

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com



Research Article

Nutritional Adequacy of Home-packed School Lunch in Nsukka, South East Nigeria

V.N. Ibeanu, F.O. Okechukwu and E.P. Eme-Okafor

Department of Home Science, Nutrition and Dietetics, University of Nigeria, Nsukka, Nigeria

Abstract

Background and Objective: Access to a nutritious mid-day meal is important for the overall well being and academic performance of school children. This cross-sectional study evaluated the nutrient content and percentage of Recommended Daily Intake (RDI) met by pupils who consumed home-packed lunch. **Methodology:** Two primary schools were purposively selected from a University town in South East of Nigeria. A total of 200 pupils and their mothers participated in the study. Questionnaire was used to obtain background information and socio-economic characteristics of the parents of the pupils. Home-packed lunch of each pupil was weighed for 3 days and food composition table used to calculate the mean nutrient content of the meals of all the children. The percentage of RDI met by the pupils was also calculated. **Results:** The results revealed that 90.2% of the pupils had breakfast at home and 78.3% went to school with home-packed lunch such as, jollof rice (21%), indomie noodles/spaghetti (17.5%), biscuits (28.7%) and pastries (14.7%). About 15% of the pupils bought foods from hawkers around the school compound. The pupils who consumed home-packed lunch met 1/2 of their carbohydrate, vitamin B and zinc, 1/3 of protein, iron and potassium, 1/20 vitamin A, 1/22 of calcium, 1/5 of vitamin C RDI. **Conclusion:** There is need for adequate nutritional counseling of parents/guardians on choice and combination of foods for school lunch that would meet the recommended 1/3 of the RDI for all nutrients needed for optimal growth, development and academic performance of school children.

Key words: Home-packed school lunch, RDI, malnutrition, home-packed lunch

Received: September 06, 2016

Accepted: November 30, 2016

Published: February 15, 2017

Citation: V.N. Ibeanu, F.O. Okechukwu and E.P. Eme-Okafor, 2017. Nutritional adequacy of home-packed school lunch in Nsukka, South East Nigeria. Pak. J. Nutr., 16: 125-130.

Corresponding Author: F.O. Okechukwu, Department of Home Science, Nutrition and Dietetics, University of Nigeria, Nsukka, Nigeria Tel: +2348069627637

Copyright: © 2017 V.N. Ibeanu *et al.* This is an open access article distributed under the terms of the creative commons attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Adequate nutrition is paramount for optimal growth and development as well as in reducing risks associated with both immediate and long-term health problems in school children. Nutritional and health status have influences on a child's learning ability and school performance. Access to a nutritious mid-day meal is crucial in maintaining good nutritional status as well as the overall well being and cognitive development of a school child. According to UNICEF¹, hungry children may have difficulty in concentrating or performing academic activities even when healthy and well-nourished. 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 food². School-age children are nutritionally significant because they are engaged in many mental and physical activities. This stage of life cycle is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence³.

Malnutrition manifests in different forms, such as under-nutrition, over-nutrition and micro-nutrients deficiency in children⁴. About 8, 26 and 16% of children worldwide suffer from wasting, stunting and underweight respectively. These figures are more in developing countries. According to UNICEF¹ the prevalence of wasting is 10%, stunting 38% and underweight 23% in developing countries and 16.8, 27.6 and 61.2%, respectively in Nigeria. At the same time, overweight and obesity, which were previously considered problems afflicting mainly the affluent, are now markedly on the increase in low and middle income countries, particularly in urban areas⁵. In 2010, 43 million children (35 million in developing countries) were estimated to be overweight and obese, with 92 million at risk of overweight⁶. The prevalence rates of overweight and obesity in school-age children in Nigeria was 11.4 and 2.8%, respectively by Ene-Obong *et al.*⁷.

Malnutrition has continued to be a public health problem in developing countries where the poor socio-economic conditions work in synergy with malnutrition⁸. It is well documented that malnutrition negatively effects brain development causing delays in motor and cognitive development, such as: Attention deficit disorder, impaired school performance, decreased IQ scores memory deficiency, reduced social skills, reduced language development, reduced problem solving abilities⁹. These might invariably lead to high withdrawal rate from school^{8,9}. It is estimated that close to one billion children will be physically and mentally impaired globally by 2020 if interventions are not carried out¹⁰, global monitoring report¹¹. According to World Food Programme¹²

66 million primary school-age children attend classes hungry across the developing countries and 23 million of these children live in Africa alone.

