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Nutritional Status and Associated Factors among School Children in Nsukka, Enugu State

Ugochi. E. Omeje[1*], Charlse Chima Igbokwe[2], Joel. C. Omeje[3]

[1-3]Department of Human Kinetic and Health Education, University of Nigeria Nsukka, Nigeria

Abstract

The study investigated nutritional status and associated factors among school children in Nsukka, Enugu State. Three research questions and twu null hypotheses guided the study. The Correlational survey research design was used for the study. The study population comprised of 8,102 school children. A sample size of 420 was drawn using multi-stage sampling procedure. The instruments for data collection were the Nutritional Status of Primary School Pupils Check List (NSPSPCL) and the Revised Family Affluence Scale (RFAS). Data collected were analyzed using SPSS version 22 to calculate frequency, percentage, phi correlation, and multinomial logistic regression. The results revealed that high proportion of school children (64.3%) were underweight, while low proportion of the school children had normal weight (33.5%), however few were overweight (1.7%), and obese (0.5%). There was a significant relationship between parental income (lower income, $p = 0.000$; middle income, $p = 0.009$) and child obesity. However, government should provide school meal services to school pupils in Enugu State Nigeria, where good nutritive school lunch will be provided. Moreover, health educators should organize workshops for parents and teachers on the need to make adequate diets based on locally available food. This hopefully will boost nutritional status of primary school children in Nsukka, Enugu State.

Keywords: Nutritional status, Associated factors, Primary school children, parents

Introduction

Poor nutritional status among school children is becoming a major public health concern especially in developing countries. Nutritional problems (malnutrition), in all its forms, including under-nutrition (wasting, stunting, underweight), inadequate vitamins or minerals, overweight, obesity, and diet-related non-communicable diseases, are affecting school children in developing nations (World Health Organization [WHO], 2024). Nutritional problems have serious health challenges on the growth of school children. Poor nutritional status among school children is significantly associated with adverse health outcomes during the developmental period and has been responsible for the in-hospital mortalities and morbidities due to severe diseases, such as severe malaria, gastroenteritis, lower respiratory tract diseases among preschool and school children (Amoadu et al., 2024; Naotunna, et al., 2017)

In Africa, nutritional problems have been reported among school children. Africa now has the world highest rate of stunting among children (43%) which has been consistent and shows little improvement over the past fifteen years (United Nations Children Fund [UNICEF], WHO & World Bank, 2017). At least 216 million African children suffer from stunting and

malnutrition. In sub-Saharan Africa, malnutrition is the second leading cause of death among children after malaria (African Development Bank Group [ADBG], 2023).

Poor nutritional status seems to be prevalent among children in Nigeria. The UNICEF (2022) reported that Nigeria has the second highest burden of stunted children in the world, with a national prevalence rate of 32 per cent of under-five children. Adeomi et al (2021) reported prevalence rates for stunting (34.9%), underweight (13.5%), thinness (10.3%) and overweight/obese (11.4%) among school aged children in Northern part of Nigeria. Adeomi, et al. (2021) reported that Gombe State, which is in the Northern part of Nigeria, had significantly higher burden of stunted, underweight and thin children than Osun State, while Osun State, in the Southern part of Nigeria, had a significantly higher burden of overweight/obesity. Good nutritional status is characterized by an alert, good natured personality, a well-developed body with normal weight for height, well developed and firm muscles, healthy skin, reddish pink coloured eyelids and membranes of mouth, good layer of subcutaneous fat, clear eyes, smooth and glossy hair, good appetite and excellent general health (Amuta et al. 2009; Home Science, 2016; Thomas, 2017). According to Goon et al (2011), nutritional status is an integral component of the overall health of an individual that provides an indicator of the wellbeing of children.

Nutritional status is the balance between the food intake and utilization of nutrients by man in the process of growth and development (Amirat et al., 2013). Nutritional status is the condition of health of an individual influenced by nutrients intake and its utilization by the body (Sharma & Watode, 2017). Nutritional status is categorized as malnutrition, under-nutrition, and over-nutrition. Morley (2016) asserted that under-nutrition usually results from deficiencies primarily of calories and proteins. Home Science (2016) viewed under-nutrition as a condition that results when nutrients provided in the diet are inadequate, not utilized properly resulting in a state of imbalance. Geletaw et al. (2021) reported thinness (13.1%) and stunting (24.6%) among school children in Somali. The authors further revealed that family size of less than five, household food insecurity were among the factors associated with under-nutrition (stunting).

