

East African Medical Journal Vol. 95 No. 2 February 2018

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THE BURDEN OF UNDER-NUTRITION AMONG SCHOOL AGED CHILDREN IN ILORIN NORTH CENTRAL NIGERIA

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ABSTRACT

Background: Nutrition is a major determinant of a child's overall development and learning. The new trend of malnutrition, described as double burden of malnutrition, is one in which under-nutrition is coexisting with over-nutrition and is a major problem facing the world today. Under-nutrition is the most common health disorder among children, linked with various diseases causing death in developing countries. There is paucity of data on the burden of under-nutrition among school aged children in Ilorin and Nigeria as this is presently not routinely done hence this study.

Objective: To determine the prevalence of under-nutrition among school age children in Ilorin.

Methods: A cross sectional descriptive studies of school aged children in Ilorin Kwara State using a multi – staged sampling techniques. Sixteen primary schools, eight public and equal number of private school pupils were recruited for the study. The anthropometric measurements were taken to determine the anthropometric indices using the World Health Organization (WHO) reference 2007.

Results: A total number of 480 primary school pupils from Ilorin were recruited. Males were 221 (46.0%) with a M:F of 1:1.2 and a mean age of 9.2 ± 1.8 years. The prevalence of underweight and stunting were 15.4% and 11.5% respectively. There are more underweight and or stunted children among the public school pupils compared with the private school pupils

Conclusion: The study brings to the fore the magnitude of under-nutrition among school children in Ilorin Nigeria. Routine nutritional assessment of primary school children is advocated as against the present practice where such an important survey is

limited to once and at the point of school entry only. The ongoing pilot school meal programme should also be extended to all states of the federation.

INTRODUCTION

Malnutrition refers to both undernutrition and over-nutrition.¹ Under-nutrition is the most common health disorder among school-aged children, linked with various diseases causing death in developing countries.² It affects the child's physical and mental health during the period of rapid growth and development.^{3,4} Curtailing under-nutrition during this critical period (first 1000 days) of life will prevent irreversible impairment in growth and cognition.¹

The major contributor to under-nutrition is insufficient diet, which may be in quality, quantity or both as well as the presence of diseases.⁵ Others are reduced dietary absorption and increased energy requirement.⁵ These scenarios make the achievement of energy requirement for growth and development a difficult task. Due to the inadequacy of energy needed, the body switches to other sources through the breaking down and depletion of fat and muscle mass to drive gluconeogenesis.⁶ This process of mal-adaptation if allowed to proceed unchecked, results in a change of body composition with the manifestation of wasting and stunting.⁶ Under-nutrition is ravaging many developing countries.⁷

Children with weight for age less than 2 standard deviations (SD) are termed underweight.⁷ While a child whose height for age is less than 2 SD is considered stunted.⁷ Under-nutrition accounted for approximately 50% of the world's 2 billion people suffering from malnutrition.^{8,9} It accounted for 5 million deaths annually, most occurring in developing countries.¹⁰ Approximately 18% of

all individuals in developing countries are undernourished.¹⁰

A study conducted a decade ago among Pre-school children revealed 26.7% and 41% prevalence of underweight and stunting respectively.¹¹

There is dearth of study on under-nutrition among school aged children in our environment despite the prevailing socio-economic issues. Knowing the magnitude of the problem will help policy makers in planning toward reversal of the ugly trend.

General Objective: To determine the burden of underweight and stunting among primary school children in Ilorin.

METHODOLOGY

A descriptive cross-sectional school-based study carried out among public and private primary school children aged 6 – 12 years from the three Local Government Areas (East, West and South) of Ilorin the capital of Kwara State. The number of schools recruited per LGA was based on population size in a ratio 2:1:1 in Ilorin West, South and East respectively.

A minimum sample size of 480 was calculated and a multi stage stratified sampling technique was used to select subjects from sixteen schools using the school lists provided by the state ministry of Education. In each of the selected schools, 30 pupils were recruited to make a total of 480 pupils. Children with history suggestive of chronic diseases such as Sickle cell disease, seizure disorders, renal, cardiovascular, hepatic or gastrointestinal diseases and or features compatible with genetic syndrome were excluded from the study.