Government sponsored school programmes was launched by UNICEF¹³ with the aim of ensuring that every school child gets at least one adequate diet daily^{2,14}. The programme is affected by the economic down turn especially in developing countries like Nigeria. In realization of the central role of nutrition in academic performance, the Federal Government of Nigeria in collaboration with New Partnership of African Development (NEPAD), World Food Program (WFP), United Nations International Children's Fund (UNICEF) and International Development Partner (IDPS), piloted Home Grown School Feeding and Health Program (HGSFHP) in 12 states^{2,15} in 2005. The aim of GSFHP was to provide a nutritionally adequate meal during school hours while promoting food production by local farmers in the pilot states. Only one state (Osun state) is still implementing the programme in Nigeria¹⁵.

In many parts of Nigeria school children have a meal before they leave home for school and have no food until they get home late in the afternoon. Some children however, rush out to school with empty stomach. This problem is compounded with the increase of school hours from the usual 6-10 h. It is the sole responsibility of Nigerian parents to provide lunch for their children while in school. There is no guideline as to what to pack for the child. 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. Thus some mothers resort to packing no lunch or pack poor quality meal or just snacks. Despite the role of packed lunch in deterring poor nutritional status and cognitive development of school children, the question remain, are home-packed lunches nutritionally adequate and can provide 1/3 of the child's RDI that is the main objective of the school lunch programme? This study assessed the nutrient content of home-packed school lunch and calculated the percentage of the RDI of the children met by the home-packed school lunch.

MATERIALS AND METHODS

Design, study location and subject: A cross sectional survey design was adopted. The study was carried out in Nsukka, the second largest city in Enugu State, South-East Nigeria. Nsukka lies on the North-West boarder of Enugu state and has a land mass of about 81 and 125 km². The town houses the number one University in Nigeria and many secondary and primary

schools. Two primary schools (Federal government university staff primary school and a private primary school) were purposively selected for the study. Both schools were in Nsukka urban. Multistage sampling technique was adopted in selection of the pupils. A total of 200 primary school children aged 5-8 years participated in the study. Informed consent of parents of the pupils and the school authorities were obtained after the purpose and full details of the study were explained to them.

Data collection: Data was collected using questionnaire validated by three experts from Department of Home Science, Nutrition and Dietetics, University of Nigeria, Nsukka. The questionnaire was taken home by the pupils for their mothers to complete and return. Packed lunch of each child was weighed for 3 days. The different lunches were weighed before the pupil started eating and the leftovers were weighed and subtracted from the initial quantities to determine the quantity consumed.

Data analysis: Statistical Package for Service Solution (SPSS) version 20 was used for data analysis. The mean nutrient contents of the home-packed school lunch were calculated using food composition table by Platt¹⁶. The values were compared with the recommended 1/3 of RDI for the age group required from school lunch.

RESULTS

The educational level and monthly income of parents of the pupils in primary schools in Nsukka showed that all the parents had formal education, 9.8% of them completed primary school education, while 71.3% were university graduates. About 52.4% of the parents had monthly income of ₦50,000 and above (Table 1).

Majority (90.2%) of the pupils ate breakfast before going to school, 78.3% were given home-packed meals, 15.4% had money to buy lunch from hawkers at school and 2.1% went to school with nothing (Table 2). Information on the amount of money given to pupil for school lunch indicates that 59.2% of the pupils had only home-packed lunch with no money. Among those given money, 36.4% had between ₦5-₦30 and 3.5% of the pupils were given ₦30 and above (Table 3). The most commonly home-packed meals were jollof rice (40.9%), spaghetti/indomie noodles (30.1%) and bambara groundnut pudding (13.3%). The snacks included: Pastries (62.2%) and bread sandwich (4.5%). Table 4 showed that 69.1% of the pupils did not take drinks (except water) to school, 8.1% took

Table 1: Educational level and monthly income of parents of the pupils

Level of education	Frequency	Percentage
Primary school uncompleted	7	4.8
Primary school completed	14	9.8
Secondary school uncompleted	3	2.1
Secondary school completed	7	4.9
National certificate in education (NCE)	7	4.8
University degree	102	71.3
Others (Polytechnics and co-operative studies)	3	2.1
Total	143	100.0
Income per month		
<₦10,000	11	7.7
₦10,000-₦20,000	17	11.7
₦20,000-₦30,000	20	14.0
₦30,000-₦40,000	13	9.1
₦40,000-₦50,000	7	4.8
₦50,000<	75	52.4
Total	143	100.0

