DIETARY HABITS AND ANTHROPOMETRIC STATUS OF SCHOOL-AGED CHILDREN IN ENUGU EAST LOCAL GOVERNMENT AREA OF ENUGU STATE

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ABSTRACT

This cross-sectional study assessed the dietary habits and anthropometric status of school-aged children in Enugu East Local Government Area of Enugu State. A multi-stage sampling technique was used to sample 382 children from both public and private schools. Data were gathered with the use of structured questionnaire while height and weight were measured with anthropometric equipment. Descriptive statistics and WHO anthro were used to analyze the collected data while Chi-square was used to determine association between dietary habits of the children and their anthropometric status. The result on personal data of the children showed that 55.0% were females, 45.0% were males and their age ranges were 6-8years (36.1%), 9-10years (34.0%) and 29.9% were of ages11-12years. The educational and occupation status of their parents showed that 49.7% and 57.1% of their fathers and mothers attained secondary level, respectively, 31.7% and 24.1% of their fathers and mothers were civil servants, respectively. The dietary habits of the children indicated that 26.7% of them skipped meals especially lunch (11.1%) or dinner (11.0%). The main reason for skipping meal was non-availability of food (12.0%). Majority (77.2%) of the children had normal weight-for-height, and 76.4% had normal weight-for-age. Height-for-age index indicated that 82.2% were normal. Positive associations were noted between dietary habits of the children and parents' level of education. Dietary habits of the children showed significant positive associations with all the anthropometric indices. This shows that good dietary habits as well as improved economic status contributes to good nutritional status.

Keywords: Dietary habits, school-aged children, anthropometric status.

INTRODUCTION

Sustainable development of any country or region can be achieved when poverty, health, education, food security and nutrition are addressed. Education of the children is paramount in ensuring that, hence schools contribute immensely and can have long-lasting impacts on those determinants of sustainable development through various ways and opportunities (Faber, Lauries, Maduna, Magudulela, & Muehlhoff, 2013; Global Panel on Agriculture and Food Systems for Nutrition (GLOPAN), 2015). Primary school age is a dynamic period of physical growth as well as of mental development of the child. Schools are considered as perfect settings for health promotion for children. However, regular provision of adequate and nutritious meals at homes contributes to that as well as complements any that the government may implement at school. This can improve

vulnerable children's attendance levels at school, attention capability and parent motivation thus potentially affecting academic performance and future enrolment (World Bank/World Food Programme, 2016). The United Nations Educational, Scientific and Cultural Organization (UNESCO), (2016) defines school-age children as persons within the age group of 6-12years. It is the period of life between infancy/preschool and adolescence. It further groups childhood into middle childhood (5-10years) and pre-adolescence (9-11years for girls and 10-12years for boys).

Malnutrition is a global problem with many forms and affects majority of the world's population. Young children are especially vulnerable. Poor diets is one of the major causes of malnutrition which subsequently have devastating effects on children's health, school performance and ability to learn which thus damages their future productivity and earning potential (Victora, Adair, Fall, Hallal, Marorell, Richter, & Singh, 2008; Black, Victora, Walker, Bhutta, Chritian, de Onis, Ezzati, Grantham- McGregor, Katz, Martorell, & Uauy, 2013). Conversely, good nutrition can promote optimal growth and development, better learning and overall health and well-being.

The period of school years up to adolescence represent another window of opportunity to promote healthy diets and practices and to support catch-up growth and the prevention of all forms of malnutrition (FAO, 2019). During the school years, there is dynamic period of growth and development leading to major physical, mental, emotional and social changes of the children.

According to Srivastava, Mahmood, Srivastava, Shrotriya, & Kumar (2012), foundations of good health and sound mind are laid during the school-age period. In spite of that, school children are still vulnerable to malnutrition due to inadequate availability and access to a nutritious and varied diet, poor household distribution, management and preparation of food, exposure to influences that promote low nutritional value foods, reduced care giver attention and higher susceptibility to infectious disease (Mispireta, 2012; Mwaniki & Makokha, 2013; Degarage, Degarage, & Animut, 2015). Therefore, urgent attention is needed to improve diets to end malnutrition in all its forms.

All forms of malnutrition are associated with various forms of ill health and higher levels of mortality (Development Initiatives, 2018). Globally, 150.8m children or 22.2% under age five are stunted while 38.3m are overweight (GLOPAN, 2016). The report further stated that India, Nigeria and Pakistan have the largest number of children who are stunted with 46.6m, 13.9m and 10.7m, respectively while 25.5m, 3.4m and 3.3m were wasted. The prevalence of anaemia among school-aged children in Northwestern Nigeria was 37.7% (Bello- Manga, Awwalu, Ijei, Hassan, & Mamman, 2018). Eltayeb, Elsaeed, Mohamedani, & Assayed (2016) reported a prevalence of 88.3% in Sudan while Salama and Labib (2016) reported 59.3% in Egypt.

