NUTRITIONAL STATUS AND ACADEMIC PERFORMANC OF SCHOOL AGE CHILDREN IN ILARO

[1*]Adepoju, A. B; [2]Coker, O. J
[1]Department of Nutrition and Dietetics, Federal Polytechnic Ilaro, Ogun State
[2]Department of Food Technology, Federal Polytechnic Ilaro, Ogun State
*Corresponding author: asquarebee@gmail.com; +2347037506965, +2348051588522

ABSTRACT

Poor nutritional status is one of the major public health problems; it can impair cognitive development. Continuous Evaluation of this problem will help in preventing its health consequences. A descriptive, cross-sectional survey using multistage sampling techniques was conducted among three hundred (300) school age children in Ilaro to assess their nutritional status and academic performance. A Semi-structured and interviewer administered questionnaire was used to obtain information on socio-demographic and economic characteristic of the respondents. Nutritional status was determined using anthropometric assessment method, weight-for-age, height-for-age, and body mass index for age was determined using World Health Organization (WHO) Anthro plus software. The educational performance of Pupils was assessed using end-term examination marks. Score obtained in English, mathematics and overall class performance in all subjects was determined. Data was subjected to both descriptive and inferential statistic, using statistical package for social sciences (SPSS version 20.0). Socio-economic and demographic characteristics shows that 50.7% of the respondents were male and majority of the respondents were between the age range of 6-10 years (99.3%), Yoruba (85.7%), practices Christianity religion (65.3%), and were from monogamous family (81.7%). The mean weight and height of male respondents was found to be higher than that of female respondents but the difference was not significant ($p>0.05$). The nutritional status assessment shows that 50.7% and 3.7% were moderately and severely stunted respectively, 32.7% were moderately underweight, 37.7% and 1.3% has moderate and sever low BMI for age. On academic performance, 45% perform excellently, 40.3 were above average while 14% were below average. Statistical significant association ($p<0.05$) was observed between academic performances and stunting. Academic performance was also significantly associated with some socio-economic and demographic characteristics. Conclusively, nutritional status was found to have a significant association with the academic performance of the pupils.

Key words: Academic performance, Nutritional status, School children.

BACKGROUND OF THE STUDY

Under-nutrition among school-age children (SAC) is a public health problem in developing countries (Best et al., 2010) and themost commonly reported nutrition problems among the school age group (SAG) is underweight and micronutrient deficiencies of iron, zinc, iodine, and vitamin A (Best et al., 2010). In Nigeria, under-nutrition constitutes a major health problem among the school age children (Oninla et al., 2007). School age children who suffered from early childhood malnutrition have been found to have poor intelligent quotient (IQ) levels, cognitive function and poor academic performance.

Various studies conducted by different researchers on malnourished children adopted by more affluent families indicate that intelligence improves markedly when health care; nutrition and stimulation are provided continually (Alderman et al., 2006, Victoria et al., 2008, Collombo et al 1992) and chronic malnutrition experienced during childhood inhibits growth, retards mental development, reduces motivation and energy level, causing a reduction in educational attainments and delay in school entry (Alderman et al., 2006).

Furthermore, the relationship between nutrition, health and educational achievement of school-age population in less-developed countries has been of interest to many researchers due to the frequent observation that many children did not complete primary education, and those who completed, did not perform well as children in the developed countries. Several studies in developing countries found that height-for-age, which is an indicator of stunting, is related to educational achievement (Shariff et al., 2000; Glewweet al., 2001; Alderman et al., 2001 and Aturupaneet al., 2006). Height-for-age reflects the accumulation of nutritional deprivation throughout the years, which may consequently affect the cognitive development of the children (Shariff et al., 2000). As a result of this, assessing the nutritional status and the educational performance of school age children in Ilaro, understanding the nature of the relationship will assist in formulating policy targeted at improving children nutritional status, thus improving the health status and promote academic performances in school.

MATERIALS AND METHODS

The Study Area

The study was conducted in Ilaro, the headquarters of the Yewa South Local government, Ogun state.