Table 2: Breakfast consumption pattern and mode of school lunch of pupils

Variables	Frequency	Percentage
Always	129	90.2
Not always	14	9.8
Total	143	100.0
Mode of school lunch of pupils		
Takes money to buy only lunch at school	22	15.4
Takes packed lunch	112	78.3
Takes fruits and money	2	1.4
Takes drinks and money	4	2.8
Takes nothing	3	2.1
Total	143	100.0

Table 3: Amount of money given to pupils for school lunch

Amount	Frequency	Percentage
<₦5	-	-
₦5-₦10	27	18.9
₦11-₦15	1	0.7
₦16-₦20	17	11.9
₦21-₦25	1	0.7
₦26-₦30	6	4.2
₦30 and above	5	3.5
Not given money for school	83	59.2
Total	140	100.0

milk base drinks and 7.4% had fruit juice, while 5.9 and 9.6% took dried sorrel (*Hibiscus sabdariffa*) leaf drink and soft drinks, respectively.

Table 5 showed that the snacks bought from hawkers by the pupils included pastries (59.6%), roasted/boiled groundnut (12.3%), bambara groundnut pudding (10.5%), spiced fried cowpea cake (5.3%) and ice cream (5.3%). The nutrient contents of the commonly used home-packed meals/snacks/drinks were jollof rice 79.6 g carbohydrate, roasted/boiled groundnut 23.2 g protein and 0.79 mg vitamin B₁, buns 7.0 mg niacin, among others. Some of the items were deficient in some of the nutrient examples buns vitamins A, C and iron, soft drinks protein, niacin, vitamins, zinc, biscuits and jollof rice vitamins A and C (Table 6).

The mean nutrient content of home-packed meals/snacks/drinks was 89.2 g carbohydrate, 14.3 g protein, 7.6 mg niacin, 0.41 mg vitamin B₁, 30.6 µg vitamin A, 9.2 mg vitamin C. The zinc, potassium, iron and calcium contents were 5.12, 642.7, 3.46 and 36.72 mg (Table 7). The mean intakes of the pupils met 68% (1/2) for carbohydrate, 42% (1/3) for protein, 5% (1/20) for vitamin A, 35% (1/3) of iron and 4.5% (1/22) for calcium.

Table 4: Types of home-packed meals/snacks/drinks carried to and eaten at school by the respondents

Types of meal	Frequency	Percentage
Jellof rice	34	40.9
Yam pottage	1	1.2
Bamabra nut pudding	11	13.3
Spiced cowpea pudding	2	2.4
Fried cowpea cake	1	1.2
Fried plantain and egg stew	4	4.8
Spaghetti/indomie noddles	25	30.1
Fried yam and stew	1	1.2
Potato chips	3	3.6
Bread sandwiches	1	1.2
Total	83	100.0
Types of snacks		
Pastries	17	25.8
Ice-cream	1	1.5
Bread sandwiched	3	4.5
Biscuit	41	62.2
Pancakes	2	3.0
Bread only	2	3.0
Total	66	100.0
Types of drinks		
Fruit juice	10	7.4
Soft drink	13	9.6
Milk base drink	11	8.1
Dried sorrel leaf (<i>Hibiscus sabdariffa</i>) drink	8	5.9
Had no drink (except water)	94	69.1
Total	136	100.0

DISCUSSION

Most parents in the study were university graduates and had monthly income above ₦50,000. This could have influenced the choice of home-packed lunch for their children. This finding agreed with result of studies on assessment of nutritional status of primary school children¹⁷⁻¹⁹ the researchers found that socio-economic status of parents was a factor in the choice of lunch to pack for the children. Parents within the high income bracket sent their children to private schools where the content of home-packed lunch is taken as a reflection of socio-economic status of the parents.

Very high percentage (90.2%) of the pupils ate breakfast before going to school and 78.3% were also given home-packed lunch. Hoyland *et al.*²⁰ and Lateef *et al.*²¹ recorded high percentage (86%) of breakfast consumption among school children. This was attributed to education and income of the parents. This practice is very healthy and might impact positively to the growth, development and academic performance of the pupils.