Poor dietary habits has contributed to the increase in the different forms of malnutrition. According to Development Initiatives (2018), regardless of wealth, school-aged children, adolescents and adults are eating too many refined grains and sugary foods and drinks and few fruit, vegetables, legumes and whole grains. Specifically, 30.3% and 13.9% of school-aged children do not eat any fruit or vegetable daily yet 43.7% consume soda every day. Worse still, around 1 in 20 children

reported feeling hungry with more hunger among school-age children in Africa and Oceania. Prior to that report, Bogin *et al*. (2014) observed that children are most widely influenced by food globalization. This according to earlier observations, has negative impacts on their nutrition status often assessed by anthropometric measurements. Anthropometry is the science of obtaining systematic measurements of the human body. Anthropometric measurements involve the size and composition of humans (Utkualp & Ercan, 2015). Weight and height measurements are used to obtain indices such as weight-for-height, weight-for-age and height-for-age which are used to describe different levels of wasting, underweight and stunting in children and adolescents.

The school-age child who survives in an environment of high under five morbidity and mortality is often most times not regarded as vulnerable and therefore not targeted for many nutrition and health programmes. However, most countries have programmes that involve provision of school meals to complement what those children receive at homes. When such programmes lay emphasis on nutrition especially by integrating school food and nutrition education and focusses on quality, adequacy and nutrient composition, they support development and prevent all forms of malnutrition (FAO/WHO, 2014; Kristgansson *et al*., 2016).

Therefore, better understanding of the nutritional status of school-aged children will only be possible when more studies are carried out among this age category. The study is designed to assess the dietary habits and anthropometric status of school-age children in the study location.

MATERIALS AND METHODS

Study Design and Location: The cross-sectional study was carried out in Enugu East Local Government Area of Enugu State, Nigeria. The place covers an area of 383km^2 with a population of 279089. The Local Government Area shares borders with Ebonyi State to the east, Benue State to the northeast, Kogi State to the northwest and Anambra State to the west. According to the Annual School Census Report (ASCR) (2017), there are thirteen primary schools in Enugu East Local Government Area.

Sample Size and Sampling Procedure: The sample size was calculated with the use of the formula by Winn, Naing, & Rusli (2006), which is N= Z^2 *P(100-P)/X^2, where N= sample size; Z=confidence interval represented as 1.96; P=percentage of school-aged children suffering from malnutrition in Nigeria which is 32% (United Nations International Children's Emergency Fund (UNICEF) (2016); 100-P= percentage of children assumed not to be malnourished in Nigeria and X=width of confidence interval or required precision level taken to be 5%. Substituting the values in the equation: N=2^2*32 (100-32)/5^2=348. Ten (10%) of 348 was added as drop out to the sample size which made it to be 382.

The multi-stage sampling method used involved four stages. Stage one, Enugu State was purposively selected from the five South Eastern Nigeria because of limited study of such nature in the state. In the second stage, Enugu East Local Government Area was also purposively selected

from the 17 Local Government Areas in the state because there are many public and private primary schools for the study. In the third stage, six primary schools were randomly chosen out of the thirteen. Finally, ten pupils were selected by balloting from each class of the chosen schools while the remaining 22 pupils were drawn from the first two public and private primary schools to complete the required sample size.

Method of Data Collection: A structured questionnaire made up of three sections was used to gather information on the personal data of the children and their parents' socio-economic status, their feeding patterns and anthropometric measurements. A portable bathroom scale and stadiometer were used to measure the children's weight and height. Weights of the pupils were measured while they wore light cloths, bare-footed and standing on a scale with head pointing straight to the nearest 0.1kg. For the height measurements, the pupils wore no foot wears and were positioned straight, knees together, buttocks and heels touched the wall. The headpiece was then lowered gently to rest on the crowns of their heads. The reading was then taken to the nearest 0.1cm (WHO, 2005). All the measurements were done twice and the average used for analysis.

Data Analysis: Data obtained from the anthropometric measurements were analyzed using the WHO Anthro survey analyzer based on weight-for-age, height-for-age and weight-for height.

