Research Journal of Medical Sciences 6 (4): 187-192, 2012
ISSN: 1815-9346

Nutritional Assessment of School-Age Children Attending Conventional Primary and Integrated Qur'anic Schools in Kaduna

[1]Aliyu Hassan, [2]O.O. Onabanjo and [2]C.R.B. Oguntona
[1]Department of Food Technology, College of Science and Technology,
Kaduna Polytechnics, Kaduna, Nigeria
[2]Department of Human Nutrition and Dietetics, University of Agriculture,
P.M.B. 2240, Abeokuta, Nigeria

Abstract: Under nutrition among school-age children have serious consequence on individual and national growth and development. The purpose of this study was to assess the nutritional status of 394 school-age children (7-11 years) attending Conventional Primary Schools (CPS) and Integrated Qur'anic Schools (IQS) in Kaduna. A pretested questionnaire was used to generate information on their socio-economic, food intake pattern and anthropometric status. The mean energy (1861±547.53 23 kcal), protein (32.16±8.93 g), Vitamin A (795.48±183.48 RE), iron (11.61±4.02 mg), iodine (122.65±130.35 mg), calcium (625.38±212.57 g) and Vitamin C (28.09±29.12 mg) intakes were lower for those in CPS compared to their counterparts in IQS facilities. Results showed that about 41.2% of the children were stunted been slightly higher in children attending IQS (9%) than those in CPS but the difference was no significant ($p>0.05$). Underweight was also generally high (48.7%). There were more (24.6%) cases of overweight among CPS than IQS (22.0%) children and only 1% level of obesity was recorded. Malaria and helminthes infection was not significantly different ($p>0.05$) among subjects attending CPS and IQS. Correlation between malnutrition and type of school, level of energy intake rate and mother's educational level showed no relationship ($p = 0.05$). Data on the prevalence and degree of malnutrition among school-age children attending both CPS and IQS sectors of education in Nigeria is limited.

Key words: Nutritional assessment, school-age children, conventional primary school, integrated Qur'anic school, deprivation

INTRODUCTION

There is increasing evidence with resulting international concern that the high level of nutritional deprivation combined with heavy burden of disease among the school-age children will negatively affect child's performance and overall development. This has prompted an increased focus on the diverse needs and possible consequences of malnutrition of the school-age (6-11 years) child (Drake *et al*., 2002). However, records revealed that many of the Nigerian children enrolled into basic educational facilities are already malnourished and the condition which is cumulative continued even when in school. For instance data has revealed that among the pre-schools, stunting still remains as high as 41%, underweight 23% and wasting 14% (NPC and ICF Macro, 2009). The situation is worst in the Northern part of Nigeria were stunting and underweight have reached 44 and 38%, respectively (FGN/UNICEF, 2001).

It is believed that when these categories of children are enrolled in basic education classes, there will be high rate of poor attendance and participation due to frequent ill health, difficulty in coping with school demands with vigor and alertness. This result to poor learning achievement and high withdrawal rates in conventional primary and other established education centers where children acquire basic education (ACC/SCN, 2000) thus limiting the realization of goal 2 of the MDGs by 2015. Achieving the MDGs and other national goals by 2015 and beyond will remain unrealistic unless nutritional crises of the school-age are adequately and urgently attended to. This study assessed the nutritional status of school-age children attending both CPS and IQS facilities in Kaduna, Nigeria.

MATETRIALS AND METHODS

Study design: The study was a cross-sectional and descriptive involving 394 school-age children attending

Corresponding Author: Aliyu Hassan, Department of Food Technology, College of Science and Technology, Kaduna Polytechnics, Kaduna, Nigeria

both Conventional Primary and Integrated Qur'anic Schools in Kaduna metropolis. A total of 10 schools each for CPS and IQS from the 5 communities were randomly selected to arrive at the schools that were surveyed in each stratified location while the subjects were selected in equal number from each school using a systematic random sampling technique.

Data collection procedures: A semi structured questionnaire was used to generate information on the respondents' bio-data, anthropometry, 24 h recall. All the anthropometric measurements were done according to International Society for the Advancement of Kinanthropometry (ISAK) standards. Length was measured to the nearest 0.1 cm with a standiometer (Invicta, IP 1465, UK) and weight was determined on a portable electronic scale to the nearest 0.1 kg (Precision Health Scale, A and D Company, Japan). Data obtained for anthropometry was used to compute Z-score deviations of the weights or heights from the weights and heights of the WHO (2006) growth standards.