Table 5: Type of snacks bought by pupils

Type of lunch bought by pupils	Frequency	Percentage
Pastries	34	59.6
Groundnut (roasted/boiled)	7	12.3
Banana fingers	2	3.5
Ice-cream	3	5.3
Fruit juice	1	1.8
Soft drinks	1	1.8
Bambara nut pudding	6	10.5
Spiced fried cowpea cake	3	5.3
Total	57	100.0

Table 6: Nutrient content of home-packed meals/snacks/drinks of pupils per hundred grams of edible portion

	Carbohydrate (g)	Protein (g)	Niacin (mg)	Vitamin B ₁ (mg)	Vitamin A (µg)	Vitamin C (mg)	Zinc (mg)	Potassium (mg)	Iron (mg)	Calcium (mg)
Meals/snacks/drinks										
Buns	44.20	7.3	7.00	0.40	0.0	0.0	1.1	151.0	0.00	55.30
Roasted/boiled groundnut	23.00	23.2	1.50	0.79	1.5	1.0	5.3	657.5	3.80	4.90
Bambara nut pudding	29.40	4.4	0.31	0.08	3.1	0.0	0.1	96.2	2.20	8.38
Fruit juice	0.12	0.8	0.40	0.00	50.5	2.4	0.8	155.0	0.20	0.10
Soft drink	10.30	0.0	0.00	0.00	0.0	0.0	0.0	1.1	0.03	3.00
Meat pie	47.80	2.4	0.12	0.12	1.8	6.1	0.2	201.5	1.50	21.80
Biscuit	77.00	12.8	5.40	0.30	0.0	0.0	0.6	222.8	3.60	48.60
Jellof rice	79.60	7.0	5.40	0.16	0.0	0.0	10.0	513.0	2.70	6.00
Fried plantain	31.00	1.0	0.70	0.05	1.0	30.0	0.2	595.0	0.50	7.00
Indomie	7.00	5.3	0.80	0.05	127.0	0.0	0.4	119.5	0.30	15.10

Table 7: Mean of nutrient content of home-packed lunch/snacks/drinks consumed and the percentage of RDI met by the pupils

	Carbohydrate (g)	Protein (g)	Niacin (mg)	Vitamin B ₁ (mg)	Vitamin A (µg)	Vitamin C (mg)	Zinc (mg)	Potassium (mg)	Iron (mg)	Calcium (mg)
Lunch/snacks/drinks										
RDI	130.0	34.0	8.0	0.60	600.0	45.0	10.00	2000.0	10.00	800.00
Mean content	89.2	14.3	7.6	0.41	30.6	9.2	5.12	642.7	3.46	36.72
RDI	130.0	34.0	8.0	0.60	600.0	45.0	10.00	2000.0	10.00	800.00
Mean intake	68.0	42.0	95.0	68.00	5.0	20.0	51.00	32.0	35.00	4.50
Intake as fraction of RDI	1/2	1/3	1.0	1/2	1/20	1/5	1/2	1/3	1/3	1/22

Most pupils in this study were not given lunch money and among those who had money to buy lunch, majority of the pupils were given ₦5-₦10. This finding is in contrast with Ugochukwu *et al.*²² study which found that 80% of the pupils in private schools in Nnewi, Anambra state were given money to buy lunch from food vendors. This disparity in result could be attributed to location. Nnewi is a big commercial town East of Nigeria while the study area was a university town.

Verities of home-packed meals/snacks/drinks carried and eaten at school by the pupils includes: Popular meals Jollof rice, indomie noodles and bambara nut pudding. The snacks include pastries, bread sandwiches and drinks were milk base drinks, fruit juice, sorrel (*Hibiscus sabdarffa*) dried leaf drink and drinking water. The choice of these meals/snacks/drinks could be because of their nutrient contents so as to meet the RDI at school, availability, likeness by the pupils and convenience to carry to school.

Findings on types of meals/snacks/drinks bought by the pupils who were given money to school showed that various items purchased include: Pastries (59.6%), roasted/boiled groundnuts (12.3%), bambara nut pudding (10.5%), fried cowpea cake (5.3%) and ice-cream (5.3%). The choice may be influenced by the preference of the children and items that were available since the parents were not there to make choice for the pupils on things to buy (Table 5) this finding is in line with the findings of a similar study by Lateef *et al.*²¹, who indicated that the highest mean composite consumption per week by participants include: Snacks (pastries), ice-cream and different fruit juice.

