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Nutritional status and sociodemographic characteristics of 'urban poor' school children in Onitsha, Southeast Nigeria

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Abstract *Background:* The neglect of the health and nutritional status of school aged children has adverse consequences on their long term cognition and survival. Sequel to emerging issues on urbanization and the health of school children, this study focused on the nutritional status and sociodemographic characteristics of 'urban poor' school children in Onitsha, a major city in South East Nigeria.
Objectives: The study was aimed at determining the nutritional status and evaluating the effect of certain sociodemographic factors on the nutritional status of 'urban poor' public primary school children in Onitsha, South East Nigeria
Method: This was a cross sectional study of 788 children aged 6 to 12 years, randomly selected from 12 public primary schools in Onitsha metropolis. Their anthropometric measures were used to determine their nutritional status. Data on their sociodemographic characteristics was obtained from their parents or caregivers using interviewer administered standardized questionnaires. Analysis was done using Microsoft Office Excel 2007, SPSS version 17 and Epi-info version 3.5.1 software packages
Results: Stunting was the predominant form of under nutrition with a higher prevalence in the slum resident children. Greater than 60% of all the children studied were from large families with more than 4 children. Family size, however, age and gender were not significantly associated with the nutritional status of the children. Relatively though, a greater percentage of the stunted children were from large families.
Conclusion: The nutritional status of 'urban poor' school children especially in slums in Onitsha is suboptimal compared with their counterparts in developed countries of the world. There is need for regional studies of children with similar characteristics who should be considered when favourable health policies are being made for children.

Introduction

The nutritional status of children plays a central role in their health, with malnutrition accounting for 45% of all deaths among children under the age of five and stunting growth among a further 165 million[1]. With the progressive success of various child survival programmes, more children are reaching school age (ages 6 to 12)[2]. Unfortunately, minimum attention has been paid to the health and nutritional status of the school aged child, especially in developing countries with more emphasis laid on improving their educational access[3]. However, undernourished and unhealthy school children will fail to reach their full cognitive potential with ultimate reduction in intellectual achievement in school, and poor work capacity later on in adulthood[3,4,5].

Hundreds of millions of children in the world's urban areas are growing up amidst scarcity and deprivation with increasing incidence of childhood malnutrition and its complications[4,6]. Certain sociodemographic characteristics like age, gender and birth order have also been found to influence their health and nutritional status[7,8,9]. There is need to study the prevailing characteristics in different areas so as to identify those that need specific interventions.

This cross sectional study is focused on 'urban poor' public primary school children residing in slum and non-slum areas of Onitsha, Anambra state with the aim of drawing attention to their needs. Not all of the urban poor live in slums, and not every inhabitant of a slum is poor[4]. However, most of the poor are known to attend

the public schools that are 'tuition free' in the state while the 'well off' send their children to fee paying private institutions[10]. The results from this study will provide evidence on school-age malnutrition in this part of the country, drawing attention to the need for effective interventional strategies that will improve the health outcome of these children.

Method

This was a cross sectional study conducted in Onitsha from September to November, 2010. Onitsha is a riverine port on the Eastern bank of the River Niger. It is the most rapidly expanding commercial centre in Eastern Nigeria[11]. Densely populated with four recognized slum areas, major parts lack basic social services[11].

Children of school age in public schools in the slums and non slum areas formed the study population. Twelve schools were randomly selected for the purpose of this study; six were located in the slum areas making up approximately 30% of all the public primary schools in the slum areas while the corresponding numbers of public schools were located in the non slum areas. The subjects were selected by the stratified multistage random method. A sample size of 384 was determined using a standard formula[12].

Approval for this study was obtained from the Ethical Committee of Nnamdi Azikiwe University Teaching Hospital as well as the Anambra state Universal Basic Education Board. Children were recruited prorate based on the school population and their age and sex distribution. Consenting parents or guardians were invited to the schools to provide answers to interviewer-administered questionnaires on the demographic characteristics of the participants. Excluded from the study were those whose parents declined consent and those who had obvious chronic ailments. The children's weights and heights were subsequently measured using standard methods. A 'Hana' bathroom scale, model BR 9011, ISO 9001:2000 certified by SGS, was used to measure the weights of the children, dressed in lightweight gowns or pants. The weight was recorded to the nearest 0.5kilogramme. The scale needle was returned to zero before daily weighing and thereafter, a known weight was placed to assess the reliability of the scale. The heights were measured to the nearest 0.5 centimetre with a special locally constructed wooden stadiometer[13]. Random re-measuring of the weights and heights of some of the children was done to assure quality.

