

## NUTRITIONAL STATUS OF PRIMARY SCHOOL PUPILS PARTICIPATING IN SCHOOL FEEDING PROGRAMME IN OSUN STATE, NIGERIA

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### ABSTRACT

*The primary school age-group (6-12 years old) is a stage marked with physical growth, mental development and social adaptation of a child which lay the foundation for a good adult life. This study assessed the nutritional status of primary school pupils participating in the school feeding programme in Osun State. Multistage sampling technique was used to select 410 pupils from 18 schools. A structured interviewer's administered questionnaire was used to obtain information on the personal and family characteristics of the respondents. Weight and height measurements were taken using standard anthropometric procedures and WHO Anthro-Plus software (v 1.0.4) was used to determine the nutritional status of the pupils. Data was analyzed using frequency counts, percentages, means, standard deviations, correlations and Chi-square methods. Results showed that 53.2% of the pupils were females, with mean age of  $9.7 \pm 1.5$  years, 56.6% were Muslims and 65.4% of the fathers were artisans. Majority (74.6%) were from monogamous homes with mean family size of  $7.0 \pm 2.8$  members and 68.3% made use of water closet. Prevalence of stunting, underweight and wasting were 23.2%, 20.5% and 5.6% respectively. Chi-square showed significant association ( $p < 0.05$ ) between fathers' occupation ( $\chi^2 = 82.38$ ;  $df = 27$ ), family size ( $\chi^2 = 53.37$ ;  $df = 12$ ), toilet facility ( $\chi^2 = 36.08$ ;  $df = 9$ ) and BMI-for-age Z-score; fathers' occupation ( $\chi^2 = 44.26$ ;  $df = 18$ ), family type ( $\chi^2 = 28.99$ ;  $df = 4$ ), religion ( $\chi^2 = 6.92$ ;  $df = 2$ ) and weight-for-age Z-score as well as fathers' occupation ( $\chi^2 = 31.08$ ;  $df = 18$ ), family type ( $\chi^2 = 18.34$ ;  $df = 4$ ) and height-for-age Z-score of the respondents. The study concluded that malnutrition (stunting and underweight) is a public health problem among the respondents.*

**Keywords:** Pupils, Nutritional status, School feeding programme, Primary School.

### INTRODUCTION

Hunger is an ongoing problem that affects more than 815 million people who do not have enough to eat in the world (FAO, 2017). Infants and children are among the most vulnerable groups subject to this situation, and when very young, they are faced with the irreversible, short and long-term cognitive, physical and psychosocial consequences of hunger (World Bank, 2006). Childhood is a critical stage offering a window of opportunity for interventions to inculcate healthy eating habits to mitigate the occurrence of diet-related chronic diseases in later life

associated with poor eating habits in earlier life (Ochola & Masibo, 2014). School Feeding Programme (SFP) is an organized programme that aims at alleviating hunger while supporting education, health and community development. SFPs provide meals or snacks to be eaten during school hours or distributed as dry take-home food rations to pupils at the end of each day, month or school term (WFP, 2007). Studies have shown that the school feeding programme leads to improved nutritional status in participating pupils (Jomaa, McDonnell & Probart, 2011; Arsenault et al., 2009; Bittenheim, Alderman & Friedman, 2011).

The prevalence of stunting among school-aged children globally is 28% which is approximately 171 million children stunted (De-Onis, 2011; Best, Neufingerl, Van-Geel & Osendarp, 2010). Studies aimed at tackling malnutrition in developing countries have been focused on under-five children without much consideration for the school-age group. However, it has been revealed by available data that school children may not be better nourished than younger children, as they have several risk factors of malnutrition (Ejekwu, Ene-Obong & Oguizu, 2012; Olanipekun, Obatolu, Fasoyiro & Ogunba, 2012; WFP, 2016). Out of the 12 pilot states selected by the Federal Government to start the school feeding programme in Nigeria in 2005, Osun State remains as the only state that still has the school feeding programme in operation (Yunusa, Gumel & Adegbusi, 2010). This study therefore assessed the nutritional status of primary school pupils participating in the school feeding programme in Osun State. The specific objectives are to assess the family and personal characteristics of the pupils, assess the nutritional status of the pupils and determine the relationship between the family and personal characteristics of the pupils and their nutritional status. The research questions seek to answer if there is a significant relationship between the family and personal characteristics of the pupils and their nutritional status; what is the nutritional status of the pupils and the family and personal characteristics of the pupils. The hypothesis stated that there is no significant relationship between the family and personal characteristics of the pupils and their nutritional status.

