THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Nutritional Status, Associated factors and Knowledge among Pupils Attending Public and Private Owned Primary Schools in Ikot Ekpene Local Government Area of Akwa Ibom State, Nigeria

Michael E. Aisuodionoe
Lecturer, Department of Public and Community Health, Novena University Ogume, Delta State, Nigeria
Gideon I. Ogu
Lecturer, Department of Biological Sciences, Novena University, Ogume, Delta State, Nigeria
Mfoniso V. Enang
Graduate Student, Department of Public and Community Health, Novena University Ogume, Delta State, Nigeria

Abstract:
Malnutrition, a public health and social problem, has gradually become a cause for concern in Africa and indeed Nigeria. Available report indicates that more than 30% of school children in Nigeria are malnourished. Nutritional disorders in school age children may have a significant negative effect on the academic performance and general well being of the child. This study aimed to assess and compare the nutritional status, Knowledge and associated factors in pupils attending public and private primary schools in Ikot Ekpene Local Government Area, Akwa Ibom State, Nigeria. This is a school based, comparative cross sectional study in two public and two private schools involving 300 pupils. Respondents were recruited using multi-stage sampling. Data was collected through a structured interviewer-administered adapted questionnaire, entered into Microsoft Excel Spreadsheet and analyzed using WHO Epi-Info Statistical Software version 7.1. The results revealed that One- third of all the respondents were in private schools with most (26.7%) being in Primary One. Two-thirds of both sexes were in public schools. The average age of all the pupils was 9.51± 1.36 years with 59% living with their parents. The mean weight and height of pupils were 27.49 ± 3.53) kg and 126.98 ± 4.54 cm respectively, while 11.7% of the pupils were wasted. Underweight (26.5%) and stunting (55.5%) where more significant among pupils in public schools than their private counterparts with 17.0% and 14.0% respectively. Age was found to be significantly associated with wasting in respondents for private (p = 0.004) and public (p=0.001) schools. The private school pupils had better BMI than public school pupils, though not significantly different (p=0.004). Maternal socio-economic status (p = 0.004) and occupation of respondents mothers were statistically significantly associated with stunting. Most pupils had adequate knowledge of basic nutrition (98% in Private and 96% in Public), with no significant difference in the knowledge levels between the two groups. Based on the findings of this study, establishment of a school nutrition programme in the Local Government Area and improving socio-economic status of mothers with children of school age were among the recommendations proffered to help reduce the levels of underweight and stunting observed.

Keywords: *Nutrition, underweight, children, parents, wasting, BMI*

1. Introduction

Nutritious diet is generally needed for human well-being and good health. The body is deemed to be in state of good nutrition when it assimilates all the dietary nutrients present in appropriate amounts as required. However, when the nutrients provided in the diet are inadequate or not utilised properly, it results in a state of imbalance in the body. If this continues for some time, it may develop into a severe health and physical problem which may even prove fatal if not promptly managed. Thus, nutritional status is described as the condition of health of an individual that is determined by the intake and assimilation of nutrients. Individuals with a good nutritional status usually display no evidence of malnutrition (Atawodi et al., 2015). Healthy and adequate nutrition is very crucial for everyone, but it is especially important for the growing children to meet its active metabolic needs of good health and fitness (WHO, 1999).

Malnutrition has been a major public health and developmental issue especially among the children in developing nations leading to their high morbidity and mortality. The major factors associated with of malnutrition especially in developing countries had been reported to include poverty and ignorance (Odunayo and Oyewole, 2006). Like other African countries, reports abound on the negative effects of prevalence of poor nutritional status among pre- and school age children in many Nigerian states (Abioye and Ihebuzor, 2001; Ijarotimi, & Ijadunola, 2007; Ekpo et al., 2008; Okoroigwe and Okeke, 2009; Babar et al., 2010; Goon et al., 2011; Ekekezie et al., 2012; Adegun et al., 2013; Atawodi et al., 2015). Findings from these reported has brought to limelight the high rate of

nutritional deficiencies and its impending dangers on the well-being and performance of Nigerian children. According to Kretchmer et al., 1996, proper nutrition during the early years of a child's life has been linked to better performance in later years.

Children are the world's most valuable asset and their health status is a good proxy for the standard of living of any country. Nutritional status still remains the best indicator to assess their well-being. Inadequate nutrition has been proven to have an important implication in cognitive behavior. The first two goals of the Millennium Development Goals (MDGs) focus on reducing extreme poverty and hunger, while the fourth aims at the reduction of Child mortality. Literature has shown that majority of the deaths occurring amongst children is caused by infections and lack of food (Nandy et al., 2005). Hence, there is need to intensify the study and highlight the need to frequently review the burden of malnutrition in those places where malnutrition appears to be predominant.

Although, there are no reliable data on malnutrition among school children in Ikot Ekpene Local Government Area which generalization could be made; however, a cursory observation of the school children by researchers shows a look of undernourishment among them. Past studies have shown that there is a remarkable difference in the nutritional status of private and public owned schools in other parts of Nigeria (Ijarotimi, & Ijadunola, 2007; Amuta and Houmnsou, 2009; Ekekezie et al., 2012; Adegun et al., 2013; Atawodi et al., 2015).

Hence, this study was undertaken to assess and compare the nutritional status of pupils in public and private primary schools in Ikot Ekpene Local Government Area of Akwa Ibom State, Nigeria, as well as to determine their knowledge levels on basic nutrition and possibly identify the factors that affect their nutritional status. This would provide a base line for future studies, and evidence to influence nutrition policies in the study area especially those pertaining to school children as well provide intelligent suggestions and data that would improve their nutritional status for adequate health and fitness.

2. Materials and Methods

2.1. Ethical Consideration

Permission was sought and obtained from the Local Government Education Authority and from the head teachers of the selected schools. A verbal informed consent was sought and obtained from the pupils' parents/guardians while the pupils gave verbal assent before being assessed.