Data analysis was done using Microsoft Office Excel 2007, SPSS version 17 and Epi-info version 3.5.1 software packages. The statistical tests were carried out at significance (p value) of less than 0.05. The z-scores for the anthropometric indices were obtained using WHO/Z-score reference (2007), and the WHO/NCHS 1978 international reference standards (Epi-nut from epi-info version 3.5.1). The anthropometric indices were compared with the median for the age according to the 2007 WHO charts.

Result

Complete data and measurements were obtained from 788 children.

Demographic characteristics

The children studied included 398 males and 390 females. Male: female ratio was 1.02:1 and the mean age of the respondents was 8.9±1.9years. (Table 1) Ten year olds accounted for the greatest percentage (22.3%) of children recruited. Table 2 shows the sociodemographic characteristics of the children studied in the slums and non-slum areas. Most of the respondents were from monogamous families and from families with more than four children. (69% in the slums and 64% in the non-slums).

Table 1: Age and Sex distribution of the study population per area

Age (in years)	Slum Male n=398 (%)	Non slum Female n=390(%)	Total n=788(%)
6	62 (15.6)	62 (15.9)	124(15.7)
7	44 (11.1)	46 (11.8	90(11.4)
8	62 (15.6)	64 (16.4)	126(16.0)
9	48 (12.1)	44 (11.3)	92(11.7)
10	88 (22.1)	88 (22.6)	176(22.3)
11	60 (15.1)	50 (12.8)	110(14.0)
12	34 (8.5)	36 (9.2)	70(8.9)
Mean Age ±SD	8.9±1.9	8.9±1.9	

Table 2: Sociodemographic characteristics of the children

Demographic characteristics	Slum group n=394 (%)	Non-slum group n=394 (%)	X^2	p-value
Family setting				
Monogamy	365 (92.6)	357 (90.6)	1.29	0.525
Polygamy	22 (5.6))	26 (6.6)		
Others*	7 (1.8)	11 (2.8)		
Number of children				
≤ 4	118 (30)	130 (33)	2.42	0.120
> 4	272(69)	253(64.2)	df=1	
DNK	4(1.0)	11(2.8)		
Birth Order				
1st	66(16.8)	81(20.6)	2.41	0.299
2nd	64(16.2)	67(17.0)		
3rd	75(19.0)	69(17.5)		
4th	63(16.0)	52(13.2)		
>4	118(30.0)	110 (27.9)		
DNK	8 (2.0)	15 (3.8)		
Ethnic group				
Ibos	360 (91.4)	388 (98.5)	20.65	0.000
Non Ibos	34 (8.6)	6 (1.5)		

*Others - widowed, divorced, separated

Nutritional Status and association with sociodemographic factors

Stunting was the predominant form of under nutrition in the children with significantly higher prevalence in the slum than in the non slum areas. Table 3 shows the prevalence and patterns of under nutrition in all the children. Prevalence of underweight was 11.5% in the slum and 6.3% in the non slum area (X^2 =4.85, p=0.028), and for stunting was 16.8% in the slum compared to 6.6% in the non slum area (X^2 =19.81, p=0.000).

Table 3: Nutritional status of the children

Nutritional status	Slum n (%)	Non slum	X^2	*P-value*
Underweight (6-10years) n=304(%)	35 (11.5)	20 (6.3)	4.85	0.028
Stunting (6-12 years) n=394 (%)	66 (16.8)	27(6.9)	19.81	0.000
Wasting (6 -10 years) n=304(%)	4 (1.3)	2 (0.7)	0.67	F=0.685
	299 (98.7)	301(99.3)		

Six year old males had the highest prevalence of underweight. The mean age of the underweight children was less than the mean age of the normal. Ten year olds in the slums (28.8%) and 12 year olds in the non-slums (29.6%) had the highest prevalence of stunting. More males were stunted than females though not significantly. Only one female child was overweight in this study.

Family size was not significantly associated with the nutritional status of the children Table 4. Relatively, of all from families with less than 4 children, only 11.9% were stunted as against 18% of children from the families with more than 4 children in the slums (not represented). In the non-slum areas, 6.2% of all from families with less than 4 children were stunted compared with 6.7% amongst those from families with more than 4 children. No significant association was equally demonstrated between the birth order of the children and their nutritional status.