Statistical Analysis: The personal data of the pupils and the socio-economic status of their parents, dietary habits and anthropometric status of the pupils were analyzed using frequencies and percentages. Chi-square was used to associate between dietary habits/anthropometric status and socio-economic status of parents of the pupils.

RESULTS

The personal data of the pupils and the socio-economic status of their parents are shown in Table I. The result revealed that 55,0% of the pupils were females while 45.0% were males. Their age ranges showed that 36.1% were of 6-8years, 34.0% were 9-10years and the rest (29.9%) were 11-12years. The highest educational attainment of their parents indicated that more of their mothers (57.1%) than fathers (49.7%) attained secondary education. In contrast, more of their fathers (31.4%) than mothers (27.7%) stopped at primary level. On occupation of their parents, 31.7% of their fathers were civil servants as against 24.1% of their mothers. There were more mothers (36.6%) than fathers (27.0%) who were artisans and more mothers (25.9%) than fathers (3.1%) were unemployed while few mothers (2.6%) than fathers (28.0%) were self-employed.

Table I. Personal Data of the Pupils and Socio-economic Status of their Parents

	School type				Total	
	Private schools		Public Schools			
Characteristics	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
Sex						
Male	88	46.1	86	45.0	174	
Female	103	53.9	105	55.0	208	

Total	**191**	**100.0**	**191**	**100.0**	**382**	**100.0**
Age (years)						
6-8	72	37.7	69	36.1	141	
9-10	67	35.1	65	34.0	132	
11-12	59	27.2	50	29.0	109	
Total	**191**	**100.0**	**191**	**100.0**	**382**	**100.0**
Educational level						
Father						
No formal	10	5.2	10	5.2	20	5.2
Primary	39	20.4	81	42.5	120	31.4
Secondary	105	55.0	85	44.5	190	49.8
Tertiary	37	19.4	15	7.8	52	13.6
Total	**191**	**100.0**	**191**	**100.0**	**382**	**100.0**
Mother						
No formal	8	4.2	11	5.8	19	5.0
Primary	66	34.5	40	20.9	106	27.7
Secondary	107	56.1	111	58.1	218	57.1
Tertiary	10	5.2	29	15.2	39	10.2
Total	**191**	**100**	**191**	**100**	**382**	**100.0**
Occupation						
Father						
Civil servant	61	31.9	60	31.4	121	31.7
Businessman	19	9.9	20	10.4	39	10.2
Artisan	54	28.3	51	26.7	103	27.0
Self-employed	52	27.2	53	27.7	107	28.0
Unemployed	5	2.7	7	3.8	12	3.1
Mother	**191**	**100**	**191**	**100**	**382**	**100.0**
Civil servant	47	24.6	45	23.5	92	24.1
Businesswoman	3	1.6	3	1.6	4	1.0
Artisan	68	35.6	72	37.7	140	36.6
Self-employed	4	2.1	6	3.1	10	2.6
Unemployed	50	26.2	49	25.6	99	25.9
Housewife	19	9.9	18	9.4	367	9.7
Total	**191**	**100**	**191**	**100**	**382**	**100.0**

Table II presents the dietary habits of the pupils. In Table II, 26.7% comprising of 29.9% and 23.6% private and public schools' pupils skipped meals. Meals they usually skip were lunch (11.1%) or dinner (11.0%) and the major reason for skipping those meals was unavailability of food (12.0%). In their households, 50.3% of them reported boys eating together, 31.9% individually while 17.8% of them said that girls ate together. The frequency of fruit intakes by the pupils indicated that 85.1% of them took occasionally and a few (14.9%) ate frequently.

Unavailability of food (40.3%) and improper meal planning (30.9%) were the major challenges encountered in feeding the pupils.

Table II: Dietary Habits of the Pupils

	School type				Total	
	Private schools		Public Schools			
Variables	**Frequency**	**%**	**Frequency**	**%**	**Frequency**	**%**
Meal skipping						
Yes	57	29.9	45	23.6	102	26.7
No	134	70.2	146	76.4	280	73.3
Total	**191**	**100**	**191**	**100**	**382**	**100.0**
Meal usually skipped						
Breakfast	13	21.7	4	8.9	17	4.4
Lunch	25	41.7	20	44	45	11.8
Dinner	22	36.7	21	46.7	40	10.5
Total	**60**	**100**	**45**	**100**	**102**	**26.7**
Reasons for missing the meal						
No one to cook it	9	15.0	5	11.1	14	3.7
Food not available	23	38.3	26	57.8	46	12.0
Does not like it	28	46.7	12	31.1	42	11.0
Total	**60**	**100**	**45**	**100**	**102**	**26.7**
How food is shared						
Individually	64	33.5	58	30.4	122	31.9
Boys eat together	97	50.8	95	49.7	192	50.3
Girls eat together	30	15.7	38	19.9	68	17.8
Total	**191**	**100**	**191**	**100**	**382**	**100.0**
How often the children take fruit						
Occasionally	158	82.7	167	87.5	325	85.1
Frequently	33	17.3	24	12.6	57	14.9
Total	**191**	**100**	**191**	**100**	**382**	**100.0**
Major challenge encountered in feeding children						
High cost of food stuff	44	23.0	48	25.1	92	24.1
Constant skipping of meals due to playing	12	6.3	6	3.1	18	4.7
Unavailability of food	75	39.3	79	41.4	154	40.3
Improper meal planning	56	29.3	62	32.5	118	30.9
Total	**191**	**100**	**191**	**100**	**382**	**100.0**