Research Design

This study was cross-sectional and descriptive in nature and involves the school children in Poly Staff Nursery & Primary School, Methodist Wesley Nursery & Primary School, Fazil-Omar Ahmadiyya in ilaro, Ogun State, Nigeria

Sampling Procedure

A multi-stage random sampling technique was used in the study which involve; purposive selection of Ilaro followed by random selection of three schools from the town and pupils (respondent) were systematically selected from primary one to three using a regular interval.

Sample size determination

The sample size was determined using Gibson formula (Gibson, 2004)

$$N = \frac{Z^2 p(1-q)}{d^2}$$

N = sample size, Z = standard normal variable for a 95% confidence level (1.96),

p = prevalence of the attribute (Using the estimated prevalence of stunting in ogun state of 17.4% by Idowu *et al.,* 2011),

q = 1–p,

d = precision (= 0.05).
The minimum sample size for the present study was calculated to be:

$$N = \frac{1.96 \times 1.96 \times 0.174 \times 0.826}{0.05 \times 0.05} = 221.$$

Another 20% was added to account for non-responses (Asika 2001), yielding a value of 265. This will be rounded up to 300.

Data collection

Data collection was done with the aid of semi-structure questionnaire with the following section; Socioeconomic and Demographic characteristic, Anthropometry measurement, Academic performance, and Morbidity pattern

Bio-data and Socio-economic characteristic

Bio-data and Socio-economic information of the respondent like age, sex, ethnic group, religion, family structure, occupation, educational level, estimated monthly income was obtained with a semi structure questionnaire.

Anthropometry Measurement

The pupil's height measurement was taken bare footed with the feet flat on the floor, the heels, buttocks, shoulders and back of the head touching the wall with the aid of specially constructed wooden stadiometer and measured to the nearest 0.1cm. Weight was measured using a digital bathroom weighing scale which was

calibrated periodically to ensure accuracy measured to the nearest kilogram (kg) and the readings were taken twice in order to obtain accurate readings. Thereafter, weight- for-age, height-for –age and weight-for-height indices were derived from anthropometric parameters.

Academic Performance

The student educational performance was assessed using end-term examination marks in English and mathematics and the overall performance was categorized into excellent, above average and below average.

Statistical analysis

The data from the study was subjected to both descriptive and inferential statistics. Descriptive statistics such as percentage, frequency, chat, mean and standard deviation was used. Chi-square test was used to test for the statistical significant association between the nutritional status and the academic performance of the pupils using statistical package for social sciences version 20.0. Z-scores of Height-for-age (HAZ), Weight-for-age (WAZ) and Body mass index–for-age (BMIZ) were used to define stunting, underweight and thinness, respectively using a cut-off value of <-2 standard deviation from the median value of the references, using WHO-Anthroplus software

RESULTS

Table 1 shows the socioeconomic and demographic characteristics of the respondents. 50.7% of the respondents were male, ages of respondents were between 6-10 years (99.3%), Yoruba (85.7%), practices Christianity religion (65.3%), and were from monogamous family (81.7%). Larger percentages (35.3%) of the pupils' father were teacher while more than half (59%) of the pupils' mother engage in personal businesses.

Table 2 shows the mean and standard deviation of the anthropometry measurement (weight, height and MUAC) of the pupils. It reveals that male pupils weigh more than female with the mean value of 23.20±4.507 and no significant difference was observed between the two mean values ($p > 0.05$). There are no significant differences in the height and mid-upper arm circumference of male and female pupils though the males were observed to be taller than the female pupils.

The prevalence of severe wasting in the present study as revealed in figure 1 is 1.3%, 3.7% were severely stunted, 50.7% were moderately stunted, 37.7% were moderately wasted and 32.7% has mild to moderate BMI for Age.

Figure 2, shows the overall academic performance of the school age pupils. It reveals that 45.0% of the pupils perform excellently in English and mathematics, 40.3% were above average and 14.0% were below average.