Table 4: Family size, birth order and Stunting in the Children
Mean anthropometric measures in both localities

Demographic factor	Stunting Slum		X^2	*P-value*	Stunting Non-Slum		X^2	*P-value*
	Yes n=66 (%)	No n=328 (%)			Yes n=27 (%)	No n=367 (%)		
Family size								
≤4	14 (21.2)	104 (31.7)	3.46 df=2	0.177	8(29.6)	122 (33.2)	1.08 df=1	0.298
>4	49 (74.2)	223 (68)			17(63)	236 (64.3)		
DNK	3 (4.6)	1(0.3)			2 (7.4)	9(2.5)		
Birth order								
1st to 4th	41 (62.1)	226 (68.9)	1.16 df=1	0.282	14 (51.9)	254 (69.2)	3.48 df=1	0.61
> 4th	22 (33.4)	97 (29.6)			11 (40.7)	100 (27.2)		
DNK	3 (4.5)	5 (1.5)			2 (7.4)	13 (3.5)		

There was a significant difference between the mean weight and height of children in both communities. (Table 5) Children from the non-slum area were significantly heavier and taller than their slum counterparts. Male school children from the slums were significantly shorter than their counterparts in the non-slum areas (t=3.09, p=0.002). The mean weights and heights for children of same age and gender from the 2007 WHO charts were all greater than the means from the study population. Figures 1 and 2 are illustrations of approximate mean weights and heights of the children according to gender and area of residence, and compared with WHO mean weights and heights for children of same age and gender.

Table 5: Mean anthropometric parameters by age and gender in both groups

Characteristic			Study group n=394 Mean ± SD	Control group n=394 Mean ±SD	t-test	P-value
	Mean Weight (kg)		26.9±6.2	28.1±7.3	2.39	0.017
	Mean Height(cm)		129.6±10.7	132.4+11.2	3.50	0.000
Age	Sex					
6 years	Female n=31	Weight	19.6±2.5	20.3±3.3	0.958	0.342
		Height	116.1± 6.5	117.4± 5.7	0.811	0.421
	Male n=31	Weight	19.7±2.8	20.5±2.1	1.22	0.228
		Height	113.9±4.5	117.4±5.3	2.79	0.007
7 years	Female n=23	Weight	22.2±2.5	22.4±2.2	0.284	0.777
		Height	122.3±5.7	122.0±4.7	0.337	0.822
	Male n=22	Weight	21.6± 2.7	22.7± 2.6	1.42	0.163
		Height	120.1 ±6.2	122.4±4.4	1.49	0.143
8 years	Female n=32	Weight	24.8±3.1	24.9±3.2	0.218	0.827
		Height	127.8±5.5	127.8±5.9	0.55	0.957
	Male n=31	Weight	24.5±2.6	25.4 ±2.4	1.40	0.165
		Height	126.1±5.5	129.0±4.4	2.29	0.026
9 years	Female n=22	Weight	26.9±3.6	27.4±3.4	0.473	0.638
		Height	131.1±5.0	132.1±5.8	0.575	0.568
	Male n=24	Weight	26.6±2.4	28.4±4.5	1.70	0.950
		Height	129.8±6.2	134.3±6.2	2.48	0.017
10 years	Female n=44	Weight	28.3±3.2	32.2±8.4	2.90	0.005
		Height	133.7±5.3	139.5±6.8	4.51	0.000
	Male n=44	Weight	29.3±4.5	30.6±4.6	1.31	0.194
		Height	134.2±6.2	137.3±7.3	2.15	0.035
11 years	Female n=25	Weight	33.4±4.7	32.6±4.6	0.564	0.575
		Height	140.7±8.0	140.4±7.0	0.142	0.889
	Male n=30	Weight	31.6±3.8	31.8±5.0	0.189	0.851
		Height	136.8±6.6	140.3±7.0	2.01	0.049
12 years	Female n=18	Weight	37.5±5.3	40.1±8.7	1.09	0.281
		Height	143.5±7.8	149.2±6.3	2.39	0.022
	Male n=17	Weight	35.6±4.1	36.5±5.5	0.496	0.623
		Height	143.2±4.8	144.1±6.3	0.459	0.649

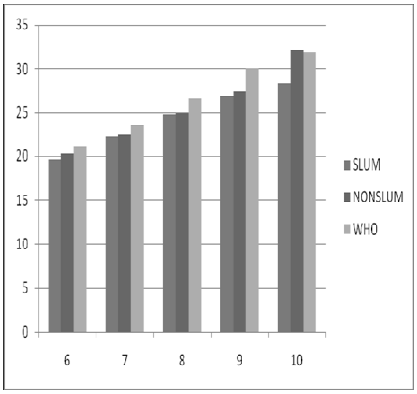
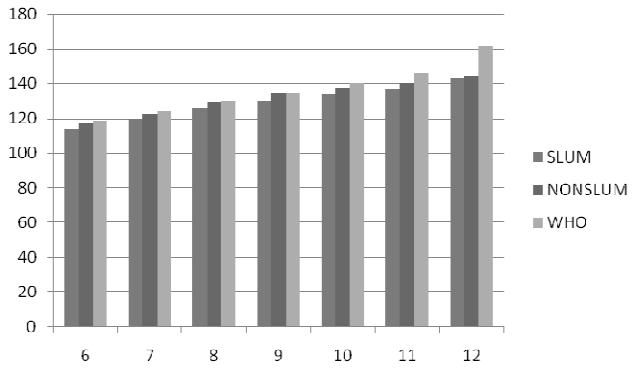


Fig 1: Mean weights of girls (per age group) in study areas and mean from WHO (2007 charts)

Fig 2: Mean heights of boys (per age group) in study areas and mean from WHO (2007 charts)



Discussion

The nutritional status of school age children in public primary schools in Onitsha is sub-optimal and concurs with the pattern in national studies of the nutritional status of Nigerian children.[13,14,15] Similar to findings from these studies, stunting had the highest prevalence, followed by underweight suggesting that these children have been exposed to long standing conditions that are inimical to good health and nutrition.

