

Nutritional Contents of Lunch Packs of Primary School Children in Nnewi, Nigeria

Ugochukwu EF, Onubogu CU, Edokwe ES, Okeke KN

Department of Pediatrics, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria

Address for correspondence:

Prof. Ebele F Ugochukwu,
Department of Pediatrics, Nnamdi
Azikiwe University Teaching
Hospital, Nnewi, Nigeria.
E-mail: ef.ugochukwu@unizik.edu.ng

Abstract

Background: Lunch packs play a significant role in the nutritional status and academic performance of school children. Available data show a high prevalence of malnutrition among school-age children. **Aims:** The aim of this study is to document the nutritional contents of lunch packs of primary school children in Nnewi, Anambra state, Nigeria. **Subjects and Methods:** A cross-sectional study was conducted among 1018 primary 1-6 pupils selected by stratified systematic random sampling from six primary schools, two each of private, – mission, – and government (public) – owned schools in Nnewi metropolis with the aid of the semi-structured questionnaire. Lunch packs of the pupils were examined. **Results:** Majority of the pupils (77.8% [792/1018]) had lunch packs although about half of pupils in public schools had no lunch pack. Only 12.4% (98/792) and 19.2% (152/792) of pupils with lunch packs had balanced meals and fruits/vegetables in their lunch packs, respectively. The odds of not coming to school with packed lunch was about 13 and 12 times higher for mothers with no formal education or only primary education, respectively, compared with those with tertiary education. Type of school had a strong influence on possession and contents of lunch pack ($\chi^2 = 2.88$, $P < 0.001$, phi coefficient = 0.72). Pupils in private (97.5% [198/203]) and mission (94.4% [388/411]) schools were more likely to have a lunch pack compared with public schools (51.0% [206/404]). However, pupils in private schools were most likely to have a balanced meal (32.5% [66/203] vs. 5.8% [24/411] in mission and 2.0% [8/404] in public schools) and fruits/vegetables (48.3% [98/203] vs. 10.2% [42/411] in mission and 3.0% [12/404] in public schools) in their lunch packs. Mothers' educational status and parents' occupation were significantly associated with lunch pack contents. **Conclusion:** Majority of the lunch packs of primary school pupils contain poor quality food especially in public schools. Mother's educational status and parent's occupation are important determinants of the nutritional contents of lunch packs.

Keywords: Lunch, Nigeria, Nutrition, School children

Introduction

Nutritional and health status have powerful influences on a child's learning ability and school performance.^[1] Access to a nutritious mid-day or afternoon meal is a very important determinant of the nutritional status as well as the overall well-being and cognitive development of school children. Students who have certain micronutrient deficiency or suffer

from protein energy malnutrition do not have the same learning potential as healthy, well-nourished children.^[1,2] In addition, hungry children may have difficulty with concentrating in or performing academic activities even if otherwise healthy and well-nourished.^[1,3] Therefore, apart from contributing to a child's daily nutrient requirements, meals provided during school hours alleviate short term hunger, increase attention span, facilitate learning and obviate the need for children to leave school in search of food.^[4] Healthier and better nourished children stay in school longer, learn more and later become healthier and more productive adults.

Content of lunch pack should supply a third to half of the daily nutrient requirements of school children.^[1,5] To obtain the full range of nutrients, a child needs to consume a good variety of foods from different food groups, every day and in the right proportions.^[6] Packing adequate meals including fruits and

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vegetables is also a powerful way for parents to teach their children healthy eating habits and food preferences to support a lifetime of good health.^[7]

Although efforts at reducing malnutrition in developing countries are mainly focused on under-5 children, available data show that school-age children may not be better nourished than younger children as they have several risk factors for malnutrition.^[3,8-12] Children often rush out from their homes very early, with little or no breakfast and may spend long hours (8-10 h) in school daily thereby missing lunch at home. Therefore, only one home meal is sometimes guaranteed. In addition, the extra demands on school-age children to perform chores or walk long distances to school create a need for energy that is much greater than that of younger children.^[1] Thus, available data indicate high levels of protein energy malnutrition as well as short term hunger among school-age children in developing countries.^[1,8,9] According to World Food Program (WFP),^[8,9] 66 million primary school-age children attend classes hungry across the developing countries and 23 million of these children live in Africa alone. In Nigeria, about 30% of school children have low body mass index for age.^[10] Nigerian studies have documented prevalence rates of stunting, underweight and wasting as 27.7%, 29.9% and 25.5%, respectively, among school-age children in the South-East^[11] and 44.8%, 43.1% and 41.1%, respectively, among boys in public primary schools in the South-West.^[12]