Table 1: Socio-economic and Demographic characteristic of the respondent

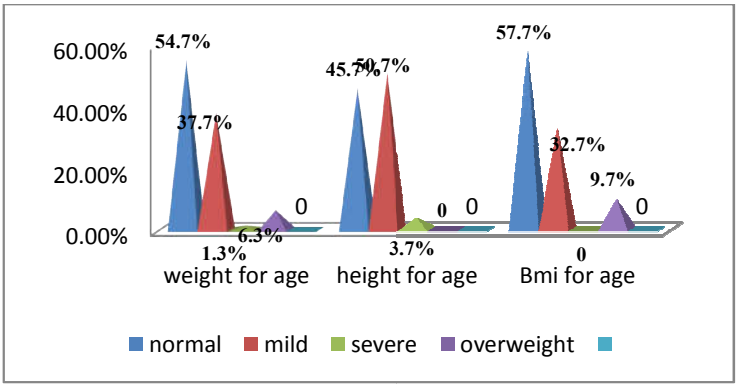
Variable	Frequency (n)	Percentage (%)
Sex		
Male	152	50.7
Female	148	49.3
Age		
1-5	2	0.7
6-10	298	99.3
Ethnic Group		
Yoruba	257	85.7

Igbo	39	13.0
Hausa	2	0.7
Igede	2	0.7
Religion		
Christianity	177	59.0
Islam	123	41.0
Family background		
Monogamy	245	81.7
Polygamy	55	18.3
Type of school		
Private school	163	54.3
Government school	137	45.7
Occupation of the mother		
Farmer	11	3.7
Civil servant	71	23.7
Personal business	177	59.0
Employee of private organization	23	7.7
Trader	11	3.7
House wife	7	2.3
Occupation of the father		
Farmer	34	11.3
Civil servant	43	14.3
Lecturer	13	4.3
Personal business	29	9.7
Teacher	106	35.3
Employee of private organization	48	16.0
Bike man	4	1.3
Driver	7	2.3
Clergy man	2	0.7

Table 2: Mean and standard deviation of Anthropometry measurement of the respondent

Variables	Male	Female	F	p-value
Weight (kg)	23.20±4.507	23.05±3.862	0.104	0.747
Height (m)	1.36±1.58	1.19±0.086	1.705	0.193
MUAC (cm)	17.30±2.01	16.69±2.94	2.013	0.157

*statistically significant at (p≤0.05)



Normal (≥−2SD), Mild/Moderately (<−2SD), severely (<−3SD

Figure 1: Nutritional status of the Pupils

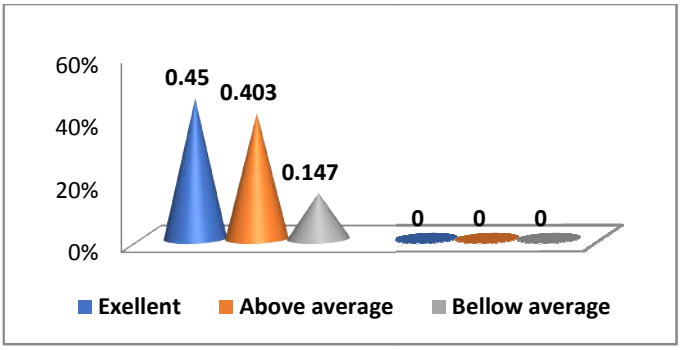


Fig 2: overall academic performance of the respondents

Table four below shows the association between nutritional status and academic performance of the pupils. It reveals that there is no significant association between weight-for-age (wasting), body mass index (BMI) for age and academic performance (p>0.05) but there is significant association between stunting and academic performance (p<0.05).

Table 3: Association between Nutritional Status and Academic Performance of the Pupils

Variables	Excellent	Abov avera
Weight for age (wasting)		
Normal (≥−2SD)	75(25.0)	62(20
Mild	44(14.7)	55(18
Severe	4(1.3)	0(0.0
Overweight	12(4.0)	4(1.3
Total	135(45)	121(4
Height for age (stunting)		
Normal	67(22.3)	44(14
Mild	65(21.7)	73(24
Severe	3(1.0)	4(1.3
Total	135(45.0)	121(4
BMI for age		
Normal	80(26.7)	66(22
	36(12.0)	49(16

Variable	Excellent	Above average	Below average	X^2	p-value
Sex					
Male	80(26.7)	58(19.3)	14(4.7)	6.134	0.005*
Female	55(18.3)	63(21.0)	30(10.0)		
Age					
1-5	0(0.0)	2(0.7)	0(0.0)	2.979	0.226
6-10	135(45)	119(42.1)	44(14.7)		
Ethnic group					
Yoruba	112(37.3)	101(33.7)	44(14.7)	13.126	0.041*
Igbo	19(6.3)	20(6.7)	0(0.0)		
Hausa	2(0.7)	0(0.0)	0(0.0)		
Igede	2(0.7)	0(0.0)	0(0.0)		
Religion					
Christian	75(25.0)	72(24.0)	30(10.0)	2.208	0.331

