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Assessment of Nutritional Status of School Children in Makurdi, Benue State

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Abstract: This study was conducted to assess the nutritional status of school aged children (6-17 years) in Makurdi, capital of Benue State-Nigeria. Compared to NCHS/WHO standard, mean BMI (body mass index) of school children in Makurdi was inferior at all ages. The prevalence rate of undernutrition was (50.66%) and schools located in the slum parts of Makurdi (C.A.C wadata and L.G.E.A Wurukum) recorded the highest rate of undernutrition with (78.33%) and (73.33%) respectively. Males recorded a relatively high rate of undernutrition 162 (57.44%) than females 142 (44.65%). The study reveals that the average of school child in Makurdi is undernourished. Poor nutrition of children do not only affects the cognitive development of children but also likely to reduce the work capacity in future.

Key words: Nutrition, assessment, school children, height, weight

INTRODUCTION

Anthropometrics can be sensitive indicators of health, growth and development in infants and children. Anthropometry is the single most universally applicable, inexpensive and non-invasive method available to assess the size, proportion and composition of human body (WHO, 1995). According to WHO, the ultimate intention of nutritional assessment is to improve human health (Beghin *et al*., 1998). Malnutrition which refers to an impairment of health either from a deficiency or excess or imbalance of nutrients is public health significance among children all over the world.

Adequate food and nutrition are essential for proper growth and physical development to ensure optimal work capacity, normal reproductive performance, adequate immune reactions and resistance to infections. Inadequate diet may produce severe forms of malnutrition in children, vitamin A deficiency and iodine deficiency disorders. World Health organization (WHO, 1995) has recommended various indices based on anthropometry to evaluate the nutritional status of the school aged children. It has now been well established that the Body Mass Index (BMI) is the most appropriate variable for nutritional status among adolescents (WHO, 1995; Himes and Bouchar, 1989; Must *et al*., 1991; Rolland-Cachera, 1993). Several studies have investigated nutritional status of adolescents from different parts of the world (Kurz, 1996; Cookson *et al*., 1998; Venkaiah *et al*., 2002; Ahmed *et al*., 1998). However, there is paucity of anthropometric indices based information on nutritional status of school children in Nigeria. Moreover, to date there are no studies which have dealt with sex differences in the level of undernutrition among school children in Makurdi . The present study was attempted to evaluate the overall prevalence of undernutrition, to assess age-sex trends in the level of undernutrition, to recommend measures for correction of the nutritional deficit of the vulnerable population group and to provide a baseline data for future research.

MATERIALS AND METHODS

The present study was carried out between January and June 2006. The data were collected from five primary schools namely: Nativity Private School (NPS), Local Government Education Authority Wurukum (L.G.E.A Wurukum), Christ African Church Primary School Wadata(C.A.C, Wadata), Benue State University Staff School (B.S.U.S.S) and University of Agriculture Makurdi Staff School (U.A.M.S.S) all located within Makurdi capital of Benue State, Nigeria. Necessary approval was obtained from the school authorities prior to the commencement of the research. A total of 600 pupils (282 boys and 318 girls) aged 6-17 years participated in the study. The study was cross-sectional in nature and the subjects were selected through random sampling procedure.

Assessment of nutritional status by anthropometry: Anthropometry is the measurement of the human. It is a quantitative method and is highly sensitive to nutritional status; especially among children. Two basic variables (height and weight) and a single derived variable (body mass index) have been used in the present report. All the anthropometric measurements were taken following the standard techniques recommended by (Lohman *et al*.,1988) and body mass index was determined by the CDC table for calculated Body Mass Index for selected heights and weights for age ages 2 to 20 years and it was computed using the following formula:

BMI (kg/m^2) = Weight (kg) / Height^2 (m^2).