Respondents' stool and blood samples were examined for possible presence of helminthes and malaria parasites. Nutrients intake of the children were calculated through the 24 h recall data.

Statistical analysis: Data were analyzed using Statistical Package for Social Sciences (SPSS) Version 18 package. Descriptive and inferential statistical analysis was employed to describe findings. Correlation was used to determine the relationships between two quantitative variables and t-test was also adopted to establish significant difference between two means of the population groups. Statistical significance was set at $p<0.05$.

RESULTS AND DISCUSSION

Information on the socioeconomic status shown in Table 1 revealed that most (52.8%) fathers of the respondents attending CPS had secondary education compared to IQS whose parents mostly (60.5%) received non-formal type of education. Similarly, mothers of those attending IQS were found to be least educated. Majority (48.5%) of the household heads were traders and substantial number (23.4%) were engaged in other forms of jobs that included carpentry, driving, small scale farming, cap knitting and house helps. About 60% of mothers, especially of those attending IQS are full-time house wives (Table 2).

Table 1: Respondents' parents level of education

		Fathers				Mothers			
Type of school	Level of education	Frequency	%	Valid (%)	Cumulative (%)	Frequency	%	Valid (%)	Cumulative (%)
CPS	Non-formal education	13	6.5	6.5	6.5	43	20.6	20.6	20.6
	Prim school	44	22.1	22.1	28.6	53	26.6	26.6	47.2
	Sec school	105	52.8	52.8	81.4	88	44.2	44.2	91.5
	Post Sec Sch	34	17.1	17.1	98.5	10	5.0	5.0	96.5
	None	3	1.5	1.5	100.0	7	3.5	3.5	100.0
	Total	199	100.0	100.0	-	199	100.0	100.0	-
IQS	Non-formal education	118	60.5	60.5	60.5	161	82.6	82.6	82.6
	Prim school	38	19.5	19.5	80.0	20	10.3	10.3	92.8
	Sec school	38	19.5	19.5	99.5	12	6.2	6.2	99.0
	Post Sec Sch	1	0.5	0.5	100.0	2	1.0	1.0	100.0
	None	-	-	-	-	0	0.0	0.0	-
	Total	195	100.0	100.0	-	195	100.0	100.0	-

Table 2: Respondent parents' employment status

	Fathers				Mothers			
Type of school	Frequency	%	Valid (%)	Cumulative (%)	Frequency	%	Valid (%)	Cumulative (%)
CPS								
Civil/Public servants	62	31.2	31.2	31.2	18	9.0	9.0	9.0
Trading	83	41.7	41.7	72.9	83	41.7	41.7	50.8
Farming	7	3.5	3.5	76.4	2	1.0	1.0	51.8
Full time house wife	-	-	-	-	93	46.7	46.7	98.5
Others	47	23.6	23.6	100.0	3	1.5	1.5	100.0
Total	199	100.0	100.0		199	100.0	100.0	-
IQS								
Civil/Public servants	21	10.8	10.8	10.8	3	1.5	1.5	1.5
Trading	106	54.4	54.4	65.6	46	23.6	23.6	25.1
Farming	22	11.3	11.3	76.9	1	0.5	0.5	25.6
Full time house wife	-	-	-	-	145	74.4	74.4	100.0
Others	45	23.1	23.1	100.0	0	0.0	0.0	-
Total	195	100.0	100.0	-	195	100.0	100.0	-

Table 3 shows the respondents' parent economic status with about 75.9% of the families of the respondents attending CPSs were living below the poverty line compared to 87.7% of those attending IQS. There is no significant differences between children in the IQS and CPS as p>0.05 in the case of those that are subjacent and ultra poor but significant at the level of median poverty (p = 0.007<0.05). The difference of those above the poverty lines is also not significant.

Information on the mean energy and nutrients intake of respondents by school types are shown in Table 4. Generally, the mean energy (1861±547.534 kcal), protein (32.16±8.972 g), Vitamin A (759.48±183.482 RE), iron (11.61±4.02 mg), iodine (122.65±130.347 mg), calcium (625.38±212.570 g) and Vitamin C (28.09±29.119 mg) were higher for those in IQS compared to their counterparts in CPS. However, no significant difference (p<0.05) between the two schools in energy, protein and iron intake in favor of the IQS pupils but no significant difference in the consumption of other nutrients.