Table III presents the anthropometric status of the pupils. Weight-for-height index showed that 77.2%, 15.4% and 7.3% were normal, wasted and severely wasted, respectively. Similarly, weight-for-age index revealed that 76.4% were normal, 12.6% were severely underweight and a few (7.6% and 3.4%) were underweight and overweight, respectively. Prevalence of stunting showed that only (17.8%) of the pupils were stunted while majority (82.2%) were of normal height-for-age.

Table III: Anthropometric Status of the Pupils

Anthropometric status indicators	**Public schools**		**Private schools**		**Total(n=382)**
	Girls F (%)	**Boys F (%)**	**Girls F (%)**	**Boys F(%)**	**F(%)**
Weight-for-height					
Severely wasted (<-3SD)	5(2.4%)	9(4.5%)	0(0%)	14(7.1%)	28(7.3%)
Wasted (≥ -3SD <-2SD)	16(8.2%)	18(9.7%)	12(6.1%)	13(7.0%)	59(15.4%)
Normal	64(60.9)	59(68.6%)	91(86.7%)	61(70.9%)	295(77.2%)
Weight-for-age					
Overweight(<+2SD)	0(0%)	0(0%)	13(7.0%)	0(0%)	13(3.4%)
Normal	83(79.0%)	46(53.5%)	90(87.4%)	73(82.9%)	292(76.4%)
Underweight(<-2SD)	0(0%)	14(7.6%)	0(0%)	15(8.0%)	29(7.6%)
Severely Underweight (<-3SD)	22(11.5%)	26(13.5%)	0(0%)	0(0%)	48(12.6%)
Height-for-age					
Severely stunted (<-3SD)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Stunted (<-2SD)	19(10.2%)	15(7.6%)	15(8.0%)	19(10.0%)	68(17.8%)
Normal	86(81.9%)	71(82.5%)	88(85.4%)	69(78.4%)	314(82.2%)

The associations between dietary habits of the pupils and socio-economic status of their parents on the one hand and the anthropometric status of the pupils on the other hand are presented in Tables IV and V. In Table IV, there were significant positive associations between dietary habits (meal skipping, determinants of child food consumption and fruit consumption) and their parents' level of education as well as occupation of the mother but not that of the father (X^2=28.09, 67.309 and 44.34; P=0.045, 0.005 and 0.029, respectively). The association between dietary habits of the pupils and their anthropometric status all showed significant positive associations. That is weight-for-height, weight-for-age and height-for-age against meal skipping, determinants of child food consumption and fruit consumption. (X^2=72.305, 56.94 and 27.90; P=0.001, 0.007 and 0.021, respectively).

Table IV Association between Dietary Habit and Anthropometric Status of Parents of the Pupils

	Dietary habit category					
Variable	**MS (%)**	**DCF (%)**	**FC (%)**	**Total (%)**	**X^2 – value**	**P-value**
Fathers occupation						
Civil service	22(18.2)	39(32.2)	60(49.6)	121(31.7)	60.154	0.008
Trading/Business	8(20.5)	11(28.2)	20(51.3)	39(10.2)		
Artisan	15(14.6)	45(43.7)	43(41.7)	103(27.0)		
Unemployed	3(25.0)	5(41.7)	4(33.3)	12(3.1)		
Mothers occupation						
Civil service	16(17.4)	26(28.3)	50(54.3)	92(24.1)	44.34	0.029
Trading/Business	0(0)	0(0)	4(100)	4(1.0)		
Artisan	20(14.3)	34(24.3)	86(61.4)	140(36.6)		
Unemployed	12(12.1)	18(18.2)	69(69.7)	99(25.9)		
Fathers level of education						
No formal education	3(15.0)	6(30.0)	11(55.0)	20(5.2)	67.309	0.005
Primary education	10(8.3)	30(25.0)	80(66.7)	120(31.4)		
Secondary education	37(19.5)	46(24.2)	107(56.3)	190(49.7)		
Tertiary education	12(23.1)	23(44.2)	17(32.7)	52(13.6)		
Mothers level of education						
No formal education	3(15.7)	4(21.1)	12(63.2)	19(5.0)	28.09	0.045
Primary education	16(15.1)	27(25.5)	63(59.4)	106(27.7)		
Secondary education	34(15.6)	78(35.8)	106(48.6)	218(57.1)		
Tertiary education	7(17.9)	18(46.2)	14(35.9)	39(10.2)		