Anthropometric measurements:

Weight: Was measured using the weighing scale with attached stadiometer (Seca Model 213, USA). The recordings were measured to the nearest 0.01kg.

Height: Was measured using a standard stadiometer (Seca Model 213, USA). The recordings were measured in centimeter to the nearest 0.1cm.

Body mass index: This was calculated from weight and height in kg/m² as follows.

BMI= weight (kg)/height (m²). The Z scores for height-for-age, weight-for-age and BMI-for-age were calculated by comparing to the standard reference values for the age and sex using the WHO Anthroplus soft-ware. A child was adjudged undernourished if his measured anthropometric values were below -2 Z score and over nourished when the value for BMI Z score is $\geq +2$.

Data analysis: Statistical Package for the Social Sciences (SPSS) version 20 Program was used for analyzing the data. The student's t-test was used to analyze continuous variables and to identify the significance between two means while the analysis of variance (ANOVA) test was used when there were more than two means. Discrete variables were compared using the Chi-square test. The level of significance was established at P-value of < 0.05 .

Ethical consideration: Ethical approval was obtained from the Kwara State Ministry of Education. Permission was also obtained from the school head teachers and class teachers during field work. In addition, written informed consent was obtained from the parents or guardians of the participants. Assent was also sought and obtained from participants aged 10 years and above.

RESULTS

Demographic characteristics of the study population: A total of 480 primary school pupils were recruited, 240 from the public and 240 from private schools. There were fewer proportion of children aged 11 and 12 years among the private school pupils 23 (9.6%) compared with the public school pupils 101 (42.1%). The public school pupils 18 (7.5%) on the other hand that has fewer children within the age brackets of 6 and 7 years when compared to the private school pupils 89 (37.1%). The gender distribution of children between the public and private schools is comparable. Of the total study population, 221 (46.0%) were males while 259 (54.0%) were females, with a male to female ratio of **1:1.2 (Table I)**.

Table I
Demographic characteristics of the study population

Parameters	Public schools	Private schools	Total
	n (%)	n (%)	n (%)
Age (years)	n=240	n=240	n = 480
6	5 (2.1)	41 (17.0)	46 (9.6)
7	13 (5.4)	48 (20.0)	61 (12.7)
8	34 (14.2)	38 (15.8)	72 (15.0)
9	38 (15.8)	45 (18.8)	83 (17.3)
10	49 (20.4)	45 (18.8)	94 (19.6)
11	43 (17.9)	18 (7.5)	61 (12.7)
12	58 (24.2)	5 (2.1)	63 (13.1)
Gender	n=240	n=240	n=480
Male	111 (46.3)	110 (45.8)	221 (46.0)
Female	129 (53.7)	130 (54.2)	259 (54.0)

Figures in parentheses (percentages) were added up across columns.

The mean age (\pm SD) of study population was 9.2 ± 1.8 years.

Age and Anthropometric parameters of the school children: The mean (\pm SD) weight and height for public school children were significantly higher than that of the private schools ($p=0.0001$). The height for age z-scores of the public school pupils was significantly less than that for the private school pupils $p=0.0001$ (Table II).

The mean age (\pm SD) of the study population was 9.2 ± 1.8 years. The mean age (\pm SD) of children in public schools (10.0 ± 1.6 years) was significantly higher than those in the private schools (8.3 ± 1.7 years) $p=0.0001$. The mean age (SD) of males in the public schools (9.8 ± 1.7 years) was significantly higher than males in the private schools (8.5 ± 1.7 years)

($p=0.0001$). Similarly, the mean age (SD) of females in the public schools (10.1 ± 1.6 years) was significantly higher than those in the private schools (8.2 ± 1.6 years) $p=0.0001$ (Table II).