## **METHODOLOGY**

The study used a cross-sectional, descriptive research design. It was carried out in Osun state among the public primary school pupils aged 6-12 years. There are 1378 public primary schools in the state and the pupils benefitting from the school feeding programme is estimated as 252,793 pupils (PCD & HGSEF, 2012; Osun Elementary School Feeding and Health Programme, 2017). Multi-stage simple random sampling technique was used. In stage one, three local governments each were randomly selected from the three senatorial districts giving a total of nine local governments. In stage two, two wards were randomly selected from each of the nine local governments giving a total of 18 wards. In stage three, one school was randomly selected from each of the wards giving a total of 18 schools and the last stage was the selection of 23 pupils from each school using the systematic sampling method making a total of 414 respondents; while 410 respondents gave their consent. A structured questionnaire titled “The Nutritional status of primary school pupils participating in the school feeding programme in Osun State, Nigeria”, with two sections (namely: Personal and family characteristics and Anthropometry); was used to obtain information on the pupils’ personal and family characteristics. The weights of the pupils

were taken with a sensitive digital (SECA 803) scale and a stadiometer (portable, wooden and calibrated) was used to measure the height of the pupils. The instruments were pre-tested on 30 private school pupils, the measurements were taken in duplicates and the average recorded. The nutritional status of the respondents was determined by converting the anthropometric measurements to Z-scores using the WHO Anthro-Plus software (v 1.0.4). Data analysis was done using the IBM SPSS version 20.0 (Statistical Package for Social Sciences) software for descriptive (frequency counts, percentages, mean and standard deviation) and inferential statistics (Chi-square). Chi-square was used to test the hypothesis at  $P < 0.05$  level of significance.

## RESULTS

**Table I: Personal and Family Characteristics of Respondents**

<b>Variables</b>	<b>Frequency (N)</b>	<b>Percentage (%)</b>
<b>Gender</b>		
Male	192	46.8
Female	218	53.2
<b>Age</b>		
6-8	87	21.2
9-12	323	78.8
<b>Religion</b>		
Christianity	178	43.4
Islam	232	56.6
<b>Family type</b>		
Monogamous	306	74.6
Polygamous	103	25.1
Divorced	1	0.3
<b>Family size</b>		
1-5	125	30.5
6-10	253	61.7
11-15	25	6.1
16-20	4	1.0
21-25	3	0.7
<b>Fathers' Occupation</b>		
Trader	48	11.7
Farmer	22	5.4
Civil servant	46	11.2
Artisan	268	65.4
Other professions	23	5.7
Unemployed	2	0.5
<b>Mothers' Occupation</b>		
Housewife	32	7.8
Trader	215	52.4
Civil servant	28	6.8
Artisan	127	31.0
Farmer	3	0.7
Auxiliary Nurse	4	1.0

### Personal and family characteristics of respondents

Table I shows that more than half (53.2%) of the pupils were females and 46.8% were males. The mean age of the respondents was  $9.7 \pm 1.5$  years with majority (78.8%) within the age-range of 9-12 years and more than half (56.6%) of the respondents were Muslims. Three-quarter (74.6%) were from monogamous homes, 61.7% had family size of 6-10 members, 65.4% of the respondents' fathers were artisans while more than half (52.4%) of the mothers were traders.