2.2. Study Area

Ikot Ekpene Local Government Area is one of the 31 local government areas in Akwa Ibom State in the South-South, Nigeria. Its headquarters is at Ikot Ekpene town and is located on latitude 5°11" north of the equator and longitude 7°43" east of the Greenwich meridian. It has 11 political wards and covers a land mass of 1,460 km and it is located on the A342 highway that parallels the coast between Calabar to the South East and Aba to the West, with the State Capital, Uyo on the road just leading to the East and Umuahia is the next major town to the north. Ikot Ekpene, known throughout Nigeria as "The Raffia City" or locally simply as "IK" is a semi-urban LGA in the southern Nigeria, in Akwa Ibom State. It is political and cultural capital of the Annang ethnic group in Nigeria. Ikot Ekpene is known as a regional center of commerce, with notable exports of palm products especially palm oil, kernels, raffia products including raffia fibres and its sweet wine, as well as ground crops of yams, cassava and corn. The population is made up primarily of the Annang people with a small number of Igbo traders and Hausa suya vendors. The LGA has a projected population of 254,806 people from the 2006 national population census. Ikot Ekpene LGA has numerous health facilities that provide different health care services at all levels. These include 1 general hospital, 11 primary health care centers controlled by the local government authority, 37 private clinics, many laboratories and patent medicine stores.

2.3. Study Sites

Two public and two private schools were randomly selected from primary schools lists obtained from the LGA Education Authority. The public schools were: St. Francis primary School, Ikot Osurua which has a population of 380 pupils and community primary School, Ikot Inyang which has 465 pupils, and Holly Child Private Nursery and Primary school, Ifuho and Liberty Model Private School, Utu with a combined population of 420 pupils (Fig. 1). All the schools have pupils of both sexes, with the public schools having classes from primary 1-6 and the private schools having pupils in only primary 1-5.

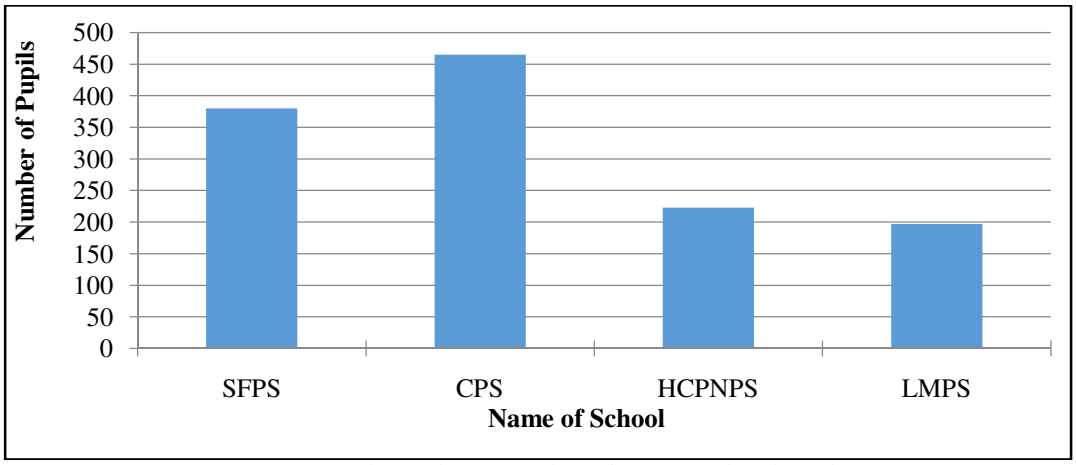

Figure 1: The study sites and number of pupils selected
SFPS=Saint Francis Primary School, Ikot Osura; CPS=Community Primary School, Ikot Inyang; HCPNPS=Holly Child Private Nursery and Primary School, Ifuho; LMPS=Liberty Model Private School, Utu

2.4. Study Population
The study population included all duly registered school children between the ages of 7-11 years attending both public and private primary schools in Ikot Ekpene LGA.

2.5. Study type
The study was of a comparative cross-sectional design.

2.6. Sample Size Determination
The sample size was calculated using the formula for difference in proportions for comparative studies (Cochran, 1963).

$$N = 2.\ \frac{[Zcrit\ \sqrt{2p\ (1-p)} + ZPwr\ \sqrt{P_1(1-P_1)\ (1-P)} + ZPwr\ VP_1\ (1-P_1) + P_2\ (1-P_2)]^{\ 2}}{D^2}$$

Where;
N = required sample size
Zcrit = Standard Normal Deviate at 95% significant criteria with a value of 1.960
Zpwr = Standard' Normal Deviate at 0.80 Statistical Power with a value of 0.842
P1 = Pre-study estimates of Prevalence of Malnutrition among public Primary school pupils= 39.98%[4]
P2 = Pre-study estimates of prevalence of malnutrition among private primary schools =29.24%[4]

$$P = \frac{P1+P2}{2}$$

$$= \frac{0.3998 + 0.2928}{2} = 0.058$$

$$D=P1 - P2 = 0.1074$$

Therefore, $D^2 = 0.0\ 12$

$$N = 2.\ \frac{[1.96\sqrt{2x0.058\ (1-0.058)} + 0.842\sqrt{0/3998\ (1-0.3998)} + 0.2928(1-0.2928)]^2}{0.012}$$

$$N = 244$$

Fifty-six (56) pupils were added to increase the precision of the study, making it up to 300 pupils.