Good number of pupils (89.2%) came with carbohydrate, meals/snacks good for energy supply. Few (14.3%) pupils came with protein based meals. Fruits and vegetables were left out except for very few (7.4%) pupils that came to school with fruit juice. Although, majority of the children (90%) came to school with home-packed meals/snacks/drinks, only few of them had adequate meals. The deficient nutrients in these meals/snacks/drinks could influence the optimal development of the pupils. Similar findings have been reported by both African and non-African studies by Briley *et al.*²³ and Ogbimi and Ogunba²⁴ reported that only 12% of preschool children had fruits in their lunch pack. This findings could explain that why researchers^{14,18,25} reported very high rate of malnutrition problems among primary school-age children.

Findings on the mean nutrient contents of the lunch/snacks/drinks consumed and the percentage of RDI met by the pupils indicates carbohydrate 68 g (1/2), protein 42 g (1/3), niacin 95 mg (1), vitamin B, 68 mg (1/2), vitamin A 5 µg (1/20), vitamin C 20 mg (1/5), zinc 51 mg (1/2), potassium 32 mg (1/3), iron 35 mg (1/3) and calcium 4.5 mg (1/22). The

result of this study showed that carbohydrate, protein, niacin, vitamin B₁, zinc and iron content of the home-packed lunch met 1/3 of the pupils RDI while calcium, vitamin A and vitamin C did not meet the required 1/3 of their RDI. This result is in line with the study by Meldrum²⁶ in South Africa which revealed that the home-packed in township schools often met 50% of the pupils RDI. Previous studies by Senbanjo *et al.*¹⁷, Ogbimi and Ogunba²⁴ and Babar *et al.*²⁷ documented a strong link between poor socio-economic status and malnutrition which the findings of the present study showed where the nutrient contents of most of the home-packed meals/snacks/drinks met 1/3 of the pupils RDI. This was influenced by the parent's high level of education and socio-economic status among others. The nutrients that could not meet up to 1/3 of the RDI could be as a result of poor food choices and combinations by the parents.

CONCLUSION

Majority of the pupils went to school with home-packed lunch which met the required 1/3 of the pupils RDI for protein, carbohydrate, iron, zinc, niacin and vitamin B₁. The 1/3 of the RDI was not met for vitamins A, C and calcium. There is therefore great need for nutrition guidelines on food choices to guide parents and caregivers in providing adequate home-packed lunch for optimal growth, development and academic performance of school children.

ACKNOWLEDGMENTS

The authors would like to acknowledge the Department of Home Science, Nutrition and Dietetics, University of Nigeria for their contributions to the success of this study. Special thanks also go to Enugu state Universal Basic Education Board (ESUBEB) Nigeria, the participating schools and all participants for their active cooperation, patience and support.

REFERENCES

1. UNICEF., 2013. Improving Child Nutrition: The Achievable Imperative for Global Progress. United Nations Children's Fund, New York, USA., ISBN-13: 978-92-806-4686-3, Pages: 124.
2. Akanbi, G.O. and E. Alayande, 2011. Home grown school feeding and health program in Nigeria: an innovative approach to boosting enrolment in public primary schools-a study of Osun state 2002-2010. Afr. Symposium: Online J. Afr. Educ. Res. Network, 11: 20-28.

