NDHS%202018.pdf. 2019;

9 Iheme G. The undernutrition situation of school-age children in Nigeria: A systematic review and meta-analysis. Curr Nutr Food Sci [Internet]. 2021;17(8):826–832. Available from: https://www.benthamdirect.com/content/journals/cnf/10.2174/1573401317666210216114311

10 Umeokonkwo A, Ibekwe M, Umeokonkwo C, Okike C, Ezeanosike O, Ibe B. Nutritional status of school age children in Abakaliki metropolis, Ebonyi State, Nigeria. BMC Pediatr [Internet]. 2020;20(1):114. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7060553/

11 Ayogu RNB, Afiaenyi IC, Madukwe EU, Udenta EA. Prevalence and predictors of under-nutrition among school children in a rural South-eastern Nigerian community: a cross sectional study. BioMed Cent Public Heal [Internet]. 2018;18:587–95. Available from: https://doi.org/10.1186/s12889-018-5479-5

12 Miller V, Yusuf S, Chow C, Dehghan M, Corsi D, Lock K, et al. Availability, affordability, and consumption of fruits and vegetables in 18 countries across income levels: findings from the Prospective Urban Rural Epidemiology (PURE) study. Lancet Glob Heal [Internet]. 2016;4(10):e695-703. Available from: https://pubmed.ncbi.nlm.nih.gov/27567348/

13 Atukunda P, Eide W, Kardel K, Iversen P, Westerberg A. Unlocking the potential for achievement of the UN Sustainable Development Goal 2 - "Zero Hunger" - in Africa: targets, strategies, synergies and challenges. Food Nutr Res [Internet]. 2021;26:65. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8254460/

14 Moyegbone J, Nwose E, Nwajei S, Agege E, Odoko J, Igumbor E, et al. Identifying Landmark Achievements in Primary Eye Care Promotion in Nigeria in Accordance with Alma – Ata Declaration of 1978 : A Review. Ophthalmol Res An Int J. 2021;14(1):1–12.

15 Moyegbone J, Nwose E, Anowa E, Clarke A, Odoko J, Agege A. Prevalence of Visual Impairment among Primary and Secondary School Children in Delta State, Nigeria. J Niger Optom Assoc [Internet]. 2023;25(1):42–53. Available from: https://dx.doi.org/10.4314/jnoa.v25i1.7

16 Delta State. Primary Schools in Delta State. 2021; Available from: https://eduintelng.org/edu-stat/primary-schools-in-delta-state/

17 Delta State Ministry of Basic & Secondary Education. Schools List. Delta State [Internet]. 2022; Available from: https://deltastatemobse.net/SchoolsList.aspx

18 WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. World Heal Organ Available https//iris.who.int/server/api/core/bitstreams/b82789de-df63-41ba-8058-25f9f5da0c40/content. 2011;

19 WHO Expert Committee on Physical Status. Physical status: the use and interpretation of anthropometry, report of a WHO expert committee. (WHO Technical Report Series, No. 854. World Heal Organ Geneva [Internet]. 1995; Available from: http://whqlibdoc.who.int/trs/WHO_TRS_854.pdf], accessed 20 May 2011

20 Kuczmarski R, Ogden C, Guo S, Grummer-Strawn L, Flegal K, Mei Z, et al. CDC 2000: Growth Charts for the United States: methods and development. Vital Heal Stat. 2002;11(246):1–190.

21 Waterlow I, Buzina R, Keller W, Lane I, Nichaman M, Anner I. The presentation and use of height and weight data for comparing the nutritional status of groups of children under the age of 10 years. Bull World Heal Organ. 1977;55:489–98.

22 Martínez-Castaneiras P, Ortiz C, Larrea-Baz N, Lope V, Sanchez-Gordon G, Ruiz-Moreno E, et al. Intake of fruit, vegetables and pulses, and all-cause, cardiovascular and cancer mortality: Results from a population-based prospective study. Public Health [Internet]. 2025;239:169–78. Available from: https://www.sciencedirect.com/science/article/pii/S0033350624005109

23 Senbanjo I, Oshikoya K, Odusanya O, Njokanma O. Prevalence of and risk factors for stunting among school children and adolescents in Abeokuta, southwest Nigeria. J Heal Popul Nutr [Internet]. 2011;29(4):364–70. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC3190367/

24 Wrottesley S, Mates E, Brennan E, Bijalwan V, Menezes R, Ray S, et al. Nutritional status of school-age children and adolescents in low- and middle-income countries across seven global regions: a synthesis of scoping reviews. Public Health Nutr [Internet]. 2023;26(1):63–95. Available from: https://pubmed.ncbi.nlm.nih.gov/35156607/

25 Beressa G, Feyissa G, Murimi M, Muhammed A, Abdulkadir A, Jema A, et al. Nutritional status and associated factors among school age children in Southeast Ethiopia using a bayesian analysis approach. Sci Rep [Internet]. 2025;15(1):24141. Available from: https://pubmed.ncbi.nlm.nih.gov/40619564/

26 Obasohan PE, Walters SJ, Jacques RM. The Risk Factors Associated with the Prevalence of Multimorbidity of Anaemia , Malaria , and Malnutrition among Children Aged 6 – 59 Months in Nigeria. Int J Environ Res Public Health [Internet]. 2024;21(6):765. Available from: https://www.mdpi.com/1660-4601/21/6/765

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