2.7. Inclusion Criteria
All pupils in classes 1-5 between the ages of 7-11 years.

2.8. Exclusion Criteria
- Primary six (6) pupils in public schools.
- Acutely ill pupils.
- Pupils above eleven years' old

2.9. Sampling Techniques
The multi-stage sampling technique was used to select study subjects as described below:

- Stage 1: Two wards were selected by simple random sampling (balloting) from a sample frame consisting of the 11 wards in the LGA.
- Stage 2: Four primary schools were selected by simple random sampling (balloting) i.e. one public and one private in each selected ward, out of 113 public and 70 private primary schools in the LGA.
- Stage 3: The ratio of pupils studied between private and public schools was 1:2 based on the relative proportion of the number of pupils in private and public primary schools obtained from the Local Education Authority. For each class, an arm was randomly selected and all the pupils studied, while in schools that had only one arm, all the pupils in that class were studied.

2.10. Data Collection Toll

A validated structured questionnaire was adapted for this study. It had three sections:

→ Section A: Socio-demographic characteristics of the pupils.
→ Section B: Anthropometric measurements of the pupils
→ Section C: Nutritional knowledge of the pupils.

The questionnaire was pre-tested among 20 pupils in Ikot Inyang Community Primary School and was interviewer administered. Six research assistants were trained for two days on administering the questionnaire and carrying out anthropometric measurements. A Seca manufactured weighing scale was used to weigh the pupils. They had minimal clothing on them. The weight measurements were recorded to the nearest 0.5kg. A height meter rule was used to measure the height of the pupils to the nearest 0.1cm, with the pupils standing erect having their occiputs, shoulder blades and buttocks touching the meter.

2.11. Data Analysis

Data was entered in Microsoft Excel sheet and analyzed using the EPI-Info 7 statistical software.

The WHO 2007 reference population was used in assessing nutritional status. Frequency distributions were used to describe variables and cross tabulations used to examine relationships between them. Absolute numbers and simple percentages were compared by Chi-square test. All statistical analysis was at 5% level of significance. Similarly, quantitative variables were described using measures of central tendency and dispersion.

2.12. Scoring System

Correct responses to questions in the nutritional knowledge section of the questionnaire were scored one while wrong responses or non-response was scored zero.

3. Results

It was observed from the analysis of class and age structures of the respondents (Table 1 and 2), that majority of the pupil belongs to primary one class pupil (26.7%) and 11 years old ((30.0%). There was no significant difference between the classes of the respondents and their school type (p = 0.1014). Similarly, no significant difference was noted between the age distribution of pupils in both schools (p = 0.9516). It was also observed that most of the pupils were of the Annang tribe (57.3%), while the Igbos and Hausa/Fulanis made were 23.7% and 5.3% of the study population respectively (Table 3). There were more of other tribes (3.0%) in private schools than in public schools. Also, there was no statistically significant difference in the distribution of respondents' tribes by school type (p = 0.3685).

Class of Pupil	Private School (%)	Public School (%)	Total (%)
1	36 (36.0)	44 (22.0)	80 (26.7)
2	16 (16.0)	34 (17.0	50 (16.7)
3	22 (22.0)	47 (23.5)	69 (23.0)
4	16 (16.0)	43 (21.5)	59 (21.7)
5	10 (10.0)	32 (16.0)	42 (14.0)
Total (%)	**100 (33.3)**	**200 (66.7)**	**300 (100.0)**

Table 1: Classes of the respondents and their schools

X^2 =7.745, p = 0.1014

Age (Years)	Private School (%)	Public School (%)	Total (%)
7	15 (15.0)	22 (11.0)	37 (12.3)
8	13 (13.0)	23 (11.5)	36 (12.0)
9	18 (18.0)	35 (17.5)	53 (17.7)
10	14 (14.0)	70 (35.0)	84 (28.0)
11	40 (40.0)	50 (25.0)	90 (30.0)
Total (%)	**100 (100.0)**	**200 (100.0)**	**300 (100.0)**

Table 2: Age distribution of respondents

t= 0.060, p = 0.9516

Tribe	Private School (%)	Public School (%)	Total (%)
Annang	68 (68.0)	133 (66.5)	172 (57.3)
Igbo	26 (26.0)	52 (26.0	71 (23.7)
Hausa/Fulani	3 (3.0)	13 (6.5)	16 (5.3)
Others	3 (3.0)	2 (1.0)	5 (1.7)
Total (%)	**100 (33.3)**	**200 (66.7)**	**300 (100.0)**

Table 3: Distribution of respondent' tribes by schools

x = 3.154, p = 0.3685

The study further revealed that a similar proportion (59.0%) of the pupils in the two school groups live with both parents (Table 4). Pupils in public schools are three times more likely to live with only their fathers. Most of the respondent's fathers were artisans, with those in public and private schools attaining secondary and tertiary education as their respective highest educational qualifications. The vocation and highest educational attainment of mothers follows the same patterns (Table 4). There was no significant difference between the pupils living with parents in both school types (p= 0.1421). However, significant differences were noted between the pupils in both schools, in the occupation of the father (p 0.0001), highest educational level of the father (p = 0.0001), mother's occupation (p= 0.0146) and mother's highest educational level (p = 0.0001).