**Table II: Anthropometric Characteristics of the Respondents**

Variables	Frequency (N)	Percentage (%)
<b>Height-for-Age Z-score (HAZ)</b>		
Normal	315	76.8
Moderate stunting	72	17.6
Severe stunting	23	5.6
<b>Weight-for-Age Z-score (WAZ)</b>		
Normal	326	79.5
Moderate underweight	70	17.1
Severe underweight	14	3.4
Overweight	0	0
<b>BMI-for-Age Z-score (BAZ)</b>		
Normal	384	93.7
Moderate wasting	20	4.9
Severe wasting	3	0.7
Obesity	3	0.7

### Anthropometric characteristics of respondents

Table II shows that three-quarter (76.8%) of the respondents were of normal height-for-age, 17.6% were moderately stunted while 5.6% were severely stunted; about 80% were of normal weight-for-age, 17.1% were moderately underweight, 3.4% were severely underweight while no respondent was overweight; 93.7% were of normal BMI-for-age, 4.9% were moderately wasted, 0.7% were severely wasted while 0.7% were obese. The mean Height-for-age (HAZ), Weight-for-age (WAZ) and BMI-for-age (BAZ) are 1.32, 1.24 and 1.09 respectively.

**Table III: Family and Personal Characteristics and Height-for-age Z-score (HAZ)**

Variables	HAZ				P-value
	Normal N (%)	Moderate stunting N (%)	Severe stunting N (%)	Total N (%)	
<b>Age</b>					
6-8	69(79.3)	13(14.9)	5(5.7)	87(21.2)	0.770
9-12	246(76.2)	59(18.3)	18(5.6)	323(78.8)	
Total	315(76.8)	72(17.6)	23(5.6)	410(100)	
<b>Family Type</b>					
Monogamous	240(78.4)	50(16.3)	16(5.2)	306(74.6)	<b>0.001*</b>
Polygamous	75(72.8)	22(21.4)	6(5.8)	103(25.1)	
Divorced	0	0	1(100)	1(0.3)	
Total	315(76.8)	72(17.6)	23(5.6)	410(100)	
<b>Fathers' Occupation</b>					
Trader	39(81.2)	6(12.5)	3(6.2)	48(11.7)	<b>0.028*</b>
Farmer	21(95.5)	1(4.5)	0	22(5.4)	
Civil servant	38(82.6)	7(15.2)	1(2.2)	46(11.2)	
Artisan	199(74.3)	52(19.4)	17(6.3)	268(65.4)	
Clergy	9(69.2)	3(23.1)	1(7.7)	13(3.2)	
Auxiliary nurse	3(50)	3(50)	0	6(1.5)	
Deceased	0	0	1(100)	1(0.2)	
Unemployed	2(100)	0	0	2(0.5)	
Banker	2(100)	0	0	2(0.5)	
Contractor	2(100)	0	0	2(0.5)	
Total	315(76.8)	72(17.6)	23(5.6)	410(100)	
<b>Religion</b>					
Christianity	143(80.3)	25(14.1)	10(5.6)	178(43.4)	0.257
Islam	172(74.1)	47(20.3)	13(5.6)	232(56.6)	
Total	315(76.8)	72(17.6)	23(5.6)	410(100)	

**Personal and family characteristics and height-for-age Z-score (HAZ) of respondents**

Table III shows that there was a significant relationship ( $p < 0.05$ ) between the fathers' occupation and family type of the respondents and their height-for-Age Z-score.

**Table IV: Family and Personal Characteristics and Weight-for-age Z-score (WAZ)**

Variables	WAZ			Total N (%)	P-value
	Normal N (%)	Moderate Underweight N (%)	Severe Underweight N (%)		
<b>Age</b>					
6-8	132(81.5)	23(14.2)	7(4.3)	162(39.5)	0.355
9-12	194(78.2)	47(19)	7(2.8)	248(60.5)	
Total	326(79.5)	70(17.1)	14(3.4)	410(100)	
<b>Religion</b>					
Christianity	144(80.9)	24(13.5)	10(5.6)	178(43.4)	<b>0.031*</b>
Islam	182(78.4)	46(19.8)	4(1.7)	232(56.6)	
Total	326(79.5)	70(17.1)	14(3.4)	410(100)	
<b>Family type</b>					
Monogamous	243(79.4)	52(17)	11(3.6)	306(74.6)	<b>0.000*</b>
Polygamous	83(80.6)	18(17.5)	2(1.9)	103(25.1)	
Divorced	0	0	1(100)	1(0.3)	
Total	326(79.5)	70(17.1)	14(3.4)	410(100)	
<b>Fathers' Occupation</b>					
Trader	36(75)	12(25)	0	48(11.7)	<b>0.001*</b>
Farmer	20(90.9)	2(9.1)	0	22(5.4)	
Civil servant	42(91.4)	2(4.3)	2(4.3)	46(11.2)	
Artisan	210(78.4)	48(17.9)	10(3.7)	268(65.4)	
Clergy	9(69.2)	3(23.1)	1(7.7)	13(3.2)	
Auxiliary nurse	4(66.7)	2(33.3)	0	6(1.5)	
Deceased	0	0	1(100)	1(0.2)	
Unemployed	1(50)	1(50)	0	2(0.5)	
Banker	2(100)	0	0	2(0.5)	
Contractor	2(100)	0	0	2(0.5)	
Total	326(79.5)	70(17.1)	14(3.4)	410(100)	