MS = Meal Skipping
DCF = Determinants of child food consumption
FC = Food consumption

Table V: Association between Dietary Habits and Anthropometric Status of the Pupils

	Dietary habit category					
Variable	**MS (%)**	**DCF (%)**	**FC (%)**	**Total (%)**	**X^2 – value**	**P-value**
Weight-for-height						
Severely wasted (<-3SD)	18(64.3)	7(25.0)	3(10.7)	28(7.3)	72.305	0.001
Wasted (≥ -3SD <-2SD)	36(61.0)	13(22.0)	10(16.9)	59(15.4)		
Normal	10(3.4)	29(9.8)	256(86.8)	295(77.2)		
Weight-for-age						
Overweight(<+2SD)	7(58.7)	4(30.8)	2(15.4)	13(3.4)	56.94	0.007
Normal	23(7.9)	35(12.0)	234(80.1)	292(76.4)		

Underweight(<-2SD)	19(65.5)	6(20.7)	4(13.8)	29(7.6)		
Severely Underweight (<-3SD)	22(11.5)	26(13.5)	0(0)	48(12.6)		
Height-for-age						
Severely stunted (<-3SD)	0(0)	0(0)	0(0)	0(0)	27.90	0.021
Stunted (<-2SD)	42(61.8)	19(27.6)	7(10.3)	68(17.8)		
Normal	17(5.4)	37(11.8)	260(82.8)	314(82.2)		

MS = Meal Skipping
DCF = Determinants of child food consumption
FC = Food consumption

DISCUSSION

There is improvement in girl-child education as shown in the study where more females were studied. If the trend is sustained everywhere, it will contribute to the achievement of sustainable development goals 4 and 5 which concern quality education and gender equality. Specifically, they state "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all and achieve gender equality and empower all women and girls". The ages of the children studied indicated that they fell within the school age period of 6-12 years. The educational attainment of the parents of the children was different from the current trend where more females were enrolled in school. More of their fathers attained tertiary and primary education. This could be due to the fact that education of the female child in the past was considered unimportant. However, education and empowerment of women and girls help them involve in decision making and contribute to their nutrition as well as that of their family members as primary caregivers. It also enables them to take up paid employment to enhance their income generation capacity. The study found that more of the mothers of the school children were artisans, unemployed and housewives while the reverse was the case for their fathers. This could be due to the fact that the primary roles of women are mothers and caregivers.

School age is a time of transition when lifelong dietary patterns continue to be developed and the period is crucial for establishing healthy eating patterns. According to Non-Communicable Disease Risk Factor Collaboration (2017), appetite and food intakes can increase before growth spurts and decrease during slower growth periods. Therefore, it is imperative for healthy and good dietary patterns to be established at this time and continued to be built upon later. Meal skipping was noted among the children but more of the private school children skipped meals especially lunch and dinner. However, few of the children skipped breakfast and this agrees with the assertion of Khara & Dolan (2014) that school age children around the world commonly skip breakfast thus depriving them of the meal that supports cognition. For such children, it could be that their families are poor, hence they lack the resources to feed them in the morning. For those children who usually skip launch, probably they stayed longer in school and did not go to school with lunch. Others may have

preferred eating snacks in place of a meal. For those children, it could be that their parents or caregivers are not at home to prepare lunch for them. Nature of work or busy schedule of most parents may hinder them from preparing lunch. For those children, food insecurity may be a contributory factor where missing food serves as a way of coping for family members. Dinner time is usually an ideal time for most families to eat meals together but if food is not available, family members including children may go to bed hungry. In London, almost 1 in 10 children reported going to bed hungry (Smith, Thompson, Harland, Parker, & Shelton, 2018). The situation may even be worse in developing countries, so it is not unusual that the children reported skipping dinner.