Variables	Private School (%)	Public School (%)	
Person (s) the pupil live with			
Father only	4 (4.0)	25 (12.5)	$X^2 = 6.884$
Mother only	25 (25.0)	39 (19.5)	P = 0.1421
Both parents	59 (59.0)	118 (59.0)	
Relatives	4 (4.0)	5 (2.5)	
Others	8 (9.3)	13 (6.5)	
Total	100 (100.0)	200 (100.0)	
Father's/Male caregivers occupation			
Senior managerial/professional	25 (25.0)	24 (12.0)	Fishers' exact
Mid-level managerial	23 (23.0)	27 (13.5)	P = 0.0001
Artisans	43 (43.0)	93 (46.5)	
Unskilled	7 (7.0)	56 (28.0)	
Don't know	2 (2.0)	0(0.0)	
Total	100 (100.0)	200 (100.0)	
Father's/Male care-givers highest level of education			
No formal education	0(0.0)	11(5.5)	
Primary	7(7.0)	23(11.5)	Fishers' exact
Secondary	29 (29.0)	85 (42.5)	P = 0.0001
Tertiary	38 (38.0)	52 (26.0)	
Koranic	0(0.0)	13 (6.5)	
Don't know	26 (26.0)	16 (8.0)	
Total	100(100.0)	200(100.0)	
(d). **Mother's/Female care-givers occupation**			
Senior managerial professional	9 (9.0)	15 (7.5)	$X^2 = 6.884$
Mid-level managerial	32 (32.0)	31(15.5)	P = 0.0146
Artisans	45 (45.0)	111 (55.5)	
Unskilled	13 (13.0)	38 (19.0)	
Unemployed	1 (1.0)	5 (2.5)	
Total	100(100.0)	200 (100.0)	
(e). **Mother's/Female care-givers education**			
No formal education	1(1.0)	4 (2.5)	Fishers' exact
Primary	9 (9.0)	46 (23.0)	P = 0.0001
Secondary	13 (13.0)	79 (39.5)	
Tertiary	48 (48.0)	48 (24.0)	
Koranic	0(0.0)	2(1.0)	
Don't know	29 (0.0)	21(42.0)	
Total	100 (100.0)	200 (100.0)	

Table 4: Socio-Demographic Characteristics of Parents Care-Givers

The analysis of the weight for age distribution of pupils by school type (Table 5) showed that most pupils had normal weights (81% and 73.5% for private and public schools respectively). The pupils in public school had relatively higher mild underweight (21.5 %) but with no overweight while their private counterpart had 16.0% and 2.0 % of mild underweight and overweight respectively (Table 5). Age was significantly associated with weight in both private (p =0.001) and public (p = 0.0001) schools. It was also discovered from the comparison of weight for height of the pupils that there were more stunting among pupils in public schools (55.5%) than in private schools (34.0%) (Table 6). The severity was also more in the public schools. Age was also found to be significantly associated with stunting in both private (p = 0.000 1) and public (p = 0.001). Pupils of private schools were relatively taller than pupils of public schools.

School Type	Moderate underweight	Mild underweight	Overweight	Normal weight	Total
Private	1 (1.0)	16 (16.0)	2 (2.0)	81 (81.0)	100 (100.0)
Public	10 (5.0)	43 (21.5)	0 (0.0)	147 (73.5)	200 (100.0)
Total	11 (3.7)	59 (19.7)	2 (0.7)	228 (76.0)	300 (100.0)

Table 5: Weight for age distribution of pupils by school type

School Type	Moderate stunting	Mild stunting	Severe stunting	Normal stunting	Total
Private	13 (13.0)	20 (20.0)	1 (1.0)	66 (66.0)	100 (100.0)
Public	32 (16.0)	66 (33.0)	13 (6.5)	89 (44.5)	200 (100.0)
Total	45 (15.0)	80 (28.7)	17 (4.7)	155 (51.7)	300 (100.0)

Table 6: Comparison of height for age between pupils in private and public schools
Fisher's exact p = 0.0001

The analysis of weight for height as shown in Table 7 indicated that 4.0 % and 5.0 % of pupils in private schools were overweight and obese respectively, while 8.5% of those in public schools were overweight. Obesity was not recorded in public schools. 15.0% of pupils in private schools and 13.0% in public schools were wasted. Age was significantly associated with wasting in private schools (p= 0.003) and public schools (p=0.000l). Pupils in private schools had better weights corresponding to heights than pupils in public schools.

School Type	Moderate underweight	Mild underweight	Over weight	Obese	Normal weight	Total
Private	0 (0.0)	11 (11.0)	4 (4.0)	5 (5.0)	80 (8.0)	100 (100.0)
Public	2 (1.0)	22 (11.0)	17 (8.5)	0 (0.0)	159 (79.5)	200 (100.0)
Total	2 (0.7)	33 (11.0)	21 (7.0)	5 (1.7)	239 (79.7)	300 (100.0)

Table 7: Weight for height distribution of pupils by school type and age
Fisher's exact p = 0.0001

A comparison of the BMI between the school type (Table 8), showed that almost pupils in both school type had relatively similar proportions (84.0% in private schools and 85.0% in public schools) of healthy weights. Unhealthy weight was found more among pupils in public than private schools. Pupils in public schools were more overweight (11.5%) and underweight (2.5 %), while their private counterparts only displayed more obesity (6.0%). School type was not significantly associated with BMI. The private school pupils had better BMI than public school pupils.

School Type	Under weight	Over weight	Obese	Healthy weight	Total
Private	0 (0.0)	10 (10.0)	6 (6.0)	84 (84.0)	100 (100.0)
Public	5 (2.5)	23 (11.5)	2 (1.0)	170 (85.0)	200 (100.0)
Total	5 (1.7)	2 (1.0)	8 (2.7)	254 (84.7)	300 (100.0)

Table 8: Comparison of BMI between pupils in private and public schools

The results of association between sex and weight for age (Table 9) revealed that 80.0% of private school pupils and 73.5% of public school pupils had normal weights corresponding to their ages. 13.0% of private school pupils and 26.5% of pupils in public schools had all forms of underweight. Underweight was more prevalent in public school pupils than private school pupils. There was no statistically significant association between underweight and the sex of respondents for either private (p = 0.290) and public (p = 0.152) schools. Boys in both school types had better weights than the girls.