Table 3: Descriptive and inferential statistics of respondents parents by economic status

Type of school	Frequency	Percentage	Cumulative percentage	Sig. (p-value)
CPS				
Above poverty level	48	24.1	24.1	0.506
Subjacent poor	38	19.1	43.2	0.143
Median poor	58	29.1	72.4	0.007*
Ultra poor	55	27.6	100.0	0.205
Total	199	100.0	-	-
IQS				
Above poverty level	24	12.3	12.3	-
Subjacent poor	16	8.2	20.5	-
Median poor	45	23.1	43.6	-
Ultra poor	110	56.4	100.0	-
Total	195	100.0	-	-

*Values with significance difference at p<0.05

The results in Table 5 show that over three-quarter of the respondents in the two school categories did not consume enough energy, iodine, calcium and Vitamin C when compared with the RDA. Results of t-test on equality of means conducted showed only adequacy intake of energy (p = 0.05) and Iodine (p = 0.526) were not significant (p<0.05).

There is a significant (p<0.05) differences in the level of stunting among the two schools with 41.2% been stunted (Table 6). About half of the respondents in all the schools were also reported to be underweight with no significant difference (p>0.05) between the level of underweight of CPS and IQS pupils in Table 7. Overweight among CPS respondents (24.6%) was slightly higher than those attending IQS (22.0%) while that of wasting was much higher (51.3%) among IQS than the CPS pupils (Table 8).

Correlation between malnutrition and gender, type of school, energy intake, mothers' educational status and school attendance are shown in Table 9. Results showed no observed relationships between malnutrition and gender and rate of school attendance but there was

Table 4: Respondents' mean energy and nutrient consumption by type of school and age group

Type of school	Years	Total energy consumed/day (kcal)	Total protein consumed/day (g)	Total Vitamin A consumed/day (RE)	Total iron consumed/day (mg)	Total iodine consumed/day (mg)	Total calcium consumed/day (g)	Total Vitamin C consumed/day (mg)
CPS	**7-9**							
	Mean	1559.950	23.140	674.51	9.320	97.670	565.57	25.75
	SD	291.737	6.447	353.17	2.138	18.770	137.69	18.49
	10-11							
	Mean	1799.120	32.710	742.58	11.140	112.330	623.24	25.73
	SD	320.054	10.230	366.19	2.313	56.653	213.83	21.05
	Total							
	Mean	1701.770	28.810	714.87	10.400	106.360	599.76	25.74
	SD	329.838	10.040	361.60	2.410	45.728	188.38	19.99
IQS	**7-9**							
	Mean	1659.450	30.010	721.22	10.860	102.000	606.38	24.19
	SD	299.317	8.257	185.06	2.457	77.109	205.57	28.21
	10-11							
	Mean	1984.590	33.470	782.88	12.060	135.270	637.00	30.47
	SD	624.270	9.170	179.27	4.680	153.059	216.78	29.52
	Total							
	Mean	1861.200	32.160	759.48	11.610	122.650	625.38	28.09
	SD	547.534	8.972	183.48	4.020	130.347	212.57	29.12
Total	**7-9**							
	Mean	1607.450	26.420	696.81	10.060	99.740	585.05	25.01
	SD	298.609	8.111	285.61	2.415	54.829	174.07	23.57
	10-11							
	Mean	1893.020	33.100	762.00	11.600	123.950	630.21	28.13
	SD	505.455	9.692	287.29	3.727	116.284	214.98	25.74
	Total							
	Mean	1780.680	30.470	736.95	10.990	114.420	612.44	26.90
	SD	457.353	9.662	288.09	3.357	97.504	200.87	24.92

Table 5: Proportion of respondents adequate in energy and nutrient consumption

Energy/Nutrients and type of school	Level of adequacy: No. of adequate	No. of inadequate	Adequate (%)	Inadequate (%)	t-test for equality of means: t-value	Sig.
Energy						
CPS	27	172	13.6	86.4	-1.963	0.050
IQS	41	154	21.0	79.0		
Protein						
CPS	28	171	14.1	85.9	-3.938	0.000*
IQS	59	136	30.3	69.7		
Vitamin A						
CPS	31	168	15.6	84.4	-3.062	0.002*
IQS	55	140	28.2	71.8		
Iron						
CPS	74	125	37.8	62.8	-4.316	0.000*
IQS	114	81	58.8	41.5		
Iodine						
CPS	13	186	6.5	93.5	-0.634	0.526
IQS	16	179	8.2	91.8		
Calcium						
CPS	05	194	2.5	97.5	-2.352	0.019*
IQS	15	180	7.7	92.3		
Vitamin C						
CPS	23	176	11.6	88.4	-3.293	0.001*
IQS	47	148	24.1	75.9		