Unavailability of food was the main reason noted for skipping meals. Poverty which limits the resources available for households has been identified as the main reason for skipping meals (UNICEF, 2019). Social norms still affect how food is shared in families as the study noted. Sharing food according to sexes can lead to discrimination and deprivation especially the girl child. In the state of the world's children, UNICEF noted that women and girls are still being discriminated against in terms of household food sharing by serving them food last making them even more vulnerable to malnutrition.

Fruit and vegetables are important dietary components which deliver micro-nutrients that combat hidden hunger. However, they were consumed less frequently by the children especially those from public schools. Many school aged children around the world are eating too little fruit and vegetables and low consumption of fruit and vegetables is worrisome because according to Department of Health and Human Services (DHHS) (2018), children who consume fruit and vegetables are more likely to continue doing so into adulthood. Unavailability of food due to poverty was the major challenge encountered by their mothers/caregivers in feeding them. Poor children are likely to be underfed and malnourished but when women are empowered their nutrition and that of their children will improve.

The study assessed the anthropometric status of the children which both in the short and long terms is a reflection of their diets. More children are surviving but far too few are thriving because they are not getting the diets they need which undermines their capacity to grow, develop and learn to their full potential. Double burden of malnutrition was identified when the anthropometric status of the children was assessed in the forms of under nutrition (wasting and stunting) and over nutrition (overweight). The study identified children who were too thin for their height and they were more in boys than in girls. This shows a recent loss in weight probably due to poor nutrient intake, illness or both. Globally over 10% of children aged 5-19 years were thin and in Africa, 5.7% and 8.8% of female and male school age children respectively, were thin (WHO, 2018).

Conversely, more of the girls were stunted in public and private schools put together than their male counterparts. Those stunted children were too short for their ages and generally shows that they were not developing well both physically and mentally. According to Ashkan (2017), it is an accurate reflection of inequalities in societies. On the other hand, improved nutrition leads to better growth, development and educational achievements in school- aged children (Jukes, Drake, &

Bundy, 2007). Simply put, wasting is a chronic condition while stunting is an acute condition and both leads to poor growth, infection and death, poor cognition, school readiness and performance, and poor earning potential later in life (UNICEF, 2019). Overweight was more prevalent among girls than boys and in private than public schools. The global prevalence among girls and boys between the ages of 5-19 have soared globally (Non-Communicable Disease Risk Factor, 2017).
Manies (2018) opined that in wealthy countries, poor children are often the most likely to be overweight or obese. This is probably due to the fact that globally, more children satisfy their energy needs opting for diets high in saturated fats, trans-fats, sugar and salt. Also more children are less physically active particularly due to urbanization where play grounds are no longer available and young children and adolescents often meet together in fast foods outlets instead of play grounds.

The positive association reported in this study was in line with the findings of Onwumere (2016), who reported a positive and significant association between parents' socio-economic status and their children's' dietary habits. Specifically, in this study, dietary habits of the children positively associated with the occupation of their mothers. This implies that mothers who are gainfully employed are able to contribute to the nutrition and well fare of their children. Therefore, empowering women is associated with better nutrition for them and their children. This is because it is likely for women to use their income for the families' food expenditure. Eating an adequate diet regularly especially breakfast have been associated with higher academic achievement (Development Initiatives 2017). In this study, the children who skipped meals and failed to consume fruit and vegetables regularly may be among those who were wasted, overweight and stunted. They fail to get the important nutrients for proper growth and development as well as energy which is important as it delivers glucose, an important fuel for the brain. Overall, those children fail to concentrate and take part in school activities, they constantly feel hungry because of skipping food, hence struggle to pay attention and complete school work.

Hruby & Hu (2015) observed that stunting is a predictor of poor educational outcomes throughout childhood. Just like the present study identified overweight children who may have missed meals, De Luca Rolfe (2018) noted that children who missed breakfast have higher body mass index than their peers who did not. This according to the author could be due to the fact that children ate snacks such as cookies, sweets, sweetened drinks etc. that are energy dense but less in nutrient density. Fruit consumption which was found to be less frequently consumed by the children was positively associated with the various forms of malnutrition noted. The study area, Enugu East Local Government Area is predominantly rural with few urban areas, hence urbanization may have affected some parts. This could pose challenges to most families resident in such areas with little or no access to healthy food. It could also be that lack of knowledge of the nutritional benefits of fruit and vegetables consumption limits their intakes and many people in such rural areas take those fruit and vegetables to urban areas to sell for income or retailers come and buy from them. This have left those rural areas where fruit and vegetables ought to be available and affordable look like food deserts. Food deserts are obesogenic environment with abundance of high calorie, low nutrient, processed foods and have been found to strongly predict obesity rates (Organization for Economic

Cooperation and Development (OECD), 2017).