Classification of subjects by anthropometric Z Scores: Overall, there were 55 (11.5%) stunted pupils, with two thirds (65.5%) in the public schools compared to a third (34.5%) in the private schools ($p=0.0150$) Table III

Mal-nutrition profile of study population by school type: Underweight status was higher among public school pupils 45 (18.8%) when compared with the private school pupils 29 (12.0%) (Table IV).

Table II
Age & Anthropometric parameters of public and private school children

Age/Anthropometry	Public schools	Private	<i>t</i>	<i>p</i> value
	Mean±SD	schools Mean±SD		
Age (years)	10.0 ± 1.6	8.3 ± 1.7	10.9	0.0001
Male	9.8 ± 1.7	8.5 ± 1.7	5.5	0.0001
Female	10.1 ± 1.6	8.2 ± 1.6	10.0	0.0001
Weight (kg)	27.9 ± 8.0	25.3 ± 7.3	3.7	0.0001
Male	27.1 ± 7.1	26.6 ± 7.7	0.5	0.6280
Female	28.7 ± 8.7	24.3 ± 6.7	4.6	0.0001
Height (cm)	131.3 ± 12.3	126.7 ± 10.9	4.4	0.0001
Male	129.9 ± 12.0	128.4 ± 11.1	0.9	0.3590
Female	132.5 ± 12.5	125.2 ± 10.5	5.1	0.0001
BAZ	-0.7	-0.6	-0.7	0.5130
Male	-0.7	-0.6	-0.4	0.6610
Female	-0.6	-0.6	-0.5	0.6270
WAZ	-0.7	-0.6	-0.8	0.4060
Male	-0.6	-0.5	-0.2	0.8340
Female	-0.8	-0.7	-1.1	0.2850
HAZ	-0.7	-0.3	-4.0	0.0010
Male	-0.6	-0.2	-1.9	0.0650
Female	-0.9	-0.4	-2.7	0.0070

BAZ, WAZ and HAZ are the BMI for age, weight for age and the height for age Z scores respectively. The mean age (SD) of the study population was 9.2 ± 1.8.

Table III
Classification of subjects by anthropometric Z Scores

Primary school pupils				
Parameter	Public n (%)	Private n (%)	χ^2	<i>p</i> value
WAZ**	n=139	n=217		
<-2	33 (58.9)	23 (41.1)	0.9	0.3367
≥ -2	106 (35.3)	194 (64.7)	0.1	0.7751
HAZ	n=240	n=240		
<-2	36 (65.5)	19 (34.5)	4.7	0.0310
≥ -2	204 (48.0)	221 (52.0)	0.6	0.4377

** : incomplete data due to the limitation of WHO Anthro plus corrected for by the BMI for age z scores.

Table IV
Malnutrition profile of study population by school type

Parameters	Public n (%)	Private n (%)	Total n (%)
BMI class	n=240	n=240	n=480
Normal	178 (74.2)	178 (74.2)	356 (74.2)
Underweight	45 (18.8)	29 (12.0)	74 (15.4)
Overweight	12 (5.0)	23 (9.6)	35 (7.3)
Obesity	5 (2.0)	10 (4.2)	15 (3.1)

Figures in parentheses (percentages) were added up across columns.

DISCUSSION

The present study showed that children aged six to eight years are more in the private schools while those aged 10 – 12 years were more in the public schools. This is probably so because of early age of school enrolment among private school pupils as found in the current study. There is no significant gender difference between the two schools. The study also finds a significant higher mean age among public than private school pupils. In addition, there is a significant difference in the gender and anthropometric parameters (weight and height) across the two school population. These findings further support the early age of enrolment of private school pupils.

The prevalence of underweight in this study (15.4%) was higher than the 10.2% reported by Ajayi et al¹³ in Lagos, but lower than 25.5% reported from Sagamu¹⁴ and 30.3% reported in India.¹⁵ The higher prevalence reported in this study may be due to the higher proportion of pupils from the lower socio-economic status when compared with the Lagos study. The much higher prevalences reported in Sagamu and India could be attributed to the study population which was among public school children and in rural

area, where lower socio-economic status predominates compared to this study that included equal number of public and private school pupils and in an urban area.