School Type	Sex	Moderate underweight	Mild underweight	Over weight	Normal weight	Total	
Private	Male	0 (0.0)	6 (12.8)	0 (0.0)	40 (87.2)	47 (100.0)	Fisher's exact p=0.290
	Female	1 (1.9)	10 (18.9)	2 (3.8)	40 (75.5)	53 (100.0)	
	Total	1 (1.0)	16 (10.0)	2 (2.0)	80 (80.0)	100 (100.0)	
Public	Male	4 (4.0)	27 (26.7)	0 (0.0)	70 (69.3)	101 (100.0)	Fisher's exact p=0.152
	Female	6 (6.1)	16 (16.2)	0 (0.0)	77 (77.8)	99 (100.0)	
	Total	10 (5.0)	43 (21.5)	0 (0.0)	147 (73.5)	200 (100.0)	

Table 9: Association between sex and weight for age

Also it was revealed from this study 66.0% of private school pupils and 44.5% of public schools had normal heights for their ages, while 44.0% and 55.5 % of the pupils in private and public schools had various forms of stunting (Table 10). Sex of respondents was not statistically significantly associated with stunting in either school type (Private: p = 0.160; Public: p = 0.890), Girls were generally taller compared to the boys. On the other hand, a comparison of the association between sex and weight for height (Table 11) showed that 80.0% of private school pupils and 79.5% of pupils in public schools had normal weights corresponding to heights, while 11.0 % of private and 13% of pupils in public schools had various forms of wasting. Moreover, 4.0 -5.0 % private school pupils were overweight and obese, while 8.5% of pupils in public schools were overweight. Boys have healthier weights, corresponding to their heights than girls. The sex of respondents was found to be significantly associated with wasting in both private (p 0.001) and public (p = 0.0001) primary schools. Also, sex was found to have no significant relationship with the BMI of pupils in this study.

School Type	Sex	Moderate stunting	Mild stunting	Severe stunting	Normal weight	Total	
Private	Male	4 (8.5)	13 (27.7)	0 (0.0)	30 (63.8)	47 (100.0)	Fisher's exact p=0.177
	Female	9 (17.0)	7 (13.2)	1 (1.9)	36 (67.9)	53 (100.0)	
	Total	13 (13.0)	20 (20.0)	1 (1.0)	66 (66.0)	100 (100.0)	
Public	Male	18 (17.8)	32 (31.7)	7 (6.9)	44 (43.6)	101 (100.0)	X^2=0.629 p=0.890
	Female	14 (14.1)	34 (34.3)	6 (6.1)	45 (45.5)	99 (100.0)	
	Total	32 (16.0)	66 (33.0)	13 (16.5)	89 (44.5)	200 (100.0)	

Table 10: Association between sex and height for age

School Type	Sex	Moderate wasting	Mild wasting	Over weight	Obese	Normal weight	Total	
Private	Male	0 (0.0)	0 (0.0)	4 (6.4)	4 (8.5)	40 (85.1)	47 (100.0)	Fisher's exact p=0.001
	Female	0 (0.0)	11 (20.8)	1 (1.9)	1 (1.9)	40 (75.1)	53 (100.0)	
	Total	0 (0.0)	11 (11.0)	4 (4.0)	5 (5.0)	80 (80.0)	100 (100.0)	
Public	Male	0 (0.0)	5 (5.0)	14 (13.9)	0 (0.0)	82 (81.2)	101 (100.0)	Fisher's exact p=0.0001
	Female	2 (2.0)	17 (17.0)	3 (3.0)	0 (0.0)	77 (77.8)	99 (100.0)	
	Total	2 (2.0)	22 (11.5)	17 (8.5)	0 (0.0)	159 (79.5)	200 (100.0)	

Table 11: Association between sex and weight for height

Table 12 revealed that 41 and 58 pupils in private schools belong to the high income and low-income groups respectively, while 46 and 41 pupils in public schools belong to those two same groups respectively. 12.3% and 15.2% of wasted pupils in both private and public schools respectively had mothers' in high income groups, while 19% and 11.4% of wasted pupils in private and public schools respectively had mothers in the low income group. 5.2% and 2.5% of overweight children in private schools belong to mothers in the low and high income groups, while 8.1% and 4.3% belongs to the same category in public schools. Of those with normal weight for height, 85.4% and 75.9% had mothers in both high and low-income groups respectively in private schools while similar proportions (80%) has mothers in both high and low-income groups respectively for public schools. The occupation of respondents' mothers in both school types was significantly associated with wasting.

Frequency (%)										
	Private (%)					Public (%)				
Occupation	Moderate wasting	Mid wasting	Over weight	Normal weight	Total	Moderate wasting	Mid wasting	Over weight	Normal weight	Total
High income	1 (2.5)	4 (9.8)	1 (2.5)	35 (85.4)	41 (100.0)	1 (2.2)	6 (13.0)	2 (4.3)	37 (80.5)	46 (100.0)
Low income	4 (6.9)	7 (12.1)	3 (5.2)	44 (75.9)	58 (100.0)	16 (10.7)	16 (10.7)	12 (8.1)	120 (80.5)	149 (100.0)
Others	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)	0 (0.0)	3 (60.0)	2 (40.0)	5 (100.0)
Total	5 (5.0)	11 (11.0)	4 (4.0)	80 (80.0)	100 (100.0)	22 (11.0)	22 (11.0)	17 (8.5)	159 (79.5)	200 (100.0)

Table 12: Association between mother's occupation and weight for height in primary schools

Fisher's exact p = 0.003 Fisher's exact p = 0.001

The results for the association between mother's occupation and height for age (Table 13) shows that 26.8 % and 63% of stunted pupils in both private and public schools respectively had mothers in the high income groups, while 37.9% and 52.4% of stunted pupils in private and public schools respectively had mothers' in the low income group. Of those with normal heights for age, 73.2 % and 62.1% had mothers in both high and low-income groups respectively in private schools while 37.0% and 4.7% percent had mothers in both high and low income groups respectively for both private and public schools, Occupation of respondents' mothers in public schools was found to be significantly associated with stunting (p = 0.001) in public schools but not in private schools (p = 0.5 82).