According to UNICEF (2019), food deserts are now common in low and middle income countries experiencing rapid urbanization. This predisposes families and children with less access to fruit and vegetables, making them to opt for diets lacking in diversity which are often easily accessible and affordable.

CONCLUSION AND RECOMMENDATIONS

The study investigated more of the female school aged children whose parents mainly attained secondary education and were predominantly artisans. Dietary patterns of the children were marked with meal skipping especially lunch mainly due to food unavailability. Fruit and vegetables were less frequently taken and unavailability of food was the major challenge encountered in feeding the children. Wasting, stunting and overweight were prevalent among the children. However, majority of the children did not suffer any of the above conditions. There were positive associations between the children's dietary habits and socio-economic status of their parents, particularly their mother's occupation. Dietary habits of the children also associated with their anthropometric status. Therefore, improvements in dietary habits by not missing meals, frequent intakes of fruit and vegetables will both in the short and long terms improve nutritional status of the children.

There is need for effective and sustainable food and nutrition interventions aimed at improving dietary intake and food diversity. Strategies aimed at empowering women will enable them contribute to nutrition and wellbeing of their children. Also, nutrition education should be targeted at school aged children because dietary habits are formed at that age so that they will build on them later in life. School food environment should be encouraged to sale wholesome and affordable snacks to pupils. Finally, government should implement and build upon the existing school meal program to complement the diets the children receive at home because majority often skip lunch.

REFERENCES

Annual School Census Report (ASCR) (2017). Annual statistics of schools in Nigeria. Retrieved from https://www.ascr.com/annual-statistics-of-schools-in-nigeria. on 29/10/2019.

Ashkan, A. (2017). Health effects of dietary risks in 195 countries, 1990-2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet, 393*(10184), 1958 - 1972.

Bello- Manga, H., Awwalu, S., Ijei, I. P., Hassan, A. & Mamman, A. I. (2018). Prevalence of anaemia and iron status among nomadic Fulani children in a grazing reserve in Northwestern, Nigeria. *Archives of Medicine and Surgery*, *3*, 43-48.

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Chritian, P., de Onis, M., Ezzati, M., Grantham- McGregor, S., Katz, J., Martorell, R. & Uauy, R. (2013). Maternal and child under-nutrition and overweight in low-income and middle-income countries. *The Lancet, 382* (9890), 427-451.

Bogin, B., Azcorra, H., Wilson, H. J., Vazquez- Vazquez, A., Avila- Escalante, M. H., Castillo-Burguete, M. T., Varela- Silva, I. & Dickinson, F. (2014). Globalization and children's diets. The case of Maya of Mexico and Central America. *Anthropological Review*, *77*, 11-32.

De Luca Rolfe, E. (2018). Associations of stunting in early childhood with cardio-metabolic risk factors in adulthood. *Plos One*, 13(4), e0192196.

Degarage, D., Degarage, A. & Animut, A. (2015). Under-nutrition and associated risk factors among school-age children in Addis Ababa, Ethiopia. *BMC Public Health*, *15*, 375.

Department of Health and Human Services, Centers for Disease Control and Prevention (2018). Prevalence of obesity among youths by household income and education level of head of household United States 2011-2014. Morbidity and Mortality Weekly Report, *67*(6), 186-189.

Development Initiatives (2017). *Global Nutrition Report 2017: Nourishing the SDGS*. Bristol, UK. Development Initiatives.

Development Initiatives (2018). *Global nutrition report: Shining a light to spur action on nutrition*. Bristol, United Kingdom. Retrieved from https://globalnutritionreport.org.

Eltayeb, M. S. E., Elsaeed, A.E., Mohamedani, A. A. & Assayed, A. A. (2016). Prevalence of anaemia among quaranic school students in Wad El Magboul village, Gezira State, Central Sudan. *Pan African Medical Journal*, *24* (50), 22 - 28.

Faber, M., Lauries, S., Maduna, M., Magudulela, T. & Muehlhoff,, E. (2013). Is the school food environment conducive for healthy eating in poorly resourced South African schools? *Public Health Nutrition*, *17* (6), 1214 - 1223.

Food and Agriculture Organization (FAO) (2019). *Nutrition guidelines and standards for meals; A report from 33 low and middle-income countries*. Rome. Retrieved from https://www.fao.org>card.