Table 1: Age and sex variation in anthropometric characteristics of school children in Makurdi

Age (years)	Gender	Height (Cm) Mean ± SD	Weight (kg) Mean ± SD	BMI (kg/m^2) Mean ± SD	BMI (NHCS/WHO standard) Mean
6	M (n = 9)	107.23 ± 4.18	16.20 ± 2.18	4.14 ± 2.67	15.37
	F (n = 13)	106.20 ± 4.23	15.94 ± 2.93	14.18 ±2.46	5.32
7	M (n = 12)	114.62 ± 4.60	17.80 ± 3.16	13.69 ± 3.43	15.59
	F (n = 14)	113.58 ± 3.87	17.20 ± 4.82	13.47 ± 3.89	15.51
8	M (n = 13)	120.31 ± 4.58	19.10 ± 3.12	13.26 ± 3.78	15.87
	F (n = 13)	121.40 ± 4.65	20.04 ± 3.18	13.68 ± 3.92	15.85
9	M (n = 41)	123.12 ± 5.33	21.10 ± 4.52	13.94 ± 4.19	16.68
	F (n = 36)	122.10 ± 4.84	20.90 ± 6.12	14.04 ± 3.70	16.32
10	M (n = 37)	128.90 ± 6.40	23.63 ± 4.68	14.42 ± 3.10	16.66
	F (n = 42)	126.20 ± 4.64	24.25 ± 3.74	15.27 ± 2.19	16.90
11	B (n = 30)	131.12 ± 6.44	26.10 ± 4.70	15.20 ± 3.42	17.20
	F (n = 43)	131.90 ± 3.18	27.09 ± 3.13	15.78 ± 2.19	17.57
12	M (n = 53)	138.16 ± 6.12	28.62 ± 4.12	15.93 ± 3.21	17.84
	F (n = 64)	135.12 ± 5.90	31.12 ± 2.13	17.07 ± 2.13	18.36
13	M (n = 36)	143.10 ± 4.12	32.70 ± 4.13	15.99 ± 3.27	18.58
	F (n = 31)	145.18 ± 4.13	35.83 ± 3.11	17.04 ± 3.54	19.15
14	M (n = 30)	146.19 ± 4.03	39.10 ± 3.62	18.34 ± 3.28	19.35
	F (n = 33)	145.18 ± 3.13	41.20 ± 2.16	18.80 ± 3.97	19.88
15	M (n = 8)	150.22 ± 3.20	44.24 ± 3.17	19.55 ± 3.67	20.10
	F (n = 12)	153.19 ± 3.17	46.64 ± 3.19	19.92 ± 3.41	20.86
16	M (n = 5)	155.12 ± 2.47	48.44 ± 2.15	19.22 ± 3.18	20.18
	F (n = 9)	161.15 ± 4.19	51.66±3.18	19.92 ±3.46	20.86
17	M (n = 8)	164.10 ±3.18	54.56±3.22	20.28±3.17	21.14
	F (n = 8)	168.42±4.56	57.12±3.17	20.94±2.19	21.40

RESULTS

The numbers of boys and girls in each group and their mean weight and mean height with standard deviation is given in Table 1. The findings indicate that mean height and mean weight of girls are higher than boys except for the age group 6 to 8 where mean height and mean weight of the boys were higher. There was no significant difference in the mean BMI of boys and girls (X^2 =38.44, P>0.05), boys recorded a mean BMI of 16.34±2.40 while girls have a BMI of 16.67±2.68.

Prevalence of undernutrition among school children according to different location of the schools is given in Table 2. Pupils in the slum parts of Makurdi L.G.E.A Wurukum and C.A.C Wadata showed higher prevalence of undernutrition 88 (73.33%) and 94 (78.33%) respectively while private schools NPS, UAMSS and BSUSS were less affected with 35 (28.33%), 41 (34.16%) and 46 (38.33%) respectively. However, there was a significant difference (X^2=6.57, P<0.05) between the nutritional status of the children of the different schools.

Considering sex variation, boys recorded a prevalence rate of 162 (57.44%) while girls recorded a prevalence rate of 142 (44.65%). However, the age groups 10, 11 and 12 years recorded high prevalence of undernutrition with 6.83%, 7.00% and 11.66% respectively. There was no significant difference (X^2=38.72, P>0.05) between age and sex in the prevalence of undernutrition for it is observed that both sexes and all ages are undernourished.

Table 2: Assessment of nutritional status in selected schools

Schools	Number examined	Undernutrition (%)	Normal(%)
Nativity Private School	120	35 (28.33)	85 (71.66)
L.G.E.A Wurukum	120	88 (73.33)	32 (26.66)
C.A.C Wadata	120	94 (78.33)	26 (21.66)
B.S.U.S.S	120	41 (34.16)	79 (65.83)
U.A.M.S.S	120	46 (38.33)	74 (61.66)
Total	600	304 (50.66)	296 (49.33)

DISCUSSION

The mean height and mean weight of the present study at all ages were found to be much inferior when compared to NCHS (National Center for Health Statistics, USA) standard which is the reference data recommended by WHO. Mean height and Mean weight of girls in 12 to 17 years were better than boys of the same age groups. This could be due to the earlier onset of pubertal growth spurt in girls than boys.