Frequency (%)										
	Private (%)					**Public (%)**				
Occupation	Moderate stunting	Mid stunting	Severe stunting	Normal height	Total	Moderate stunting	Mid stunting	Severe stunting	Normal height	Total
High income	5 (12.2)	6 (14.6)	0 (0.0)	30 (73.2)	41 (100.0)	11 (23.9)	13 (28.3)	5 (10.8)	17 (37.0)	46 (100.0)
Low income	8 (13.8)	13 (22.4)	1 (1.7)	36 (62.1)	58 (100.0)	21 (14.1)	49 (32.9)	8 (5.4)	7 (4.7)	149 (100.0)
Others	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	4 (80.0)	0 (0.0)	1 (20.0)	5 (100.0)
Total	13 (13.0)	20 (20.0)	1 (1.0)	66 (66.0)	100 (100.0)	32 (16.0)	66 (33.0)	13 (6.5)	89 (44.5)	200 (100.0)

Table 13: Association between mother's occupation and height for age in primary Schools

Fisher's exact p = 0.582 Fisher's exact p = 0.001

On the association between mother's highest educational level and weight for height shown in Table 14, it was found that 11.8% and 12% of wasted pupils in both private and public schools respectively had mothers that had primary education; 7.7% and 21.65 respectively had mothers with secondary education; 9% and 15.8% had mothers with tertiary education; 20% and 14.2% had mothers' with other forms of education, while 12.7% and 48.1% were overweight pupils in private and public schools respectively with a higher percentage in the "others" group. Of those with normal weights for height, 80% and 79.5% had mothers in all categories of educational level attained for both private and public schools respectively. Significant association was established between the highest level of education attained by respondents' mothers and their weight for height in public primary schools (P=0.030) but it was not established in the private primary schools (0.241).

Frequency (%)										
Highest Educational level	**Private (%)**					**Public (%)**				
	Moderate wasting	Mid wasting	Over weight	Normal weight	Total	Moderate wasting	Mid wasting	Over weight	Normal weight	Total
Formal	0 (0.0)	1 (100.00	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	4 (100.0)	4 (100.0)
Primary	0 (0.0)	1 (11.1)	0 (0.0)	8 (88.9)	9 (100.0)	4 (8.7)	2 (4.3)	2 (4.3)	40 (87.0)	46 (100.0)
Secondary	0 (0.0)	0 (0.0)	0 (0.0)	12 (92.3)	13 (100.0)	0 (0.0)	10 (12.7)	7 (8.9)	62 (78.5)	79 (100.0)
Tertiary	1 (4.5)	11 (11.0)	2 (9.1)	18 (81.8)	22 (100.0)	2 (1.0)	5 (14.8)	3 (11.1)	38 (74.1)	48 (100.0)
Others	4 (7.3)	7 (12.7)	2 (3.6)	42 (76.4)	55 (100.0)	0 (0.0)	3 (14.2)	5 (23.8)	15 (65.2)	23 (100.0)
Total	5 (5.0)	11 (11.0)	4 (4.0)	80 (80.0)	100 (100.0)	2 (1.0)	22 (11.0)	17 (8.5)	159 (79.5)	200 (100.0)

Table 14: Association between mother's highest educational level and weight for height

Fisher's exact p = 0.241 Fisher's exact p = 0.030

Furthermore, a similar trend was observed for the association between mother's highest educational level and weight for age in primary schools as depicted in Table 15. Significant association was established between the highest level of education attained by respondents' mothers and their weight for age in public primary schools (p= 0.001) but it was not established in the private primary schools (0.164).

Frequency (%)								
Highest Educational level	**Private (%)**				**Public (%)**			
	Moderate Underweight	Mild Underweight	Normal weight	Total	Moderate Under weight	Mild Underweight	Normal weight	Total
Formal	0 (0.0)	1 (100.00	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	4 (100.0)	4 (100.0)
Primary	0 (0.0)	2 (22.2)	7 (77.8)	9 (100.0)	5 (10.9)	5 (10.9)	36 (78.3)	46 (100.0)
Secondary	0 (0.0)	3 (23.1)	10 (76.9)	13 (100.0)	1 (1.3)	24 (30.4)	54 (68.4)	79 (100.0)
Tertiary	0 (0.0)	2 (9.1)	20 (90.9)	22 (100.0)	3 (6.3)	10 (20.8)	35 (72.9)	48 (100.0)
Others	1 (1.7)	9 (16.3)	44 (80.0)	55 (100.0)	1 (4.3)	4 (17.4)	18 (78.3)	23 (100.0)
Total	1 (1.0)	16 (16.0)	81 (81.0)	100 (100.0)	10 (5.0)	43 (21.5)	147 (73.3)	200 (100.0)

Table 15: Association between mother's highest educational level and weight for age in primary schools

Fisher's exact p =0.164 Fisher's exact p = 0.001

Additionally, it was found in this study that a high percentage of the pupils had adequate knowledge of basic nutrition (Table 16). There is no significant difference in their knowledge levels (p = 0.243). Also, Age of pupils has no significant relationship with their knowledge of basic nutrition in both private (p = 0.311) and public schools (p = 0.767).

Knowledge level (%)						
	Private (%)			**Public (%)**		
Age	Adequate	Inadequate	Total	Adequate	Inadequate	Total
7	14 (93.3)	1 (6.7)	15 (100.0)	21 (95.5)	1 (4.5)	22 (100.0)
8	12 (92.3)	7 (7.7)	13 (100.0)	23 (100.0)	0 (0.0)	23 (100.0)
9	18 (100.0)	0 (0.0)	18 (100.0)	34 (97.1)	1 (2.9)	35 (100.0)
10	13 (92.9)	1 (7.1)	14 (100.0)	67 (95.7)	3 (4.3)	70 (100.0)
11	40 (100.0)	0 (0.0)	40 (100.0)	49 (98.0)	1 (2.0)	50 (100.0)
Total	97 (97.0)	3 (3.0)	100 (100.0)	197 (97.0)	6 (3.0)	200 (100.0)

Table 16: Association between age of pupils' schools and their knowledge levels of nutrition

Fisher's exact p = 0.311 Fisher's exact p = 0.767

Finally, it was observed that while more girls had adequate knowledge of nutrition level than boys in the private schools, the proportion was similar in public schools (Table 19). The sex of pupils in both school types, however, has no significant association with their knowledge level about nutrition.