Chronic overweight progresses to obesity, which is a morbid condition. The WHO (2010) defined overweight as a condition of abnormal or excessive fat accumulation and that a chronic positive energy balance precipitates the accumulation of excess fat. According to WHO (2010), body mass index (BMI) greater than 30-40 is an indicator of obesity. Dop (2016); and UNICEF, WHO, World Bank (2017) stated that overweight and obesity pose health problems of diabetes mellitus and cardiovascular diseases in later life. Akinpelu et al. (2014) stated that obesity among school children has serious medium and long term consequences including endocrine, cardiovascular, renal, pulmonary, orthopaedic and gastro-intestinal diseases. Asiegbu et al.(2017) stated that overweight and obesity are associated with increasing urbanization with tendency to a shift in diet to energy dense food particularly with people of high socio-economic status. Asiegbu et al. (2017) reported prevalence of 5.0% and 3.0% for overweight and obesity respectively among children attending private primary schools in Abakaliki, Ebonyi State, South East Nigeria. The prevalemce is determined by assessment using certain tools.

Assessment of nutritional status is a vital public health tool for identifying individuals or a group of children at risk of malnutrition or over-nutrition. The World Health Organisation (2006); (2007) and Dop (2016) disclosed that nutritional status is assessed by direct and indirect methods. There are four basic direct methods of nutritional status assessment. These are clinical methods, biochemical methods, dietary evaluation methods and anthropometric methods. Dop (2016) stated that clinical methods pays special attention to general clinical

examination with special attention to body structures, such as hair, angles of the mouth, gums, nails, skin, eyes, tongue, muscles, bones, and thyroid gland.

Biochemical methods include haemoglobin estimation which is used to detect anaemia, protein and trace element deficiencies. Stool examination, and Urine dipstick for microscopy are forms of biochemical investigation that are used to assess the presence of ova and/or intestinal parasite, and albumin and sugar level respectively. Biochemical method detects early changes in body metabolism and nutrition before the appearance of overt clinical signs. It is precise, accurate and reproducible (Dop, 2016, Elamin, 2002; FAO, 2007). Dietary assessment involves assessment of nutritional intake of humans by five different methods. These are 24 hours dietary recall, food frequency questionnaire (FFQ), Dietary history since early life, food dietary technique (FDT) and observed food consumption (OFC) (Dop, 2016).

Anthropometry is one of the most useful tools for assessment of nutritional status of school children. Anthropometry is the measurement of body height, weight, and proportions (Dop, 2016; WHO, 2010). According to the authors, anthropometric method is used to evaluate both under-nutrition and over-nutrition, and the measured values reflect current nutritional status. The indicators are height-for-age index, weight-for-height index and weight-for-age index. The authors equally stated that the height for age index or Z score (HAZ) is an indicator of chronic illness, while weight-for-height index or Z-score (WAZ) is an indicator of acute illness. Other anthropometric methods used to measure nutritional status of children are body mass index (BMI), waist-to-hip-ratio, skin fold thickness test, mid-upper arm circumstance (MUAC), head/chest ratio and head circumstance. The BMI is a measurement of a person's weight-to-height ratio. It is used to determine if a person has normal weight, underweight, overweight or obese. Weight-for-age is a composite index and it takes into account both acute and chronic malnutrition. Anthropometric methods were used to measure nutritional status of children in this study.

Literature suggests that certain factors are capable of influencing nutritional status of school-age children in diverse socio-cultural backgrounds. Among these factors are location, and family income level. Location refers to area of residency in terms of urban or rural setting as well. Mushtag, et al. (2011) reported that stunting was significantly higher in rural areas especially among those with low socio-economic status (occupation, income and education) among primary school children in Pakistan. Oninla et al.(2010) conducted a study on nutritional status of urban and rural Nigerian school children in Ife Central Local Government Area of Ogun State, South-West Nigeria. The study showed that malnutrition (underweight, wasting and stunting) constituted major health problems among school children in Nigeria, particularly in the rural areas. Akinpelu et al. (2014) studied nutritional status of Nigerian children from urban communities using different measuring parameter. Their findings showed prevalence of stunting among boys (75.6%) and girls (74.4%) which increased with age. Akinpelu et al. reported underweight (5% and severe underweight (1.2%) among their studied populations. Also, obesity (3.6%) and overweight (4.16%) and thinness (43.2%) were observed. The overall prevalence of intestinal parasite infection was 26.6 per cent. The findings showed that stuntedness (43%) and under weightiness (13.6%) were significantly associated with intestinal parasite infection ($p<0.001$) and ($p=0.001$) respectively. Naotunna et al. (2017) conducted a study on nutritional status among primary school children aged 5-10 years in rural Sri-Lanka. A school-based cross-sectional study was conducted using 100 rural schools. Their study population comprised of 5,000 children studying in grade 1-5. A sample size of 4,608 children was recruited for the study. A sample of 3ml of blood, obtained from each child was used for haemoglobin estimation. The BMI for age (Z-score), weight for age (Z-score), height for age (Z-score), and mean haemoglobin were completed using WHO anthro-plus software in comparison to WHO growth standards

which were used in WHO multicenter growth reference study group. The study revealed that more than onethird of children aging 5-10 years in rural central province are having low BMI and one-fourth have anaemia.