3. Sunita, K. and R. Jain, 2005. Assessment of nutritional status of school children from rural Bihar. *Indian J. Nutr. Dietetics*, 42: 326-334.
4. Babatunde, R.O., F.I. Olagunju, S.B. Fakayode and F.E. Sola-Ojo, 2011. Prevalence and determinants of malnutrition among under-five children of farming households in Kwara State, Nigeria. *J. Agric. Sci.*, 3: 173-181.
5. WHO., 2013. Obesity and overweight. Fact Sheet No. 311, World Health Organization, Geneva, Switzerland. <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>
6. De Onis, M., M. Blossner and E. Borghi, 2010. Global prevalence and trends of overweight and obesity among preschool children. *Am. J. Clin. Nutr.*, 92: 1257-1264.
7. Ene-Obong, H., V. Ibeanu, N. Onuoha and A. Ejekwu, 2012. Prevalence of overweight, obesity and thinness among urban school-aged children and adolescents in southern Nigeria. *Food Nutr. Bull.*, 33: 242-250.
8. Olusanya, J.O., 2010. Assessment of the food habits and school feeding programme of pupils in a rural community in odogbolu local government area of Ogun state, Nigeria. *Pak. J. Nutr.*, 9: 198-204.
9. Orphan Nutrition, 2016. Impact of malnutrition of health and development. Spoon Foundation. <http://www.orphannutrition.org/understanding-malnutrition/impact-of-malnutrition-on-health-and-development/>
10. UNICEF., 2011. Level and trends in child mortality report 2011. The UN Inter-agency Group for Child Mortality Estimation. http://www.unicef.org/media/files/Child_Mortality_Report_2011_Final.pdf
11. The World Bank, 2012. Global monitoring report 2012: Food prices, nutrition and the millennium development goals. World Bank, Washington, DC. <https://openknowledge.worldbank.org/handle/10986/6017>
12. World Food Programme, 2009. Feed minds, change lives-school feeding: Highlights and new directions. World Food Programme, Rome. <https://www.wfp.org/content/feed-minds-change-lives-school-feeding-highlights-and-new-directions-0>
13. Wardlaw, G.M. and M. Kessel, 2002. Perspectives in Nutrition. 5th Edn., McGraw Hill, New York, USA., ISBN: 0-07-228784-5.
14. FMOH., 2006. National school health policy 2006. Federal Ministry of Health, Abuja, Nigeria.
15. Yunusa, I., A.M. Gumel, K. Adeghusi and S. Adegbusi, 2012. School feeding program in Nigeria: A vehicle for nourishment of pupils. *Afr. Symposium: Online J. Afr. Educ. Res. Network*, 12: 104-108.
16. Platt, R.H., 1976. Food Composition Table. 2nd Edn., Churchill, London.
17. Senbanjo, I.O., K.A. Oshikoya, O.O. Odusanya and O.F. Njokanma, 2011. Prevalence of and risk factors for stunting among school children and adolescents in Abeokuta, southwest Nigeria. *J. Health Popul. Nutr.*, 29: 364-370.
18. Olanipekun, T.O., V.A. Obatolu, S.B. Fasoyiro and B.O. Ogunba, 2012. Assessment of nutritional status of primary school children in Ibadan, South West Nigeria. *Nutr. Food Sci.*, 42: 390-396.
19. Adegun, J.A., O.B. Ajayi-Vincent and E.O. Alebiosu, 2013. Differences in the nutritional status of young school children from public and private owned primary schools in Ekiti state, Nigeria. *Eur. Scient. J.*, 9: 32-37.
20. Hoyland, A., K.A. McWilliams, R.J. Duff and J.L. Walton, 2012. Breakfast consumption in UK schoolchildren and provision of school breakfast clubs. *Nutr. Bull.*, 37: 232-240.
21. Lateef, O.J., E. Njogu, F. Kiplamai, U.S. Haruna and R.A. Lawal, 2016. Breakfast, food consumption pattern and nutritional status of students in public secondary schools in Kwara state, Nigeria. *Pak. J. Nutr.*, 15: 140-147.
22. Ugochukwu, E.F., C.U. Onubogu, E.S. Edokwe and K.N. Okeke, 2014. Nutritional contents of lunch packs of primary school children in Nnewi, Nigeria. *Ann. Med. Health Sci. Res.*, 4: 5108-5114.
23. Briley, M.E., N. Ranjit, D.M. Holescher, S.J. Sweitzer, F. Almansour and C. Roberts-Gray, 2012. Unbundling outcomes of a multilevel intervention to increase fruit, vegetables and whole grains parents pack for their preschool children in sack lunches. *Am. J. Health Educ.*, 43: 135-142.
24. Ogbimi, G.E. and B.O. Ogunba, 2011. Nutritional quality of the lunches of children in day care in Osun State of Nigeria. *Afr. J. Food Agric. Nutr. Dev.*, 11: 5053-5063.
25. Ejekwu, A.D., H.N. Ene-Obong and O.J. Oguizu, 2012. Nutritional status and cognitive performance among children aged 5-12 years from urban and rural areas of Enugu State, Nigeria. *Afr. J. Psychol. Stud. Social Issues*, 15: 481-496.
26. Meldrum, A., 2005. Who feeds the child; Implications of associated social and economic variable on the feeding habits of school aged children in Pretoria (South Africa). Nutrition Learning Package, World Health Organization, Geneva, Switzerland.
27. Babar, N.F., R. Muzaffar, M.A. Khan and S. Imdad, 2010. Impact of socioeconomic factors on nutritional status in primary school children. *J. Ayub Med. Coll. Abbottabad*, 22: 15-18.