Food and Agriculture Organization/ World Health Organization (FAO/WHO) (2014). *Conference outcome document: Framework for action. Second International Conference on Nutrition.* Rome, Italy. Retrieved from https://www.who.int.org.

Global Panel on Agriculture and Food Systems for Nutrition (2015). Healthy meals in schools:

Policy innovation linking agriculture, food systems and nutrition. *Policy brief no. 3*, London.

Global Panel on Agriculture and Food Systems for Nutrition (2016). *The cost of malnutrition: Why policy action is urgent.* .Retrieved from https://glopan.org/sites/default.

Hruby, A. & Hu, F.B. (2015). The epidemiology of obesity: A big picture. *Pharmoco-economics, 33*(7), 673 - 689.

Jukes, M.C.H., Drake, L. J. & Bundy, D. A. P. (2007). School health, nutrition and education for all: Levelling the playing field. *Bulletin of the World Health Organization, 87*(1), 75

Khara, T. & Dolan, C. (2014). *Technical Briefing Paper. Association between wasting and stunting, policy, programming and research implications*. Oxford, UK. Emergency Nutrition Network.

Kristjansson, E. A., Gelli, A., Welch, V., Greenhalgh, T., Liberato, S., Frances, D. & Espejo, F. (2016). Costs and cost outcomes of school feeding programmes for young children. Evidence and recommendations. *International Journal of Educational Development, 48*,79-83.

Manies, Y. (2018). Prevalence and sociodemographic correlates of overweight and obesity in a large Pan-European cohort of preschool children and their families. The Toy Box Study. *Nutrition, 51-56,* 192 - 198.

Mispireta, M. L. (2012). Determining factors of overweight and obesity in children at school age in Peru. *Salud Publica, 29* (3), 361 - 365.

Mwaniki, E. W. & Makokha, N. (2013). Nutrition status and associated factors among children in public primary schools in Dagoretti, Nairobi, Kenya. *African Health Science, 13*(1), 39-46.

Non Communicable Disease Risk Factor Collaboration (2017). Worldwide trends in body mass index underweight, overweight and obesity from 1975-2016: A pooled analysis of 2416 population based measurement studies in 128.9 million children, adolescents and adults. *The Lancet, 390*(10113): 2627-2642.

Onwumere, V.A. (2016). Assessment of food security in Nigeria. Final report of a study commissioned by FAO, Rome.

Organization for Economic Co-operation and Development (2017): *Obesity update 2017*. Paris. OECD

Salama, R. A. & Labib, M. R. (2016). Prevalence of anaemia among informal primary school children. A community-based study in rural upper Egypt. *Epidemiology, Biostatistics and Public Health*, 13 (1) ,125-129.

Smith, D., Thompson, C., Harland, K., Parker, S. & Shelton, N. (2018). Identifying populations and areas at greatest risk of household food insecurity in England. *Applied Geography, 91,* 21-31.

Srivastava, A., Mahmood, E. E., Srivastava, P. M., Shrotriya, V. P. & Kumar, B. (2012). Nutritional status of school-aged children: A scenario of urban slums in India. *Archives of Public Health*, 70 (1), 8.

United Nations Children Emergency Fund (2019). *The state of the world's children 2019. Children, Food and nutrition: Growing well in a changing world*. New York, UNICEF.

United Nations Children Emergency Fund (UNICEF) (2016). Country profile, Nigeria. Retrieved

from www. unicef .org. on 27/10/2019).

United Nations Educational Scientific and Cultural Organization (UNESCO) (2016). *School ages. Global education data base*. Retrieved from https://www. status.urs.unesco.org. on 27/09/2019).

Utkualp, N. & Ercran, I. (2015). Anthropometric measurements usage in medical sciences. *Biomedical Research International*, *7*, 10-12.

Victora, C. G., Adair, L., Fall, C., Hallal, P. C., Marorell, R., Richter, L. & Singh, H. (2008). Maternal and child under-nutrition. Consequences for adult health and human capital. *The Lancet*, *371* (9609), 340-357.

Winn, T., Naing, L. & Rusli, B. N. (2006). Practical issues of calculating sample size for prevalence studies. *Archives of Orofacial Sciences*, 1, 9 - 14.

World Bank/ World Food Programme (2016). SABER- School feeding: Manual for SABER-SF Exercise. Washington, D. C. World Bank. https://open knowledge world bank.org/bitstream.

WHO (2005). Physical status: The use and interpretation of anthropometry. *Technical Report Series no. 854*. Geneva.

WHO (2018). *Global Health Observatory (GHO) data*. Retrieved from www.who.int/gho: on 25/11/2020)