Government sponsored school lunch programs are aimed at ensuring that every school child gets at least one adequate diet daily.^[4,10] Unfortunately, this program has been affected by the economic down-turn especially in developing countries. The Federal Government of Nigeria, in the realization of the critical role of nutrition to education, launched the Home Grown School Feeding and Health Programme (HGSFHP) in 2005, in collaboration with UNICEF, WFP, New Partnership for African Development and other international development partners.^[4,10,13] The aim of HGSFHP was to provide a nutritionally adequate meal during school hours while boosting food production by local farmers in the 12 pilot states. Unfortunately, only Osun state is still implementing the program.^[10,13] Thus, in most parts of Nigeria, it is the sole responsibility of parents to provide food for their children while in school. On the contrary, more than 94% of schools (both public and private) in U.S.A. participate in the National School Lunch Program, which ensures that every child in school is served a nutritious and balanced meal in compliance with the United States Department of Agriculture dietary guidelines for Americans.^[7]

Unlike developed countries like U.S.A., no guideline exists on the feeding of school children in Nigeria. Mothers often face the challenge of deciding between what the child likes, what is available, affordable, easy to prepare and can remain in good condition after storage for hours in food flasks. Mothers may also be ignorant of how to combine the different variety

of foods to meet the nutritional requirements of the school child. Thus, some mothers may resort to packing no lunch, poor quality food or only snacks.

Despite the role of packed lunch in determining the nutritional status and cognitive development of school-age children, limited research attention has been given to the nutritional contents of lunch packs of school children in Nigeria. This study was, therefore, aimed at examining the nutritional contents of lunch packs of primary school children in Nnewi as well as the factors that determine the contents of their lunch packs.

Subjects and Methods

Study area

This cross-sectional and descriptive study was carried out in Nnewi, the second largest city in Anambra State, South-East Nigeria. Nnewi metropolis comprises of four autonomous quarters – Otolu, Uruagu, Umudim and Nnewichi. As of 2006, Nnewi had an estimated population of 391,227 according to the Nigerian Census.^[14] The city spans over 2789 km².^[14] The chief occupation of the indigenes is trading and farming, therefore, they depend mainly on agriculture and commerce for their daily livelihood. The city hosts a large market (Nkwo Nnewi) for motorcycle and motor spare parts, both locally fabricated, in its numerous small-scale industries and imported from all over the world.

Study design

There are 102 registered primary schools in Nnewi. 43 are public (government-owned) and 59 privately operated. Primary school children in classes 1-6 were studied. Six schools were randomly selected (two public, two mission-owned and two individually owned private schools) by cluster sampling. For each chosen school, a stratified systematic sampling method was employed to select the individual classes from the streams. Each school was visited twice. For each selected class, all the pupils were recruited with an opportunity to opt out. During the initial visit all the lunch packs were examined in the morning and contents noted, without prior information of the visit to pupils or teachers, in order to avoid a biased preparation. Code numbers were given to all such pupils who had their lunch packs examined as well as those without lunch packs. They were subsequently given questionnaires to be completed by their teachers and parents. Each questionnaire included a consent section and also sought demographic and socio-economic data of pupils and parents. Examination of the lunch packs sought for adequate protein content (at least a piece of meat or fish or an egg), bulk content (type of meal/food staple) and presence of fruits and vegetables.

During the second visit (1 week after the first) the parental consents and questionnaires were collected and matched with the lunch data. A total of 1018 completed questionnaires and consent forms matched with their lunch data were obtained.

All lunch data with no consent forms or filled questionnaire were excluded and discarded having been considered as refusal to participate in the study.