Underweight status was higher in males than females in this study, similar to the findings from Kaduna among school children aged 5 – 12 years.¹⁶ The similarity with the Kaduna study may be due to a comparable Geo-political zone with possible similarity in diets and lifestyle. A study in Enugu found a higher prevalence of underweight among females.¹⁷ The exact reason for this is not clear but may be due to gender preference and care for males rather than females in that part of the country. The proportion of children who were underweight in this study was higher among public than the private school pupils similar to the report in Lagos.¹³ This similarity may be due to lower socio-economic status reported among public school pupils in both studies.

CONCLUSION

The prevalence of underweight and stunting in this study are 15.4% and 11.5% respectively. Both underweight and stunting were significantly higher among the public school pupils.

RECOMMENDATIONS

Routine nutritional assessment probably at the beginning of each term or school session
School meal programme should be strengthened to involve all states and school children

REFERENCES

1. Olumakaiye M. Dietary diversity as a correlate of undernutrition among school aged children in Southwestern Nigeria. *J Child Nutr Manag*2013;37:1–32.
2. Caulfield L, De Onis M, Blossner M, Black R. Undernutrition as an underlying cause of child death associated with diarrhea, pneumonia, malaria and measles. *Am J Clin Nutr*2004;80:193–198.
3. Cunningham M. Malnutrition: Causes of over-nutrition and under-nutrition and most affected region. 2013 [cited 2014 May 10];Available from: www.educationportal.com
4. De Onis M, Blossner M. The World Health Organisation global database on child growth and malnutrition. *Int J Epidemiol*2014;32:518–526.
5. Reinhard I, Wijayarathne KBS. The Use of Stunting and Wasting as Indicators for Food Insecurity and Poverty. Trincomalee: 2000:1-15.
6. Saunders J, Smith T. Malnutrition: causes and consequences. *C Nutr*2010;10:624–627.
7. Oldewage-Theon W, Egal A. Nutrition knowledge and nutritional status of primary school children in QwaQwa. *South African J Clin Nutr*2010;23:149–154.
8. Heird W. Food insecurity, hunger and undernutrition. In: Kliegman Robert M. Jenson Hal B. Behrman Richard E. and Stanton Bonita F., editor. Nelson Textbook of Pediatrics 18th Edition. Philadelphia: Saunders Elsevier; 2007.:225–229.
9. Buhl A. Meeting nutritional needs through school feeding: A snapshot of four African Nations. Washington: 2008:1-40.
10. Food and Agriculture Organisation. World hunger and poverty facts and statistics. *World bank*. 2012 [cited 2014 May 7] Available from: www.worldbank.org
11. World health organisation WHO. Nigeria-malnutrition prevalence. *Glob database childgrowth malnutrition*. 2008:1–3.
12. Gorstein J. Assessment of nutritional status: Effects of different methods to determine age on the classification of undernutrition. *Bull World Heal Organ*1989;67:143–150.
13. Ajayi EO, Elechi HA, Alhaji MA. Prevalence of overweight and obesity among primary school pupils in urban centre, Nigeria. *Saudi J Obes*2015;3:59–65.
14. Fetuga MB, Ogunlesi TA, Adekanmbi AF, Alabi AD. Nutritional status of semi urban Nigerian school children using the 2007 WHO reference population. *West Afr J Med*2011;30:331–336.
15. Shivaprakash NC, Joseph RB. Nutritional status of rural school-going children (6 - 12 years) of Mandya district, Karnataka. *Int J Sci Study*2014;2:39 – 43.
16. Atawodi SE, Aliyu B, Abbas O, Ilouno LE. Nutritional status of primary school children in Kawo district of Kaduna metropolis, Nigeria. *Annu Res Rev Biol*2015;5:64–70.
17. Ani PN, Uvere PO, Ene-Obong HN. Prevalence of overweight, obesity and thinning among adolescents in rural and urban areas of Enugu state, Nigeria. *Int J Basic Appl Sci*2014;3:1–7.