*Values with significance difference at $p<0.05$

Table 6: Respondent's level of stunting by age group and type of school

Type of school	Frequency	%	Valid (%)	Cumulative (%)	Sig. (p-value)
CPS					
Severely stunted	8	4.0	4.0	4.0	0.01*
Moderately stunted	14	7.0	7.0	11.1	-
Mildly stunted	50	25.1	25.1	36.2	-
Normal	127	63.8	63.8	100.0	-
Total	199	100.0	100.0	-	-
IQS					
Severely stunted	7	3.6	3.6	3.6	-
Moderately stunted	35	17.9	17.9	21.5	-
Mildly stunted	48	24.6	24.6	46.2	-
Normal	105	53.8	53.8	100.0	-
Total	195	100.0	100.0	-	-

Table 7: Respondent's level of underweight by age group and type of school

Type of school	Frequency	%	Cumulative (%)	Sig. (p-value)
CPS				
Severely underweight	15	7.5	7.5	0.642
Moderately underweight	29	14.6	22.1	-
Mildly underweight	55	27.6	49.7	-
Normal	100	50.3	100.0	-
Total	199	100.0	-	-
IQS				
Severely underweight	23	11.8	11.8	-
Moderately underweight	27	13.8	25.6	-
Mildly underweight	43	22.1	47.7	-
Normal	102	52.3	100.0	-
Total	195	100.0	-	-

correlation between malnutrition and total energy (r = 0.000) intake type of school (r = 0.006) and between malnutrition and mothers educational level (r = 0.004).

More (35%) respondents from IQS were found to have tested positive to helminthes infestation than

Table 8: Respondent's BMI status by age group and type of school

Type of school	Frequency	Percent	Cumulative (%)
CPS			
Severely wasted	12	6.0	6.0
Moderately wasted	18	9.0	15.1
Mildly wasted	44	22.1	37.2
Normal	85	42.7	79.9
Mildly overweight	30	15.1	95.0
Moderately overweight	8	4.0	99.0
Obese	2	1.0	100.0
Total	199	100.0	-
IQS			
Severely wasted	28	14.4	14.4
Moderately wasted	30	15.4	29.7
Mildly wasted	40	20.5	50.3
Normal	55	28.2	78.5
Mildly overweight	34	17.4	95.9
Moderately overweight	8	4.1	100.0
Total	195	100.0	-

Table 9: Correlation of malnutrition and some variables

Variables	Malnutrition
Type of school	
Pearson correlation	-0.139
Sig. (p-value)	0.006*
Sex	
Pearson correlation	0.098
Sig. (p-value)	0.053
Mothers educational level	
Pearson correlation	0.102
Sig. (p-value)	0.042*
Adequacy of energy (%)	
Pearson correlation	0.194
Sig. (p-value)	0.000*
Malnutrition	
Pearson correlation	1.000
Sig. (p-value)	
Rate of attendance	
Pearson correlation	-0.098
Sig. (p-value)	0.051

*Correlation is significant at the 0.05 level

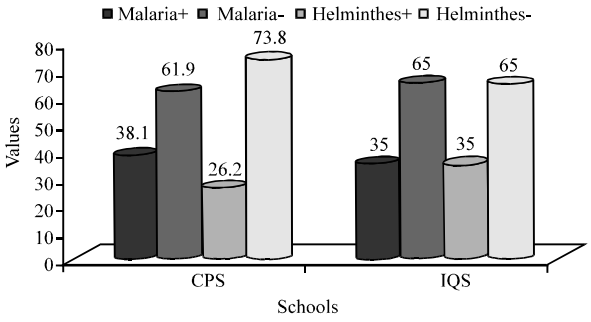

Fig. 1: Malaria and helminthes status of the respondents by type of school

those subjects attending CPS (26.2%) in Fig. 1. In both schools, inferential statistics showed that no significant differences exist in the level of malaria parasite.

The possibility of children realizing their full potentials including achieving target goals in school depends strongly on their nutritional status. Over three quarter of the respondents' parent live below the poverty line with majority been either median or ultra poor and no significant difference ($p<0.05$) was observed between the two schools. Only few parents were on paid jobs and were mainly of lower cadre. A FGN/UNICEF (2001) study had shown that educated and economically empowered parents tend to provide better health and education for their offspring.