Islam	60(20.0)	49(16.3)	14(4.7)		
Family background					
Monogamy	114(38.0)	99(33.0)	32(10.7)	3.046	0.218
Polygamy	21(7.0)	22(7.3)	12(4.0)		
Type of school					
Private school	92(30.7)	59(19.7)	12(4.0)	24.884	0.000*
Public school	43(14.3)	62(20.7)	32(10.7)		
Occupation of mother					
Farmer	3(1.0)	88(2.7)	0(0.0)	57.203	0.000*
Civil servant	45(15.0)	17(5.7)	9(3.0)		
Personal business	70(23.3)	86(28.7)	21(7.0)		
Employee of private org	10(3.3)	6(2.0)	7(2.3)		
Trader	0(0.0)	4(1.3)	7(2.3)		
House wife	7(2.3)	0(0.0)	0(0.0)		
Mild					
Overweight				19(6.3)	7(2.3)
Total				135(45.2)	121(4

*statistically significant at ($p \leq 0.05$), Figures in parenthesis denote percentages.

The table 5 shows the association between bio-data/socio-economic and the academic performance of the pupils. Significant association was observed between academic performance of the pupils and sex, ethnic group, type of school, occupation of the mother ($p<0.05$) while bio-data/socio-economic characteristics like age, religion and family background was not statistically significant with academic performance ($p>0.05$)

Table 4: Association between socioeconomic/demographic characteristics of the respondent

*statistically significant at ($p \leq 0.05$), Figures in parenthesis denote percentages.

DISCUSSION

School age is a dynamic period of growth and development because children undergo physical, mental, emotional and social changes. In other words the foundations of good health and sound mind are laid during the school age period. Hence the present study was formulated with the objective, to assess the nutritional status of this age group and its association with the academic performance of the school-age children in Ilaro. Most of the school age children studied were between the ages of 6 and 10 years, Yoruba, practicing Christianity religion

and come from monogamy family with their parent engage in one or two thing to meet their needs and also live with the children. These characteristics translate to a suitable home environment that can support well- being of the children because the child's well-being is affected by his/her environment (including the home) which is largely influenced by the family structure.

Wasting, is an indicator for present under nutrition, stunting, an indicator for past or long term under nutrition, while under weight is a convenient synthesis of both present and past under nutrition. In the present study the prevalence of stunting, wasting and underweight was determined as a marker of under-nutrition. Half (50.7%) of the respondents were mildly stunted while 3.7% of the respondents were severely stunted. This is in contrast to the study conducted by Senbanjoet al.,2011 among the similar population in Abeokuta in which the overall prevalence of stunting was reported to be 17.7%. This difference is likely to stem from differential nutritional intake and socioeconomic status of the occupant of Ilaro compared to Abeokuta which is the capital city of the state. The findings of this study shows the true mirror-image of overall standard of living in Ilaro and capability of the population to meet its basic needs, such as access to food, housing, and healthcare, which are factors closely linked to prevalence of under-nutrition. However, there is likelihood of under-estimation of the burden of stunting in this study as the survey was only on school-goers. Results of studies in Ghana and Tanzania showed that non-enrolled children were more undernourished than children enrolled in school (Fentiman et al., 1997, Beasley et al*.,* 2000). The rate of enrollment of children in school is very low in Nigeria. Between 2000 and 2006, the net enrollment ratio for Nigerian primary and secondary schools ranged from 25 to 72 (UNICEF, 2008). Therefore, the prevalence of 3.7% of severe stunting may just be a tip of the burden of stunting in the whole school-age population in Ilaro.