**Family and personal characteristics and weight-for-age Z-score (WAZ)**

Table IV shows that there was a significant relationship ( $p < 0.05$ ) between the fathers' occupation, religion and family type of the respondents and their weight-for-Age Z-score (WAZ).

**Table V: Family and Personal Characteristics and BMI-for-age Z-score (BAZ)**

Variables	BAZ					P-value
	Normal N (%)	Moderate Wasting N (%)	Severe Wasting N (%)	Obesity N (%)	Total N (%)	
<b>Age</b>						
6-8	152(93.8)	7(4.3)	2(1.2)	1(0.6)	162(39.5)	0.792
9-12	230(92.7)	14(5.6)	4(1)	0	248(60.5)	
Total	382(93.2)	21(5.1)	6(1.5)	1(0.2)	410(100)	
<b>Family size</b>						
1-5	121(96.8)	2(1.6)	2(1.6)	0	125(30.5)	<b>0.000*</b>
6-10	233(92.1)	17(6.7)	3(1.2)	0	253(61.7)	
11-15	23(9.2)	1(4)	1(4)	0	25(6.1)	
16-20	3(7.5)	1(2.5)	0	0	4(1)	
21-25	2(6.7)	0	0	1(33.3)	3(0.7)	
Total	382(93.2)	21(5.1)	6(1.5)	1(0.2)	410(100)	
<b>Toilet Facility</b>						
Pit	103(95.4)	4(3.7)	1(0.9)	0	108(26.3)	<b>0.000*</b>
Water closet	261(93.2)	16(5.7)	2(0.7)	1(0.4)	280(68.3)	
Bush	7(100)	0	0	0	7(1.7)	
Potty	13(86.7)	0	0	2(13.3)	15(3.7)	
Total	384(93.7)	20(4.9)	3(0.7)	3(0.7)	410(100)	
<b>Fathers' Occupation</b>						
Trader	47(97.9)	1(2.1)	0	0	48(11.7)	<b>0.000*</b>
Farmer	22(100)	0	0	0	22(5.4)	
Civil servant	42(91.3)	3(6.5)	1(2.2)	0	46(11.2)	
Artisan	250(93.3)	15(5.6)	1(0.4)	2(0.7)	268(65.4)	
Clergy	11(84.6)	1(7.7)	0	1(7.7)	13(3.2)	
Auxiliary nurse	6(100)	0	0	0	6(1.5)	
Deceased	1(100)	0	0	0	1(0.2)	
Unemployed	1(50)	0	1(50)	0	2(0.5)	
Banker	2(100)	0	0	0	2(0.5)	
Contractor	2(100)	0	0	0	2(0.5)	
Total	384(93.7)	20(4.9)	3(0.7)	3(0.7)	410(100)	

**Family and personal characteristics and BMI-for-age Z-score (BAZ)**

Table V shows that there is a significant relationship ( $p < 0.05$ ) between the family size, fathers' occupation and toilet facility of the respondents and their BMI-for-age Z-score.