Income level of parents is another factor capable of influencing nutritional status of school children. Adeyemo and Chukwurah (2012) conducted a study on parental socio-economic status as a correlates of children nutritional status in public and private schools in Ogbomoso, Oyo State. The results showed that socio-economic status of parents significantly influenced nutritional status of private and public (m 4.54, m 3.37) schools respectively, with mean score of private school significantly higher. Asiegbu et al. (2017) conducted a study to assess gross malnutrition among primary school children using body mass index as an assessment tools in Abakaliki, Ebonyi State, South East Nigeria. They reported prevalence of underweight (4.5%), overweight (1.2%), and obesity (0%) in public school and for private schools, underweight, overweight, and obesity using BMI were 1.1 per cent, 5.0 per cent, and 3.0 per cent respectively. Their findings showed that socio-economic status of parents affected the prevalence of underweight, overweight, and obesity as more subjects with overweight and obesity belonged to upper social class whereas more underweight children belongs to lower social class.

Purpose of the Study

The purpose of this study was to investigate the nutritional status and associated factors among senior primary school (middle basic) children in Nsukka Local Government Area, Enugu State. Specifically the study determined:

1. proportion of senior school children who have normal weight, underweight, overweight or obese;
2. relationship between nutritional status of senior school children and school location; and
3. relationship between nutritional status of senior school children and parental income level;

Research Questions

The following research questions are posed to guide the study.

1. What proportion of senior school children who have normal weight, underweight, overweight and obesity?
2. What is the relationship between nutritional status of senior primary school children and school location?
3. What is the relationship between nutritional status of senior primary school children and parental income level?

Hypotheses

The following null hypothesis were postulated and tested at 0.05 level of significance.

1. There is no significant relationship between school location (urban and rural) and nutritional status of senior primary school children in Nsukka, Enugu State.
2. There is no significant relationship between parental income level and nutritional status of senior school children in Nsukka Enugu State.

Methods

This study employed a correlational survey research design. The total population comprised 8,102 school children (primary 4, 5, & 6). The sample size for the study consisted of 420 school children selected using multi-stage sampling technique. In the first stage, simple random sampling technique of balloting without replacement was used to select two

development centres out of the three development centres in Nsukka LGA, Enugu State In the second stage, simple random sampling technique using balloting without replacement was used to select four schools out of 38 schools from Nsukka East development centre and five schools out of 50 schools from Nsukka central development centre. The purposive technique was applied in the third stage to ensure the total number of pupils in from each of the streams of 4, 5, and 6 accordingly. A systematic random sampling technique was used in the fourth stage to draw the required number of respondents from each class in the different streams of primary 4, 5, and 6 using class register. Finally, nine schools were studied.

The instrument for data collection was a self-developed Nutritional Status of Primary School Children Checklist (NSPSCC) used to collect data on nutritional status and associated factors of nutritional status of parents of school pupil and the Revised Family Affluence Scale (II) (FASII) used to generate feedback on income level of pupils' parents. The NSPSCC contained six items addressing demographic variables of the children in section A. The section B elicited data relating to demographic information of the parents. A total of 17 items was contained in section C which was on family affluence. The D section generated data on the anthropometric measurement. Anthropometric measurements of the school children were done using standard weighing scale and standiometer. Through a constructive criticism and suggestions of 3 experts in health education, nutrition and measurement and evaluation from the University of Nigeria, Nsukka, the face validated of the instrument was established. Completed copies of the checklist were crosschecked to ensure completeness of the responses. Data were coded and analyzed using the statistical package for social sciences (SPSS) version 22. Frequency and percentage were used to analyze research question one while phi-correlation was used to analyze research questions 2-4. The multinomial logistic regression was used to analyze the null hypothesis.