Knowledge level (%)						
	Private (%)			**Public (%)**		
Sex	Adequate	Inadequate	Total	Adequate	Inadequate	Total
Male	46 (97.7)	1 (2.1)	47 (47.0)	98 (97.0)	3 (3.0)	101 (100.0)
Female	51 (76.2)	2 (3.8)	53 (53.0)	96 (97.0)	3 (3.0)	99 (100.0)
Total	97 (97.0)	3 (3.0)	100 (100.0)	194 (97.0)	6 (3.0)	200 (100.0)

Table 17: Association between sex of pupils and their knowledge levels

Fisher's exact p = 0.521 $X^2 = 0.001$, p = 0.863

4. Discussion

Nutrition has a great impact on the health of populations, especially in children. Their learning capacity and quality of life in general are dependent on good nutrition. This study assessed and compared the nutritional status of private and public schools in Ikot Ekpene Local Government. Three hundred pupils were studied, which is similar to a study carried out in Ibadan. This study showed that the mean age of respondents was 9.51 years with majority of the respondents being primary one pupils. Two-thirds of the sampled respondents were public primary school pupils which is similar to findings from other Nigeria studies (Amuta and Hownsou, 2009; Fetuga et al., 2011; Goon et al., 2011; Adegun et al., 2013)

Thirty-three point four percent (33.4%) of the respondents were private school pupils while 66.6% were public school pupils, similar to the study carried out in Ekiti schools where 66.3% and33.7% were of public and private schools respectively (Adegun et al., 2013). Similarly, the proportion (59%) of the pupils living with both parents as at the time of the study were identical but statistics from the results shows that public school pupils are three times more likely to live with only their fathers. This might be as a result of more mothers taking up employment to boost the economic standards of the family, divorce, death of the mother and other issues. Most respondents' fathers were artisans; private (45%) and Public (40.5%). There is not much variation, but one could expect the value to be much in public schools. The possible reason for the change could be attributed to the fact that more parents want their children to be in private schools because of better attention and care. Most of the parents of respondents' in private schools had higher educational level than their public counterparts. Findings from this study also showed that a higher percentage of parents in the private schools belong to higher socio-economic class. Similar findings had been reported earlier (Manandhar et al., 2008; Ekekezie et al., 2012)

The mean values of weight, height and BMI are 27.49+3.53kg, 126.98 ± 4.5cm and 17.37 ± 1.80kg/m for private schools and 28.222 ± 4.45kg, 127.13 ± 6.40cm and 17.29 ± 2.40 kg/rn for public schools. They were relatively similar to the mean values obtained by Fetuga et al. (2011) in their study in Shagmu, southwestern Nigeria, but widely different from the study carried out among school children in Makurdi, Nothern Nigeria (Goon et al., 2011). The differences observed could be attributed to the differences in the Socio-demographics factors between the states.

This study also revealed high level of malnutrition among the pupils and prevalence of underweight (17% in private and 26.15% in public schools). The relatively high prevalence of malnutrition and underweight in public schools could be attributed to challenges of financial and socio-economic background. A similar submission was submitted by previous workers (Goon et al., 2011; Fetuga et al., 2011; Atawodi et al., 2013). It was also observed from our study that generally the females were more underweight than the males. This is consistent with trends from previous investigations in Nigeria where the boys weigh more than the girls. However, this trend is different from the study of Goon et al (2011) where girls were weightier than boys after 1 year of age. It is not clear whether these gender - related differences had to do with ethnic studies. Sex of respondents in this study wasn't found to be significantly associated with underweight. It is more of a general problem of both sexes in the study area. It was equally found in this study that sex has no significant association with stunting in either school type. But generally, girls were taller than the boys. Sex of respondents was found

to be significantly associated with wasting in both private (P = 0.004) and public (p= 0.004) schools. Girls were found to be more wasted than their male mates in both school types. This could be attributed to their weight, which is relatively lower when compared with their heights.

The socio-economic status of respondent's mothers in public schools was found to be significantly associated with wasting (p= 0.004), but there was no significant association in the socio-economic status of mothers of pupils in private school to wasting. This might be due to the fact that the mothers of the pupils in private schools have higher financial and socioeconomic status than their public school's counterparts. This agrees with earlier studies (Joshi et al., 2011; Nabag, 2011) that mother's socio-economic class has an association with wasting but the higher the mother's socio-economic class, the less significant the relationship with wasting. Stunting was found to be significantly associated to mothers' occupation. However, no association was found for the occupation of the fathers and the pupils' nutritional status. This might be because a larger percentage of the fathers had at least secondary school education and probably more literate than those in the studies carried out in Khartoum and Nepal (Joshi et al., 2011; Nabag, 2011). There was significant association between the mothers' highest education level attained and underweight in respondents of public primary schools, which agrees with studies earlier reports (Nabag, 2011; Adegun et al., 2013

Most pupils in private (98%) and public (86.5%) had adequate knowledge about basic nutrition. There was no significance difference in their knowledge levels (P=0.473). This is different from findings of a study in Qwa Qwa, South Africa, where the pupils had fair knowledge of nutrition (Oldewage-Theron and Egal, 2010). This might be as a result of introduction of basic nutrition and hygiene practices in the curriculum of schools in Akwa-Ibom State. Moreover, there was no much impact of the introduced basic nutrition program the nutritional status of these pupils since they are not in charge of their own menu selection and preparation unlike as it's the case with their parents. This further explains why there was no statistically significant association between knowledge of nutrition and nutritional status obtained in this study. Also, age and sex of pupils had no significant association with their knowledge of basic nutrition in both private and public schools. this finding is also in line with reports of agrees with Oldewage-Theron and Egal (2010).