## DISCUSSION OF FINDINGS

This study shows that there were more females than males in schools. Nnebue et al., (2016) and Fetuga, Ogunlesi, Adekanmbi and Alabi (2011) reported participation of more females in the study among school-age children in Owerri and Sagamu respectively. However, in a study among school children by Olumakaiye (2013) in Ile-Ife, more males participated in the study but in a study by Falade, Otemuyiwa, Oluwasola, Oladipo and Adewusi (2012) among public primary school children in Osun State, 50% of the respondents were females. The methodology used could be the reason for this difference in gender distribution. The mean age of respondents in this study is  $9.7 \pm 1.5$  years. In a study by Olumakaiye (2013) among school-age children in Ile-Ife, the mean age of respondents was  $9.1 \pm 1.44$  years and Nnebue *et al.* (2016) reported a mean age of  $9.7 \pm 0.3$  years among school children in Owerri. Other studies conducted among school children in Ile-Ife, Ghana and Ethiopia reported a mean age of 10.2 years, 10 years and 11.8 years respectively (Oninla, Owa, Onayade & Taiwo, 2007; Owusu, Colecraft, Aryeetey, Vaccaro & Huffman, 2017; Zenebe, Gebremedhin, Henry & Regassa, 2018). The differences in the age-range could be responsible for the higher mean age observed in the studies by Oninla *et al.* (2007) and Zenebe *et al.* (2018) while geographical location could be responsible for the difference in the Owusu *et al.* (2017) study. Most (78.8%) of the respondents in the study are within the ranges of 9-12 years. Nnebue *et al.* (2016) reported that 79.7% of respondents in a study among school children in Owerri are within ages 9-12 years. Also, Olumakaiye (2013) reported that 68.8% of school children in a study in Ile-Ife are within 9-12 years.

This study showed that most (77%, 79.5%, 93.2%) of the respondents had normal height-for-age, normal weight-for-age and normal BMI-for-age. Previous studies conducted in various parts of Nigeria and other developing countries among school children reported similar results of 60.6%, 68.3% 70.1%, 74.5%, 76.7% to 92% normal weight-for-age; 72.3%, 74.7%, 82%, 85.5%, 90% to 93% normal height-for-age; 71.1%, 74.5%, 77.8%, 79.7% to 91.2% normal BMI-for-age (Opara, Ikpeme & Ekanem, 2010; Fetuga *et al.*, 2011; Ejekwu *et al.*, 2012; Danquah, Amoah, Steiner-Asiedu & Opare-Obisaw, 2012; Olumakaiye, 2013; Oduor, 2013; Nnebue *et al.*, 2016).

The prevalence of stunting (23.2%) reported in this study is similar to the 25.3% stunting reported by Opara *et al.* (2010) among Uyo school-age children. However, previous studies conducted among school children in various parts of Nigeria, Ethiopia, Kenya and Ghana reported higher prevalence of stunting which range from 44.8%, 48.6% to 50.3% (Oninla *et al.*, 2007; Olusoga, Fabiola & Oluwakemi, 2008; Olanipekun *et al.*, 2012; Herrador *et al.*, 2014; Appiah & Laar, 2014; Mekonnen, Tadesse & Kisi, 2013; Chesire, Orago, Oteba & Echoka, 2008; Danquah *et al.*, 2012).

Other studies conducted among primary school-age children in Owerri, Burkina Faso, Ile-Ife, Ghana and Sagamu reported the prevalence of stunting of 2.6%, 3.4%, 10%, 13.3% and 14.2% respectively (Nnebue *et al.*, 2016; Fetuga *et al.*, 2011; Olumakaiye, 2013; Agbozo, Atitto & Abubakari, 2017; Dabone, Delisle & Receveur, 2011). The wide differences observed with these studies could be subject to the differences in age-range of the respondents, ethnicity of the pupils or location of the study.

The prevalence of underweight in this study is 20.5%. Olumakaiye, (2013) and Agbozo *et al.* (2017) reported similar results of 23.3% and 15.6% among school children in Osun State and Ethiopia respectively. However, other studies by Ejekwu *et al.* (2012); Opara *et al.*, (2010); Fetuga *et al.* (2011); Oninla *et al.* (2007); Olusoga *et al.* (2008); and Goon, Toriola, Shaw, Amusa and Musa, (2008) in various parts of Nigeria among school children reported the prevalence of underweight as 29.9%, 39.4%, 25.5%, 51.7%, 61.2% and 52.7%, respectively. Also, Nnebue *et al.* (2016) reported 6% underweight among the school children in Owerri. These differences could be as a result of the differences in the age-range of the respondents, the socio-economic status of the parents or caregivers and the differences in the geographical location of the study areas.