Ethical considerations

Clearance to conduct the study was obtained from the Ethical Committee of the Nnamdi Azikiwe University Teaching Hospital, Nnewi; Nnewi North Local Government Primary Education Commission; proprietors of the various private schools; head teachers of the schools as well as the classroom teachers.

Statistical analysis

Data were entered using the Statistical Package for Social Sciences (SPSS version 17.0, 2010 SPSS Inc., Chicago, USA). Univariate analyses were conducted to obtain summary statistics (frequencies, means and standard deviations) of the variables investigated. The Chi-square test was used to compare proportions. *P* value of 0.05 or less was used as the probability level at which differences were considered to be significant. The factors significantly associated with possession of lunch pack in Chi-square test were subjected to multinomial logistic regression analysis to determine their odds ratio, while Phi coefficient was calculated for the factors associated with lunch pack content to determine their strength of association.

Results

A total of 1018 primary school pupils were recruited in this study. Their ages ranged from 5 to 16 years with a mean of 9.4 (2.7) years.

Table 1 shows the distribution of the children according to possession of packed lunch and some family or personal characteristics. The girls constituted 54.4% (554/1018), while 45.6% (464/1018) were boys, giving a male: female ratio of 1:1.2. Among the studied pupils, 52.3% (532/1018) were in the junior primary school (classes 1-3), while 47.7% (486/1018) were in senior primary school (classes 4-6). Approximately, half of their mothers (51.8% [527/1018]) and fathers (57.9% [589/1018]) were traders. Majority of the pupils (77.8% [792/1018]) came to school with packed lunch.

Family size, class, parents' educational and occupational status were significantly associated with possession of packed lunch.

The result of logistic regression analysis for factors associated with not coming to school with packed lunch is shown in Table 2. Only mothers' educational status and family size remained significantly associated with not coming to school with packed lunch after logistic regression analysis.

Table 3 shows the distribution of the pupils according to school type and lunch data. Pupils in public schools were significantly least likely to come to school with

packed lunch (51.0% [206/404]) compared with mission (94.4% [388/411]) and private (97.5% [198/203]) schools. In addition, pupils in public schools were least likely to possess a lunch pack that contains fruit or vegetables (3.0% [12/404]) compared with mission (10.2% [42/411]) and private schools (48.3% [98/203]). Lunch packs containing a balanced diet (made up of staple food + meat or equivalent + fruit or vegetable) were most commonly found in private (32.5% [66/203]), compared to mission (5.8% [24/411]) and public (2.0% [8/404]) schools. About half of the pupils in the mission school came to school with partially balanced diet (carbohydrate and or leguminous food + protein). Phi-coefficient revealed a strong association between the school type and food category.

Table 4 shows the determinants of lunch pack content among the 792 pupils that came to school with packed lunch. Class in school, family size, parents' occupation and educational status have a significant association with lunch pack contents in Chi-square test. However, phi-coefficient shows that some of the associations were weak. Only mother's educational status and parents' occupation have moderate associations with lunch pack content.

Discussion

Results of the study show that a lot of attention is needed on the feeding of primary school children if the Millennium Development Goal 2 of achieving universal basic education must be achieved in Nigeria, in view of the contribution of poor nutrition to school absenteeism, early school drop-out, poor classroom performance and poor cognitive development of school-age children.^[3] Despite long hours spent in school, it is disheartening to note the significant number of pupils (especially those attending public schools) who come to school without packed lunch.

Coming to school with packed lunch was found to be significantly influenced by class and family's socio-economic characteristics. Pupils were most likely to come to school with packed lunch if they are in classes 4-6, if their parents were professionals or had tertiary education and surprisingly, if they came from families with more than six members. However, only maternal educational status and family size remained significantly associated with not coming to school with packed lunch after logistic regression analysis. The odds of not coming to school with packed lunch was about 13 and 12 times higher for mothers with no formal education or only primary education, respectively, compared to those with tertiary education. Mothers with higher level of education are believed to be more knowledgeable on the role of food on the health status of children compared to less educated ones.^[15,16] Education also enhances the ability of mothers to earn income and therefore, able to assist in meeting the financial needs of the family. In addition, women's income is more likely to be spent on food. Higher level of education among mothers may also