The relatively high prevalence of undernutrition observed among school children located in the slums parts may be due to the inadequate dietary intake of food. Alongside, the fact that most of these children are from parents of low socio-economic background mainly fishermen, farmers and traders, who themselves attended poor schools and live in poor houses where unhygienic living standards, unsafe drinking water and insanitary conditions of the immediate environment prevail. Such environmental factors contribute to the survival of disease agents such as parasites, bacteria and viruses. After being infected by these organisms,

Table 3: Prevalence of undernutrition (based on < 5th percentile of BMI) of 6-17 years old school children in Makurdi

Age (years)	Normal		Undernutrition		Overall undernutrition
	Male (%)	Female (%)	Male (%)	Female (%)	Male + Female (%)
6	3 (1.06)	5 (1.50)	6 (2.12)	8 (2.51)	14 (2.33)
7	5 (1.77)	5 (1.50)	7 (2.48)	9 (2.82)	16 (2.66)
8	6 (2.12)	7 (2.20)	7 (2.48)	6 (1.80)	13 (2.16)
9	22 (7.80)	24 (7.54)	19 (6.73)	12 (3.77)	31 (5.16)
10	14 (4.96)	24 (7.54)	23 (8.15)	18 (5.66)	41(6.83)
11	13 (4.60)	18 (5.66)	17 (6.02)	25 (7.86)	42 (7.00)
12	18 (6.38)	29 (9.11)	35 (12.41)	35 (11,00)	70 (11.66)
13	14 (4.96)	23 (7.23)	22 (7.80)	8 (2.51)	30 (5.00)
14	12 (4.25)	21 (6.60)	18 (6.38)	12 (3.77)	30 (5.00)
15	5 (1.77)	6 (1.88)	3 (1.06)	6 (1.88)	9 (1.5)
16	2 (0.7)	7 (2.20)	3 (1.06)	2 (0.66)	5 (0.83)
17	6 (2.12)	7 (2.20)	2 (0.70)	1 (0.31)	3 (0.5)
All ages	120 (42.55)	176(55.34)	162(57.44)	142(44.65)	304 (50.66)

these children loose the protein energy, iron and vitamins intake to the benefit of these disease agents which later adversely affect the growth and nutritional status of the individual. However, the rate of undernutrition of the present study is quite similar to the findings of Medhi *et al.* (2006) who recorded a prevalence rate of undernutrition of (53.9%) among school age children in Assam-India, a developing country like Nigeria.

The rate of undernutrition observed among boys (57.44%) is distinctively lower than the findings of the IRC (International Rescue Committee) in Kakuma, Kenya where 75% of boys were found undernourished. On the other hand, the low rate of undernutrition (44.65%) observed among the girls demonstrated a higher rate of undernutrition when compared to the study of Ahmed *et al.*(1998) that recorded a rate of (16.00%) among Bangladeshi girls, but lower than Kenyan girls (55.00%), IRC (1997). The low prevalence of undernutrition recorded in the older children may be due to the fact these children can pick up food without much parental care.

Conclusion and recommendations: The present study provides evidence that the average school child in Makurdi, Benue State-Nigeria is undernourished. The children studying in the slum areas of Makurdi do not realize their full genetic potential for growth and they are considerably undernourished than their counterparts of private schools.

The need for more calories, protein and micronutrients like iron and vitamins for the children in the slums can not be overemphasized. Giving iron tablets or micronutrient fortification are not answers to the problem in this situation but what they need is more food which is of good nutritive value. School lunch can be an ideal vehicle to achieve this end. The lunch as it is can be designed to prevent severe malnutrition, and this has been achieved in many countries (India, Kenya, Bangladesh, Sri Lanka, etc). In Nigeria some States are already giving lunch to pupils, this is expected to alleviate undernutrition. All this would need only modest outlay on part of the government since grains and pulses can be supplied free by the government to the schools. Providing equality of opportunities in education encompasses taking care of the nutritional needs of all children for ensuring optimum growth and preventing learning disabilities. A proactive role from the government and community leaders is the need of the hour.

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