The prevalence of wasting among the respondents in this study is 5.6%. Chesire *et al.* (2008) reported wasting of 4.5% among the school-age children in Kenya. However, previous studies conducted in Sagamu, Owerri, Ethiopia, India, Kenya and Ghana by Fetuga *et al.* (2011), Nnebue *et al.* (2016), Herrador *et al.* (2014), Srivastava, Mahmood, Srivastava, Shrotriya and Kumar, (2012), Oduor, (2013) and Owusu *et al.* (2017), respectively reported the prevalence of wasting of 22.2%, 17%, 21.4%, 33.3%, 28.9% and 34.6%. Agbozo *et al.* (2017) also reported the prevalence of wasting of 1.8% among Ghanaian school children. The possible explanation for this could be the differences in the age-range of the study population, geographical location and the socio-economic characteristics of the respondents' parents.

The prevalence of obesity among the respondents in this study is 0.7% and none of the respondents was overweight. Previous studies conducted in Lagos, Abeokuta, Sagamu and Ghana among school children reported prevalence of overweight and obesity which range from 1.3% - 4.4% for overweight and 0.2% to 0.5% for obesity (Ben-Bassey, Oduwole & Ogundipe, 2007; Olusoga *et al.*, 2008; Fetuga *et al.*, 2011; Danquah *et al.*, 2012). However, Olumakaiye (2013) observed that none of the public primary school children in Ile-Ife, Osun State, was overweight or obese.

This study shows that a significant relationship exists between family type, fathers' occupation and stunting. Children from polygamous homes recorded a higher percentage of stunted growth compared to children from monogamous homes. Other studies also recorded a significant association between family type and stunting among school-age children in India, Abeokuta and Ethiopia (Senbanjo, Oshikoya, Odusanya & Njokanma, 2011; Srivastava *et al.*, 2012; Herrador *et al.*, 2014).

There was no significant relationship between age, mothers' occupation and stunting in this study. However, studies by Degarege, Degarege and Anmut (2015), and Herrador *et al.* (2014) conducted among school children in Ethiopia showed a significant relationship between mothers' occupation, age of the children and stunting.

Wasting is significantly associated with family size, fathers' occupation and toilet facility in this study. Badrialaily, Jutatip and Pantyp (2008) in a study among school children in Indonesia showed association between wasting and family size of the respondents. Other studies have also

linked wasting with family size and number of children in the family (Vereecken & Maes, 2010; Nnebue *et al.*, 2016; Herrador *et al.*, 2014).

Conversely, a study conducted to determine the impacts of socio-economic factors on nutritional status of primary school children showed no significant relationship between family size of the pupils and their nutritional status (Babar, Muzaffar, Khan & Imdad, 2010).

## CONCLUSION

The study concluded that under-nutrition in the forms of stunting, underweight and wasting is still of high prevalence among primary school-age children in Osun State while the prevalence of over-nutrition is very low among the respondents. Likewise, it concluded that family type, fathers' occupation, family size, religion and toilet facilities are significantly associated with the nutritional status of school-age children; with the fathers' occupation significantly associated with all the three indices of malnutrition (stunting, wasting and underweight).

## RECOMMENDATION

It is recommended that the quality of the school meals should be improved upon and nutrition education should be included in the school syllabus and extended to the parents, teachers and caregivers; so as to ensure making the right food choices.

## REFERENCES

- Agbozo, F., Atitto, P. & Abubakari, A. (2017). Nutritional status of pupils attending public schools with and without School Feeding Programme in Hohoe Municipality, Ghana. *Journal of Food and Nutrition Research*, 5(7), 467-474.
- Appiah, K.P. & Laar, L.A. (2014). Nutritional status of school-age children in the Nkwanta south District-Volta region of Ghana. *European Scientific Journal*, 10(30), 310-327.
- Arsenault, J.E., Mora-Plazas, M., Forero, Y., López-Arana, S., Marín, C., Baylin, A. & Villamor, E. (2009). Provision of a School Snack is Associated with Vitamin B-12 Status, Linear Growth, and Morbidity in Children from Bogotá, Colombia. *The Journal of Nutrition*, 139(9), 1744–1750.
- Babar, N.F., Muzaffar, R., Khan, M.A. & Imdad, S. (2010). Impact of socioeconomic factors on Nutritional status in Primary school children. *Journal of Ayub Medical College, Abbottabad*, 22(4), 15-18.
- Badrialaily, A., Jutatip, S. & Pantyp, R. (2008). Nutritional Status and related factors among elementary school students in Banda Aceh Municipality, Nanggroe Aceh Darussalam province, Indonesia. Mahidol University Press, 51-58.
- Ben-Bassey, U.P., Oduwole, A.O. & Ogundipe, O.O. (2007). Prevalence of overweight and obesity in Eti-Osa LGA, Lagos, Nigeria. *Obesity reviews*, 8(6), 475-479.
- Best, C., Neufingerl, N., Van-Geel, L., Van-Den, B.T. & Osendarp, S. (2010). The nutritional status of school-aged children: why should we care? *Food Nutrition Bulletin*, 31(3), 400–417.