4.1. Conclusion

This cross sectional research carried out among pupils in public and private primary schools in Ikot Ekpene Local Government Area with the aim of assessing and comparing nutritional status using anthropometry, found the mean age of all the pupils to be 9.51 (± 1.36) years. Overall, 11.7% of the pupils were wasting while 7% and 1.7% were overweight and obese respectively. 23.4% were underweight and 48.4% had various degrees of stunting. The prevalence of under-weight was found to be 17.0% and 26.5% for private and public schools respectively, with the corresponding values for stunting being 14% and 22.5%. There was no statistically significant difference in observed anthropometric indices. Wasting was found to be significantly associated with the age respondents in both private (p = 0.0041) and public (p = 0.001) schools, as was maternal socio-economic status (p=0.004). Occupation of respondent mothers was significantly associated with stunting (p=0.011). Mother's highest educational level was also found to be significantly associated with underweight (p=0.018). Most pupils had adequate knowledge of basic nutrition, private - 98% and public- 96.5% with no significant difference in knowledge level of the two groups. This study has shown that under-nutrition (underweight, stunting and wasting) is a major health problem among school children in Ikot Ekpene Local Government Area. The socio economic status is among the major contributing factors to this under-nutrition.

4.2. Recommendations

From the findings of this study, the following will help improve the nutritional status of children in the study area;

i. A school nutrition program should be established by the Local Government Education Authority to provide interventions, such as school lunch.
ii. Mothers in the Local Government Area should be empowered economically to improve income levels of families especially those with school age children.
iii. Nutrition education in primary schools in the Local Government Area should be sustained to maintain and reinforce their knowledge about basic nutrition.

5. References

i. Abidoye, R. O. & Ihebuzor, N. (2001). Assessment of nutritional status using anthropometric methods on 1-4 year old children in an urban ghetto in Lagos, Nigeria. Nutr Health 15:29-39.
ii. Adegun, J. A., Ajayi-Vincent, O. B. & Alebiosu, E. O. (2013); Differences In The Nutritional Status Of Young School Children From Public And Private Owned Primary Schools In Ekiti State, Nigeria. J. Rural Health. 9(7): 32-36.
iii. Amuta, E. U. & Houmsou, R. S. (2009). Assessment of nutritional status of school children in Makurdi, Benue state. Pak. J. Nutr. 8: 691-694.
iv. Atawodi, S. E., Aliyu, B., Abbas, O. & Ilouno, L. E. (2015). Nutritional Status of Primary School Children in Kawo District of Kaduna Metropolis, Nigeria. Ann. Res. Rev. Biol. 5(1): 64-70.
v. Babar N. F., Muzaffar, R., Khan, M. A. & Imdad, S. (2010). Impact Of Socioeconomic Factors On Nutritional Status In Primary School Children. J. Ayub. Med. Coll. Abbottabad. 22(4):15-18.
vi. Cochran, W. G. (1963). Sampling techniques, 2nd Ed., New York: John Wiley and Sons, Inc. p. 75
vii. Ekekezie, O. O., Odeyemi, K. A. & Ibeabuchi, N. M. (2012). Nutritional status of urban and rural primary school pupils in Lagos State, Nigeria. West Afr. J. Med. 31(4):232-237.

viii. Ekpo, U. F., Omotayo, A. M., & Dipeolu, M. A. (2008). Prevalence of malnutrition among settled pastoral Fulani children in Southwest Nigeria. Prevalence of malnutrition among settled pastoral Fulani children in Southwest Nigeria. BMC Res Notes. 1:7.
ix. Goon, D. T., Toriola, A. L., Shaw, B. S., Amusa, L. O., Monyeki, M. A., Akinyemi, O. & Olubola A Alabi, O.A. (2011). Anthropometrically determined nutritional status of urban primary school children in Makurdi, Nigeria. BMC Public Health. 11:769.
x. Ijarotimi, O. S. & Ijadunola, K. T. (2007). Nutritional status and intelligence quotient of primary school children in Akure community of Ondo State, Nigeria. Tanz. Health Res. Bull., 9(2)69-76.
xi. Joshi, H. S., Gupta, R., Joshi, M. C &. Vipul, M. (2011). Determinants of nutritional status of school children-A cross sectional study in the Western Region of Nepal. Nat. J. Integ. Res. Med. 2(1):10-14.
xii. Kretchmer, N., Beard, J. L., & Carlson, S. (1996). The role of nutrition in the development of normal cognition. Ame. J. Clin. Nutr, 63 (6), 997-1001.
xiii. Manandhar, N., Krishna, G. & Patowary, S. (2008). Nutritional status of Primary School Children. J. Inst. Med. 30(2): 11-14
xiv. Nabag, F. O. (2011). Comparative study of nutritional status of urban and rural school girls' children in Khartoum state. J. Sci. Technol. 12 (02):60-68.
xv. Nandy, S., Irving, M., Gordon. D., Subramanian, S. V. & Smith, G. D. (2005). Poverty, child undernutrition and morbidity: new evidence from India. Int. J Pub. Health. 83:3:210-216.
xvi. Odunayo, S. I. & Oyewole, A. O. (2006) Risk factors for malnutrition among rural Nigerian children. Asia Pac J Clin Nutr 2006, 15:491-495.
xvii. Okoroigwe, F. C. & Okeke, E. C. (2009). Nutritional status of preschool children aged 2 - 5 years in Aguata L. G. A of Anambra State, Nigeria Int. J. Nut Metab. 1(1):009-013.
xviii. Oldewage-Theron, W. H. & Egal, A. A. (2010). Nutrition Knowledge and Nutritional status of primary school children Qwa Qwa. South Afr. J. Clin. Nutr. 23(3):149-154.
xix. World Health Organization(1999). Management of Severe Malnutrition: A Manual for Physicians and other Senior Health Workers. Chapter 3: pp 48-82.