The anthropometric results of the present study also indicated that 37.7% of the total group of respondents were mildly wasted, 1.3% were severely wasted and 32.7% were mildly underweight. This observation is not surprising as the economic depression in the country has been on for a long time. The purchasing power of many families had been reduced as a result of spiraling inflation of the prices of all items including food. This probably caused many of the children, particularly those that belong to the low socio-economic class, to feed on low quality foods. Several studies have similarly reported that many households in developing countries were food insecure. This results in low dietary intake of many homes. (Armstrong et al., 2002; Ijarotimi et al*.,* 2005)

Height-for-age reflects the accumulation of nutritional deprivation throughout the years, which may consequently affect the cognitive development of the children. In the present study, prevalence of stunting is significantly associated with academic performance of the school age children, this is supported by the findings of Shariff *et al.,* 2000, Glewwe et al*.,* 2001 and study conducted in China by Jamison in 1986 where children with lower height-for-age were found to be far behind in their expected school grade (Jamison, 1986).

CONCLUSION

Prevalent of malnutrition was high among the school age children in Ilaro with higher prevalence in stunting than other anthropometric indices (underweight and thinness) and significantly associated with the academic performance of the school age children. Academic performance was also significantly associated with some socio-economic and demographic characteristics.

REFERENCE

Alderman, H., Behrman, J. R., Lavy, V. & Menon, R. (2001). Child health and school enrollment: A longitudinal analysis. *Journal of Human Resources, 36,* 185-205.

Alderman, H., Hoddinott, V., Kinsey, B., (2006). Long term consequences of early child malnutrition. 'Oxford Economics papers 58, pp.450-74

Armstrong, J., Dorosty, A.R., Reilly, J.J. & Emmett, P. (2002). Coexistence of social inequalities in under-nutrition and obesity in preschool children: population based cross sectional study. *Archives of Disease in Childhood, 88,* 671-675.

Aturupane, H., Glewwe, P. & Wisniewski, S. (2006). The impact of School Quality, Socio-Economic Factors and Child Health on Students' Academic Performance: Evidence from Sri Lankan Primary Schools. [on-line]. [Accessedon10.04.2012]. Available at http://faculty.apec.umn.edu/pglewwe/documents/SLed_ha5.pdf

Beasley, N.M.R., Hall, A., Tomkins, A.M., Donnelly, C., Ntimbwa, P., Kivuga, J (2000) The health of enrolled and non-enrolled children of school age in Tanga, Tanzania. *Acta Tropical,* 76, 223-229

Best, C., Neufingerl, N., Van Geel, L., van den Briel, T., &Osendarp, S. (2010).The nutritional status of school-aged children: Why should we care? *Food & Nutrition Bulletin. 31*(3), 400-417. https://doi.org/10.1177/156482651003100303

Collombo, M., A. Paira, de la., Lopez. I.(1992). Intellectual and physiological outcome of children understanding undernourished in early life is influenced by later environmental condition. Dev. Med. Child Neurol. 34:611-622 cousins, R.J, eds. Modern nutrition in health and disease. 10th ed. Philadelphia: Lippincott Williams and WilKins: 248-70.

Fentiman, A. & Hall A. (1997). Factors influencing school enrolment and the health of children in Afram Plains, Ghana: United Nations Childrens Fund, 1997:1-56.

Glewwe, P., Jacoby, H.G. & King, E.M., (2001). Early childhood nutrition and academic achievement: A longitudinal analysis. *Journal of Public Economics,81*, 345-68.

Ijarotimi, O.S. &Oyeneyin, O.O. (2005). Effect of economy restructuring on household food security and nutritional status of Nigerian children, *Journal of Food, Agriculture and Environment*, *3*, 27-32.

Jamison D.T (1986). Child malnutrition and school performance in China. *Journal of Developmental Economics, 20 (2),* 299-309.

Oninla, S.O., Owa, J. A., Onayade, A. A., & Taiwo, O. (2007) Comparative study of nutritional status of urban and rural Nigerian School children. *Journal of Tropical Pediatrics,53(1),* 39-43

Shariff, Z.M., Bond, J.T. & Johnson, N.E. (2000). Nutrition and educational achievement of urban primary school children in Malaysia. *Asia Pasific Journal of Clinical Nutrition, 9*(*4),* 264-273

United Nations Children Fund. Child survival. The state of the world's children. New York, NY: United Nations Children's Fund, 2008. 154 p.

Victoria, C.G., Adair, L., & Fall, C. (2008). Maternal and child under-nutrition consequences for adult health and human capital. *The lancet*, DOL: 10.106/so140-6736:07:61692-4.