The prevalence of underweight and stunting in the slums of 11.5% and 16.8%, respectively are similar though marginally higher than the results of the 2004 Nigerian Demographic and health survey Ed Data Survey (the most recent National survey focused on school-age children) of 11% underweight and 13% stunting amongst school age children from South East Nigeria, which is the study location.[14] The Nigerian economy has been retrogressive in the past decade with increasing number of hungry, extremely poor people, which may be partly responsible for the non improvement in the nutritional status in this index study compared with the National study conducted 6years earlier. The lower prevalence of 6.3% underweight and 6.9% stunting in the non-slum areas suggests interplay of factors like the environment and abject poverty in the slum areas. The higher prevalence of under nutrition in high density areas in other parts of the country may be due to other factors that affect the nutritional status of children such as the educational status of the parents as well as other socioeconomic and environmental factors that need to be identified. [13,15,16,17] The two groups studied were selected from public, non-fee paying primary schools with the aim of assessing children from the lower social strata of the society. However, an assessment of the social class showed that more children from the slum areas were from the lower strata. This may be responsible for the greater prevalence of stunting in that group.

The prevalence of under nutrition in this study sharply contrasts with the 2.7% reported for school-aged children in the United States of America.[18]The disparity is not surprising as under nutrition is rooted in poverty. The index study was carried out in a Sub Saharan developing country characterized by widespread poverty with inequitable distribution of wealth and non-existence of a social security system. The United States, a Western developed country, has existing policies that result in social and health stability. Concomitantly, the mean anthropometric indices in the urban poor children were all low compared with the value from the WHO growth charts for corresponding age and gender. The charts were modified from the 1977 NCHS/WHO growth curves derived from a healthy, non-obese Caucasian population.[19] It is disheartening that these children are still disadvantaged more than three decades later.

Over nutrition is not a problem amongst the urban poor in this part of Nigeria, contrary to findings in the developed world where the prevalence has shown a steady rise.[20,21] This is expected as the Western diets of high saturated fats, sugars, and refined food is expensive and not readily available to the poor in this part of the world unlike in the developed countries. Studies on Nigerian children have equally reported an increased prevalence of over nutrition in children from the higher socioeconomic classes.[22,23]

Some sociodemographic characteristics contributed to the nutritional status of the study population. The mean age of those who were underweight was lower than that of the general population possibly because older children may be self sufficient, resorting to other measures such as begging, performing menial jobs and scavenging to satisfy their hunger. The higher mean age for the stunted children corresponds with other findings that have demonstrated the 'progression of height deficit' with the increasing age of children. Stunting is a reflection of longstanding under nutrition occurring from a cumulative process of pre-natal and early childhood malnutrition and stunted children are likely to remain stunted even into adulthood if they remain in a deprived environment.[24]

That males were generally most affected by under nutrition is similar to other findings in Nigeria and other parts of the world.[13,14,24] This may be attributable to the later onset of pubertal growth spurt in males and the findings that males usually start life at a disadvantage sustained even up to school age.[25] Uthman found a higher prevalence of stunting and underweight among males with gender having the strongest independent effect on the risk of stunting.[17] A contradicting finding in India was postulated to be due to gender bias and parental preferences for male children in their society.[9]

Poorer nutritional status has been documented in children of higher birth order and from larger household size.[8,9] The relative association noted with twice the percentage from bigger family size being stunted in this study is expected because with more mouths to feed, the individuals may likely get smaller portions. In India equally, children from joint families were found to be more likely to suffer chronic malnutrition than those from nuclear families which are smaller in size.[9]

Conclusion

The nutritional status of 'urban poor' school children in this study is suboptimal and associated with certain demographic characteristics like family size, age and gender. It is evident however, that there may be some interplay of other factors especially the social class and certain environmental characteristics, which may be why the slum resident children had worse nutritional status. There is need for further studies focusing on the social classification in terms of the educational level of the parents, their occupation and income, and environmental characteristics to get a holistic picture of the reasons for the prevalent malnutrition. It is also recommended that a school-based feeding programme should be introduced in public primary schools in the area of study.

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