Food intake analysis showed similarity between the two groups in nutrient intake and meal pattern was not unexpected, this was because the community lifestyle, family characteristics, source of income and expenditure, especially on food were similar. Some levels of significance were established for consumption of protein, iron, Vitamin A and C in favor of those attending the IQS. In addition to the general inadequate consumption, the proteins were mainly of plant sources with low efficiency rate of protein to tissue conversion (Meme *et al*., 1998). The relatively low intake of vitamins and minerals observed may likely affect respondents' immune status and ability to effectively metabolize the nutrients consumed.

Long term malnutrition among the respondents was discovered to be generally high (43.2%) but significantly higher ($p = 0.05$) in children attending IQS than CPS. The levels observed were slightly >34 and 41% reported among the under-fives by FGN/UNICEF (2002) and NPC and ICF Macro (2009), respectively. This also agreed with the report of Drake *et al*. (2002) which concluded that as children advanced in age, their nutritional status tend to worsen in low income countries. The prevalence of underweight was almost similar in both schools so also its pattern of distribution among the various ages.

About half (49.8%) of the respondents were found to be underweight in the two school categories. Finding of this study thus agreed and did not show any significant improvement with the result of a similar study conducted by FAO/FME/FBFI (1997) in five cities including Kaduna in Nigeria that discovered 50% of the primary school pupils were underweight. This result was however lower than another study by FME/UNICEF (2008) which covered the entire country that reported 80% level of underweight among primary school pupils across the country.

Overweight among the subjects in both groups also observed similar rate as against proportion of wasting. The high incidence of stunting among IQS which describes long term undernutrition despite recording higher food intake could be linked to their high level of helminthes infestation while wasting among the CPS may be linked to frequent illnesses from malaria infestations. Incidence of overweight was observed in 1% of respondents attending CPS compared with the 2% recorded by FME/UNICEF (2008). The few that were overweight and obese may be occasioned by excessive intake of carbohydrate foods and not necessarily adequate diet. This could also be described as a case of double burden malnutrition with over nutrition and undernutrition coexisting in the same community of low income earners.

Intestinal parasites have been associated with a reduction in food intake, malabsorption, endogenous nutrient loss and anemia. Behavioral effects of parasitic infestation may also cause discomfort and anorexia (Drake *et al*., 2002). Although, close to a quota of respondents were found to be infested with helminthes from the two type of schools surveyed there was no significant difference observed.

Many factors work in synergy with malnutrition to affect child's level of attendance and participation in school and by extension ability to achieving his/her full potential. This survey discovered a linear relationship between malnutrition and total energy intake, type of school and mothers educational level.

CONCLUSION

This study has revealed high level of malnutrition of varying degrees among the school age children attending both the CPS and IQS with the later having higher rate of particularly long term malnutrition (stunting). Many factors were discovered to be responsible; poverty, low educational status of especially the mothers, inadequate dietary intake and malaria and helminthes parasitic infestation were major ones. These together reinforcing

one another can contribute to the inefficiency of the educational system. School feeding programme should be introduced in both CPS and IQS and School Base Management Committees be involved in the programme.

REFERENCES

ACC/SCN, 2000. The Fourth Report on the World Nutrition Situation: Nutrition Throughout the Lifecycle. ACC/SCN, Geneva, Pages: 121.

Drake, L., C. Maier, M. Jukes and S. Patricio, 2002. Nutrition of school-age children. Institute of Partnership for Children Development.

FAO/FME/FBFI, 1997. Assessment of food vending schemes of primary schools in Nigeria. FME (Home Economic section), Nigeria.

FGN/UNICEF, 2001. Children and women in Nigeria: Situation assessment and analysis. NPC and UNICEF, Abuja.

FGN/UNICEF, 2002. State of the world children report. FGN Publication.

FME/UNICEF, 2008. National guidelines for school meal planning and implementation. FGN Publication.

Meme, M.M., K.R. Kogi-Makau, M.N. Muroki and R.K. Mwadime, 1998. Energy and protein intake and nutritional status of primary school children 5-10 years of age in schools with and without feeding programmes in Nyambene Ditrict, Kenya. Food Nutr. Bull., 19: 334-342.

NPC and ICF Macro, 2009. Nigeria Demographic and Health Survey 2008. National Population Commission and ICF Macro, Abuja, Nigeria.

WHO, 2006. WHO Child Growth Standards: Length/Height-for-Age, Weight-for-Age, Weight-for-Length, Weight-for-Height and Body Mass Index-for-Age: Methods and Development. World Health Organization, Geneva, Pages: 312.