- Buttenheim, A.M., Alderman, H. & Friedman, J.A. (2011). Impact Evaluation of School Feeding Programmes in Lao PDR. World Bank Policy Research Working Paper Series pp 5518.
- Cheshire, E., Orago, A., Oteba, L. & Echoka, E. (2008). Determinants of under nutrition among school age children in a Nairobi peri-urban slum. *East African Medical Journal*, 85(10), 471-479.
- Dabone, C., Delisle, H.F. & Receveur, O. (2011). Poor nutritional status of school children in urban and peri-urban areas of Ouagadougou (Burkina Faso). *Nutrition Journal*, 10(1), 34.
- Danquah, A.O., Amoah, A.N., Steiner-Asiedu, M. & Opare-Obisaw, C. (2012). Nutritional status of participating and non-participating pupils in the Ghana School Feeding Programme. *Journal of Food Research*, 1(3), 263-271.
- Degarege, D., Degarege, A. & Animut A. (2015). Under-nutrition and associated risk factors among school-age children in Addis Ababa, Ethiopia. *BMC Public Health*, 15(375), 1-9.
- De-Onis, M., (2011). New WHO child growth standards catch on. *Bulletin of the World Health Organization*, 89(4), 250-251.
- Ejekwu, A.D., Ene-Obong, H.N. & Oguizu, O.J. (2012). Nutritional status and cognitive performance among children aged 5-12 from urban and rural areas of Enugu state Nigeria. *African journal for the Psychological Study of Social Issues*, 15, 481-496.
- Falade, O.S., Otemuyiwa, I., Oluwasola, O., Oladipo, W. & Adewusi, S.A. (2012). School Feeding Programme in Nigeria: The Nutritional Status of Pupils in a Public Primary School in Ile-Ife, Osun State, Nigeria. *Food and Nutrition Sciences*, 3(05), 596.
- FAO (2017). The State of food security and nutrition in the world. How close are we to #ZeroHunger? FAO, Rome, 1-10.
- Fetuga, M.B., Ogunlesi, T.A., Adekanmbi, A.F. & Alabi, A.D. (2011). Nutritional status of semi-urban Nigerian school children using the 2007 WHO reference population. *West African Journal of Medicine*, 80(5), 331-336.
- Goon, D.T., Toriola, A.L., Shaw, B.S., Amusa, L.O. & Musa, D.I. (2008). Sex differences in anthropometric characteristics of Nigerian school children aged 9-12 years. *Africa Journal of Physiology*, 14, 130-142.
- Herrador, Z., Sordo, L., Gadisa, E., Moreno, J., Nieto, J., Benito, A. & Custodio, E. (2014). Cross-sectional study of malnutrition and associated factors among school aged children in rural and urban settings of Fogera and Libo Kemkem districts, Ethiopia. *PloS One*, 9(9), 1-11.
- Jomaa, L.H., McDonnell, E., & Probart, C. (2011). School feeding programmes in developing countries: impacts on children's health and educational outcomes. *Nutrition Reviews*, 69(2), 83-98.
- Mekonnen, H., Tadesse, T. & Kisi, T. (2013). Malnutrition and its correlates among rural primary school children of Fogera district, Northwest Ethiopia. *Journal of Nutritional Disorders and Therapy*, 12(2), 0509-2161.
- Nnebue, C.C., Ilika, A.L., Uwakwe, K.A., Duru, C.B., Onah, S.K., Abu, H.O., Oguejiofor, E.O., Gbarage, M.T. & Idoro, S.A. (2016). Feeding practices and determinants of the nutritional