Table 1: Distribution of pupils according to possession of packed lunch

Characteristic	Possession of packed lunch			χ^2	P value
	Yes	No	Total (%)		
Sex					
Female	438 (79.1)	116 (20.9)	554 (54.4)	0.626	0.43
Male	354 (76.3)	110 (23.7)	464 (45.6)		
Class					
Primary 1-3	394 (74.1)	138 (25.9)	532 (52.3)	5.37	0.02
Primary 4-6	398 (81.9)	88 (18.1)	486 (47.7)		
Family size					
<6	188 (68.9)	85 (31.1)	273 (26.8)	6.947	<0.01
>6	604 (81.1)	141 (18.9)	745 (73.2)		
Mother's occupation					
Professionals	42 (100.0)	0 (0.0)	42 (4.1)	48.395	<0.001
Public servants	288 (92.0)	25 (8.0)	313 (30.8)		
Traders	358 (67.9)	169 (32.1)	527 (51.8)		
Artisans	22 (59.5)	15 (40.5)	37 (3.6)		
Unemployed	82 (82.8)	17 (17.2)	99 (9.7)		
Father's occupation					
Professionals	88 (92.6)	7 (7.4)	95 (9.3)	67.49	<0.001
Public servants	94 (79.0)	25 (21.0)	119 (11.7)		
Traders	502 (85.2)	87 (14.8)	589 (57.9)		
Artisans	92 (50.3)	91 (49.7)	183 (18.0)		
Unskilled workers	16 (50.0)	16 (50.0)	32 (3.1)		
Mother's educational status					
No formal	8 (40.0)	12 (60.0)	20 (2.0)	87.87	<0.001
Primary	88 (50.6)	86 (49.4)	174 (17.0)		
Secondary	266 (72.3)	102 (27.7)	368 (36.2)		
Tertiary	430 (94.3)	26 (5.7)	456 (44.8)		
Father's educational status					
No formal	18 (51.4)	17 (48.6)	35 (3.5)	35.59	<0.001
Primary	138 (62.4)	83 (37.6)	221 (21.7)		
Secondary	350 (80.3)	86 (19.7)	436 (42.8)		
Tertiary	286 (87.7)	40 (12.3)	326 (32.0)		
Total (%)	792 (77.8)	226 (22.2)	1018 (100.0)		

ensure equitable distribution of household resources in favour of child care including provision of food for the children.

Surprisingly, family size less than 6 was significantly associated with not coming to school with packed lunch in the index study. This finding is at variance with some reports that have linked poor access to food and poor nutritional status of children with a large family size.^[17,18] However, family size may be a poor indicator of access to food in this study as parents were predominantly traders and may live with apprentices who also assist with house chores thereby making food preparation easier for the mothers.

The difference observed in the availability of food for pupils in public and private schools agrees with an Ogun state study,^[19] which reported that although 74.4% of pupils in private school did not bring food to school, 79.5% of them brought money for buying food from food vendors. On the other hand, 100% of pupils in public school did not bring food to school but only 62.1% of them brought money to buy food. Money brought to

school by pupils in public school was lower compared to that brought by their counterparts in private schools although food bought from the food vendors were said to be of poor quality and quantity. Although the index study failed to explore the possibility of bringing money to buy food from food vendors, there were no food vendors in the schools where the study was carried out and only the pupils in public and mission schools could buy snacks during breaktime if they had money.

A significant difference was found in the category of food brought to school by pupils in the different school types. Only 2.0% and 5.8% of pupils in public and mission schools, respectively, had balanced meals compared to 32.5% of pupils in the private schools. Furthermore, fruits and or vegetables were present in the lunch packs of 3.0%, 10.2% and 48.3% of pupils in public, mission and private schools respectively. These findings may explain the significantly higher rate of malnutrition among pupils in Nigerian public schools compared to private ones as documented by previous researchers.^[12,17,20] The difference in the lunch pack contents

of pupils in the different school types may be attributed to the difference in the socio-economic status of parents as only well-off families can afford the fees paid in private schools. However, the difference may also be explained by the difference in the nutritional information available to mothers of the pupils. It was discovered that one of the private schools had a food regulation that is communicated to parents during Parents' Teachers' Association (PTA) meetings. This regulation included using only fruits and fresh fruit juices as snacks. Report on the nutritional adequacy of food brought to school is also provided to the parents through daily report

booklets and parents are given nutritional advice during PTA meetings. The findings of this study imply that feeding guidelines and nutritional education may be beneficial in improving the nutrition of primary school children, in the absence of government sponsored school food programmes. Mothers often cite lack of knowledge in addition to lack of time or resources and family or child preferences as barriers to providing adequate diets for their children.^[7]