Results

Table 1

Nutritional/Weight Status of School Children in Nsukka, Enugu State (n – 403)

Weight status	**F**	**%**
Normal weight (18.5kg/m^2 – 24.9kg.m^2)	135	33.5
Under weight (<18.5kg/m^2	159	64.3
Over weight (25kg/m^2 – 29.9kg/m^2)	7	1.7
Obese (>30kg/m)	2	0.5

Results in Table 1 show that 33.5 per cent of children had normal weight, 64.3 per cent were underweight, 1.7 per cent and 0.5 per cent were overweight and obese respectively. This implies that a greater percentage of school children in Nsukka, Enugu State were underweight.

Table 2

Phi Correlation between Nutritional Status of Children and School Location (n = 403)

Nutritional status	**School location** **Urban (n = 203)** **f %**	**Rural (n = 200)** **f %**	**Ø**	***p* value**	**Decision**
Normal	61 (45.7)	74 (54.8)			
Underweight	139 (53.7)	120 (46.3)			
			.10	.27	WR

Overweight	2 (28.6)	5 (71.4)
Obese	1 (50)	1 (50)

Key ± .00 - ± .29 = none to weak relationship (WR),
± .30 - ± .59 = Moderate Relationship (MR),
± .60 - ± .99 = Strong Relationship (SR)
Source: Nwagu and Agbaje (2017)

Table 2 shows that there was a weak positive relationship ($\emptyset$ = .10; *P* = .27) between nutritional status and school location among School children.

Table 3

Phi Correlation between Nutritional Status of Children and Parental Income (n = 403)

Nutritional status	**Low income (n = 284)**	**Moderate income (n = 200)**	**High income (n = 38)**	**$\emptyset$**	***P* value**	**Decision**
Normal	96 (71.1%)	25 (18.5%)	14 (10.4%)			
Underweight	181 (69.9%)	55 (21.2%)	23 (8.9%)			
				.09	.73	SR
Overweight	6 (85.7)	0 (0.0%)	1 (14.3%)			
Obese	1 (50.0%)	1 (50.0%)	0 (0.0%)			

Table 3 shows that there was a strong positive relationship ($\emptyset$= .09; *P* = .73) between nutritional status and parental income level among School children.

Table 4

Multinominal Logistic Regression of Primary School Children's Nutritional Status and School Location

Nutritional status	**B**	**Std. Err**	**Wald**	**Df**	**p-value**	**95% CI (B) OR**	**LB**	**UB**
Underweight								
Intercept	-2.630	.791	11.056	1	.001			
Rural school	-.361	.216	2.810	1	.094	0.697	.457	1.063
Urban school	0[b]							
Overweight								
Intercept	-.6995	2.952	5.615	1	.018			
Rural school	-1.115	.850	1.720	1	.190	0.328	.062	1.735
Urban school	0[b]							
Obese								
Intercept	-16.58	5.806	8.094	1	.004			
Rural school	-.366	1.446	0.064	1	.800	0.694	.041	11.803
Urban school	0[b]							

Note: The reference category is: Normal weight (<18.5kg/m^2 – 24.9kg/m^2)
[b] The reference category for school location is Urban school
LB = Low or Boundary; UB = Upper Boundary; Std. Err. = Standard Error
CI = Confidence Interval; OR = Odds Ratio

Table 4 shows the result of multinominal logistic regression (MLR) analysis on the relationship between school children's nutritional status and school location. The results showed that there was no significant relationship between pupil's nutritional status (underweight, p = .09; overweight, p = .19; obese, p = .80) and school location. However, the results indicate that children' in rural schools are less likely to be underweight (OR = 0.69;

CL: .457-1.063), overweight (OR = 0.32; CL: .062-1.735), and obese (OR = 0.69; CL: .041-11.803) when compared to their counterparts in urban shools.

Table 5

Multinominal Logistic Regression of Primary School Children's Nutritional Status and Parental Income

						95% CI (B)		
Nutritional status	**B**	**Std. Err**	**Wald**	**Df**	**p-value**	**OR**	**LB**	**UB**
Underweight								
Intercept	-2.711	.878	9.522	1	.002			
Low income	-.040	.368	.012	1	.914	.961	467	1.975
Middle income	-.252	.421	.357	1	.550	.778	.341	1.775
High income	0[b]							
Overweight								
Intercept	-7.105	3.222	4.863	1	.027			
Low income	-.086	1.118	.006	1	.939	.918	.103	8.218
Middle income	-18.488	6957.510	.000	1	.998	.000	.000	
High income	0[b]							
Obese								
Intercept	-33.615	5.875	32.735	1	.000			
Low income	17.153	1.465	137.159	1	.000	2.931	15.969	
Middle income	17.958	.000	.170	1	.009	6.731	6.731	29.731
High income	0[2]							