- status of pupils in a public primary school in Aladinma Owerri, Nigeria. *International Journal*, 4(1), 12-18.
- Ochola, S. & Masibo, P.K. (2014). Dietary Intake of School children and Adolescents in Developing Countries. *Annals of Nutrition and Metabolism*, 64(S2), 24-40.
- Oduor, F.O. (2013). Malnutrition, dietary diversity, morbidity and associated factors among School children in Kibwezi district, Kenya. Unpublished Ph.D. dissertation, University of Nairobi.
- Olanipekun, O.T., Obatolu, A.V., Fasoyiro, B.S. & Ogunba, B.O. (2012). Assessment of nutritional status of primary school children in Ibadan, South-West Nigeria. *Nutrition and Food Science*, 42(6), 390-396.
- Olumakaiye, M. (2013). Dietary diversity as a correlate of under nutrition among school-age children in Southwestern Nigeria. *Annals of Nutrition and Metabolism*, 63, 569-569.
- Olusoga, O.J., Fabiola, R.S. & Oluwakemi, C.S. (2008). Evaluation of the nutritional status of primary 1 pupil in Abeokuta South Local Government Area of Ogun state, Nigeria. *Research Journal of Medical Sciences*, 2(2), 61-64.
- Oninla, S.O., Owa, J.A., Onayade, A.A. & Taiwo, O. (2007). Comparative study of nutritional status of urban and rural Nigerian school children. *Journal of Tropical Paediatrics*, 53(1), 39-43.
- Opara, D.C., Ikpeme, E.E. & Ekanem, U.S. (2010). Prevalence of stunting, underweight and obesity in school aged children in Uyo, Nigeria. *Pakistan Journal of Nutrition*, 9(5), 459-466.
- Owusu, J.S., Colecraft, E.K., Aryeetey, R., Vaccaro, J.A. & Huffman, F.G. (2017). Nutrition Intakes and Nutritional Status of School Age Children in Ghana. *Journal of Food Research*, 6(2), 11-23.
- Osun Elementary School Feeding and Health Programme (O'MEALS (2017). <http://www.osun.gov.ng/education/omeals/>.
- Partnership for Child Development PCD and HGFS (2012). Elementary School Feeding and Health Programme Transition strategy. State of Osun, Nigeria.
- Senbanjo, I.D., Oshikoya, K.A., Odusanya, O.O. & Njokanna, O.F. (2011). Prevalence of and Risk factors for stunting among school-age children and adolescents in Abeokuta, Southwest Nigeria. *Journal of Health, Population and Nutrition*, 29(4), 364-370.
- Srivastava, A., Mahmood, S.E., Srivastava, P.M., Shrotriya, V.P. & Kumar, B. (2012). Nutritional status of school-age children – a scenario of urban slums in India. *Archives of Public Health*, 70, 1–8.
- Vereecken, C. & Maes, L. (2010). Young children's dietary habits and associations with the mothers' nutritional knowledge and attitudes. *Appetite*, 54, 44-51.
- World Food Programme (WFP). Food for Education works: a review of WFP Food for Education monitoring and evaluation 2002-2006. WFP, Rome.
- World Food Programme (WFP) (2016). Hunger statistics. Available from: <http://www.website.www.wfp.org/hunger/stats>

- World Bank (2006). Repositioning Nutrition as Central to Development: a strategy for Large-scale Action. Directions in Development (EUA), Washington, DC, USA.
- World Health Organisation (2009). WHO Anthroplus for Personal Computers Manual: Software for Assessing Growth of the World's Children and Adolescents. Geneva.
- Yunusa, I., Gumel, A.M., Adegbusi, K. & Adegbusi, S. (2012). The school feeding programme: A vehicle for nourishment of pupils. *African Symposium*, 12, 104-110.
- Zenebe, M., Gebremedhin, S., Henry, C.J. & Regassa, N. (2018). School feeding programme has resulted in improved dietary diversity, nutritional status and class attendance of school children. *Italian Journal of Pediatrics*, 44(1), 16.