Although the majority of the pupils had lunch packs, only few of them had balanced meals. Out of the 792 pupils that came to school with lunch packs, only 12.4% had balanced meals while fruits and or vegetables were present in the lunch packs of only 19.2% of them. Similar findings have been reported by both African and non-African studies.^[7,21] An Osun state study^[21] reported that only 12% of pre-school children had fruits in their lunch packs while 22.3% had balanced meals. These findings may explain the very high rate of malnutrition reported among primary school-age children by previous researchers.^[10-12]

Significant association was found between the category of food in lunch packs and parents' occupational and educational status in this study. Parents' occupational status indicate household wealth which is an important determinant of the quality of food affordable by the family. A strong link has been documented between poor socio-economic status and malnutrition by previous studies.^[17,18,22] Children of professionals and parents with tertiary education were more likely to have balanced diet in their lunch packs compared to others. Although traders may have higher income, this did not reflect on the quality of food brought to school by their children. This may be attributed to lower level of education among them which may affect food preferences. However, the relationship between fathers' educational status alone and food category was found to be weak in contrast to the moderately strong relationship between mothers' educational status and food category. The nutritional knowledge of mothers has been reported to increase with their educational level.^[15,16] In addition, women with higher level of education may be more receptive of nutritional education and able to challenge harmful traditional beliefs about feeding children with resultant effect of improved nutrition for their children. Mother's education and household wealth have been reported as the prime factors that regulate family nutrition.^[15,16,22]

Table 2: Result of logistic regression analysis for factors associated with not having a lunch pack

Characteristic	Odds ratio	95% confidence interval
Educational status of father		
No formal education	1.003	0.212-4.636
Primary education	0.968	0.342-2.745
Secondary education	0.730	0.291-1.833
Tertiary education	0.680	0.201-2.438
Educational status of mother		
No formal education	12.759*	1.945-83.694
Primary education	12.082*	3.453-42.272
Secondary education	7.998*	2.635-24.273
Tertiary education	1.023	1.240-17.238
Mother's occupation		
Professionals	0.167	0.126-3.168
Public servants	0.562	0.203-1.559
Traders	0.803	0.214-2.872
Artisans	0.873	0.278-2.743
Unemployed	0.357	0.115-1.106
Father's occupation		
Professionals	0.658	0.097-4.468
Public servants	0.905	0.205-3.999
Traders	0.367	0.111-1.215
Artisans	0.999	0.301-3.318
Unskilled workers	0.984	0.270-3.426
Family size		
<6	2.036*	1.102-3.761
>6	1.078	0.378-3.070
Class		
Primary 1-3	0.330	0.249-0.437
Primary 4-6	0.196	0.139-0.276

*Statistically significant

Table 3: Lunch data according to type of school

Food category	School type			χ^2	P value	Total (%)
	Public	Mission	Private			
No lunch	184 (45.5)	15 (3.7)	5 (2.5)	2.56	<0.001	204 (20.0)
Snack only	14 (3.5)	8 (2.0)	0 (0.0)	$\phi=0.72^*$		22 (2.2)
Staple food only	94 (23.3)	122 (29.7)	40 (19.7)			256 (25.2)
Staple food+meat or equivalent only	100 (24.8)	224 (54.5)	60 (29.6)			384 (37.7)
Staple food+vegetable/fruits only	4 (1.0)	18 (4.4)	32 (15.8)			54 (5.3)
Staple food+meat or equivalent+vegetable/fruits	8 (2.0)	24 (5.8)	66 (32.5)			98 (9.6)
Total (%)	404 (39.7)	411 (40.4)	203 (19.9)			1018 (100.0)