Note: The reference category is: Normal weight (<18.5kg/m^2 – 24.9kg/m^2)
[b] The reference category for school location is Urban school
LB = Low or Boundary; UB = Upper Boundary; Std. Err. = Standard Error
CI = Confidence Interval; OR = Odds Ratio

Table 5 shows the results of multi-nominal logistic regression (MLR) analysis on the relationship between school children nutritional status and parental income. The Table shows that there was a significant relationship between parental income level (lower income, p = .000 < .05; middle income, p = .009 < .05) and being obese. However, no significant relationship was found between parental income (lower income, p = .91 > .05; middle income, p = .55 > .05) and underweight, (low income, p = .93 > .05; middle income, p = 99 > .05) and overweight. The result further indicates that children from parents of lower income and middle income are less likely to be underweight (lower income, OR = .96; middle income OR = .77) as shown in Table 5.

Discussion

This survey is a viable correlational analysis showing that greater proportion of primary school children in Nsukka LGA was underweight as contained in Table 1. This finding with relatively high proportion of underweight was expected and could be attributed to the prevailing and unprecedented high economic recession currently presenting adverse effects

on the means of survival and livelihood of every average citizen in Nigeria. This undermines the inadequate dietary intake of food coupled with the fact that majority of these children are from poor socio-economic background mainly farmers, artisans and civil servants who earn meager salary which they spend on house rent school fees, hospital treatment, and thus have very little left for food. This confirmed the findings of WHO, UNICEF and Word Bank (2017) which reported that Africa bears the greatest form of all kinds of malnutrition. The high proportion of under nutrition is in line with the findings of Asiegbu et al. (2017) which showed that socio-economic status of parents affected the prevalence of underweight, overweight and obesity among school aged children in Abakaliki, Ebonyi State. According to the authors, overweight and obesity are pronounced among children of wealthy and upper class whereas underweight is common among children of low class parents in the social settings. This confirmed the most recent National Demographic and Health Survey (2018) which revealed that 37% of Nigerian children are stunted, 7% are wasted, while 22% are underweight with a good percentage of them experiencing multiple forms of malnutrition including stunting and wasting simultaneously. The above findings could be attributed to finance viability and abundance as made manifest in some families in enriching their respective homes with sufficient food items while those with limited resource or poor assets suffer the malnutrition consequences.

It was also found that a weak positive relationship existed between nutritional status of primary school children and school location as shown in Table 2. Moreover, the results indicate that children in rural schools are less likely to be underweight when compared to their counterparts in urban schools. The findings were surprising and not anticipated because it was anticipated that children from urban areas was expected to come from families of high socio-economic background and could have more access to food and have normal weight and increasing number of overweight children. This contradicted the findings of Oninla et al. (2010) who reported that malnutrition (underweight, wasting and stunting) constituted major health problems among school children in Nigeria, particularly in the rural areas. The findings in table five equally revealed no significant relationship between underweight, overweight, obese and school location. This findings of weak positive relationship and no significant deference in the nutritional status and school location could be due to the fact that majority of mothers in Nukka LGA are house wives coupled with the fact that Nsukka people have various local dishes which they prepare for their children from the locally available food materials in their localities. The emphases should be on locally available food materials and provision of school meal services in the urban and rural areas of Enugu State.

A strong positive relationship was found between parental income level and nutritional status. Also, a significant relationship between parental income level and being obese as shown in Table 3. This result was anticipated and therefore was not a surprise. Income level of parents is likely to command the choice of diet which is a factor capable of influencing nutritional status. The findings agreed with the findings of Fekadu et al. (2015) who found that underweight among Somalia children was associated with dietary diversity among low income mothers of low socioeconomic status who were house wives. This study agrees with the findings of Galgamuwa et al. (2017) who found that most of the undernourished children in Sri-Lanka were from low income parents. The implication of the above findings reflects its application in improving nutrition education syllabus and topics to accommodate the influence of variables in the public health and nutritional status of people and children in particular.

Conclusion and Recommendations

Greater proportion of primary school children was underweight, with few having normal weight, overweight and obese. Nutritional status had strong positive relationship with parental income while negative weak relationship was observed with school location, implying that nutritional status of the children varied within demographic variables. Therefore, a healthy intervention by the government in collaboration with the school management authority is recommended to improve and sustain the provision of school meal services for primary school children in particular in all the schools in the state. Also, a routine supervisory activity geared towards establishing the nutritional status of the pupil is highly recommended. This action, if properly applied, would facilitate early detection of diseases and other health problems escalating from nutritional disorders.

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