*indicates strong association

Table 4: Determinants of lunch pack contents

Characteristics	Food category				Total (%)	χ^2	P value
	A	B	C	D			
Sex							
Female	134 (30.6)	204 (46.6)	40 (9.1)	60 (13.7)	438 (55.3)	5.37	0.15
Male	122 (34.5)	180 (50.9)	14 (4.0)	38 (10.7)	354 (44.7)		
Class							
Primary 1-3	112 (28.4)	188 (47.7)	38 (9.6)	56 (14.2)	394 (49.8)	7.55	0.06
Primary 4-6	144 (36.2)	196 (49.3)	16 (4.0)	42 (10.6)	398 (50.3)		
Mother's educational level							
None	3 (37.5)	3 (37.5)	2 (25.0)	0 (0.0)	8 (1.0)	31.41 $\phi=0.31^*$	<0.01
Primary	38 (43.2)	42 (47.7)	0 (0.0)	8 (9.1)	88 (11.1)		
Secondary	115 (43.2)	123 (46.2)	12 (4.5)	16 (6.0)	266 (33.6)		
Tertiary	100 (23.3)	216 (50.2)	40 (9.3)	74 (17.2)	430 (54.3)		
Father's educational level							
None	11 (61.1)	5 (27.8)	0 (0.0)	2 (11.1)	18 (2.3)	30.51 $\phi=0.28$	<0.001
Primary	50 (36.2)	76 (55.1)	8 (5.8)	4 (2.9)	138 (17.4)		
Secondary	142 (40.6)	154 (44.0)	18 (5.1)	36 (10.3)	350 (44.2)		
Tertiary	53 (18.5)	147 (51.4)	28 (9.8)	56 (19.6)	286 (36.1)		
Mother's occupation							
House wife	32 (39.0)	30 (36.6)	4 (4.9)	16 (19.5)	82 (10.4)	54.30 $\phi=0.37^*$	<0.001
Artisan	7 (31.8)	13 (59.1)	2 (9.1)	0 (0.0)	22 (2.8)		
Trader	139 (38.8)	181 (50.6)	12 (3.4)	26 (7.3)	358 (45.2)		
Public servant	76 (23.4)	146 (50.7)	32 (11.1)	34 (11.8)	288 (36.4)		
Professional	2 (4.8)	14 (33.3)	4 (9.5)	22 (52.4)	42 (5.3)		
Father's occupation							
Unskilled worker	8 (50.0)	6 (37.5)	0 (0.0)	2 (12.5)	16 (2.0)	43.50 $\phi=0.33^*$	<0.001
Artisan	40 (43.5)	44 (47.8)	4 (4.4)	4 (4.4)	92 (11.6)		
Trader	178 (35.5)	240 (47.8)	32 (6.4)	52 (10.4)	502 (63.4)		
Public servant	27 (32.1)	53 (56.4)	6 (6.4)	8 (8.5)	94 (11.9)		
Professional	3 (3.4)	41 (46.6)	12 (13.6)	32 (36.36)	88 (11.1)		
Family size							
<6	50 (26.6)	88 (46.8)	20 (10.6)	30 (16.0)	188 (23.7)	5.24	0.16
>6	206 (34.1)	256 (42.4)	34 (5.6)	68 (11.3)	604 (76.3)		
Total (%)	256 (32.3)	384 (48.5)	54 (6.8)	98 (12.4)	792 (100.00)		

A: Staple food only, B: Staple food+meat or equivalent only, C: Staple food+vegetables/fruits only, D: Staple food+meat or equivalents+vegetables/fruits, *Indicates moderate association

Conclusion

Majority of the lunch packs of primary school pupils contain poor quality food. Pupils in public schools had the poorest quality of packed lunch and about half of them come to school without food. Mother's educational status and parent's occupation are important determinants of the nutritional contents of packed lunch among school-age children.

Recommendations

- Efforts at poverty eradication and female education should be intensified in view of the obvious influence of female education and parents' occupational status on the nutrition of school children.
- Feeding guideline should be developed and implemented in all Nigerian primary schools.
- The federal government's HGSFHP should be implemented in all 36 states of Nigeria.
- The HGSFHP should be backed up with appropriate legislative act to ensure its sustainability and maximum effectiveness.

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