ANTHROPOMETRIC INDICES AND HEALTH STATUS OF SCHOOL AGED CHILDREN (6-7 YEARS) IN IBENO LOCAL GOVERNMENT AREA OF AKWA IBOM STATE, NIGERIA

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Abstract
Malnutrition among school aged children is one of the widespread problems highly prevalent in low income and middle income countries like Nigeria resulting in substantial increases in mortality and overall disease burden. The study aimed at assessing the anthropometric and health status of school aged children (6-7 years) in Ibeno Local Government Area of Akwa Ibom State and comparing their results with the World Health Organization reference growth standard. A cross sectional research design was adopted for the study. The population comprised of 755 pupils and purposive sampling technique was used to draw 75 pupils for the study. Oral Interview Question Schedule was used as instrument for data collection while a Bathroom scale and a Meter rule were used to measure heights and weights of the pupils. The research questions were analyzed using descriptive statistics while the null hypotheses were tested using a one sample t-test at 0.05 level of significance. Findings revealed that 75% of the boys and 71.8% of the girls were stunted; 94.4% of the boys and 92.3% of the girls were underweight while 80.5% of the boys and 97.4% of the girls were wasted. The results of the null hypotheses revealed that, there was a significant difference at $p>0.05$ in the Height-for-age, Weight-for-age, Body mass index-for-age and health status of school-aged children in the study area. Based on the findings, the researchers conclude that, malnutrition exist among school aged children in Ibeno Local Government Area of Akwa Ibom State and therefore recommends amongst other that parents/caregivers should be educated by Home Economics Educators and nutritionist on the nutritional needs of their children and the kind of foods that meet these needs.

Key words: Anthropometric indices, Health Status, School-aged children, Body Mass Index

Introduction

All humans irrespective of their characteristics eat food for survival and other vital life's processes. The utilization of food by the body for its functioning is termed nutrition (Ngwu, Okoye and Nwachi, 2011; FANTA, 2016). During early childhood and school-age years, children begin to establish habit for eating and exercise that remain for their entire lives, they must be properly fed and nourished with adequate diet that will aid development and form the foundation for their future, wellbeing and learning (Okoh, 2013). In the same view, Owusu, (2013) stated that, there exist a direct relationship between dietary habits during childhood years on growth and development as well as the prevalence of diseases throughout life cycle. Moreover, well-nourished children are poised to perform better in school and are able to achieve

their full physical and mental potential therefore; to achieve these objectives, school-age children must be adequately nourished, stimulated physically, psychologically and protected from preventable diseases and infection through proper nutrition (Ngwu, Okoye & Nwachi 2011). Sinkeet, (2014) further stated that, inadequate nutrition is one of a wide range of interlinked factors such as poverty syndrome-low income, large family size, poor education and limited access to food, water, sanitation, and maternal and child health. Malnutrition in children has been seen to be associated with a poor educational background of the parent/caregiver and it is likely that poorly educated parent/caregiver have malnourished children mainly due to poor job opportunities and poor knowledge on child nutrition. School is an environment that creates an atmosphere and platform for learning thus, school children leaves home and spend most of their time at school to acquire the primary education which forms the bases for other level of education.

Primary education provides a mini-structural framework on which the quality of other levels of education is anchored. According to (Etor, Mbon & Ekanem, 2013), primary education refers to education given to children aged 6-11 plus in primary schools which a bedrock to other level of education been a key to the success or failure of the entire educational system. The relevance of nutrition in the total development of school-aged children cannot be undermined therefore, an assessment of their nutritional status is imperative. In addition, Elmadfa and Meyer (2014) stated that, nutritional assessment is a detailed evaluation of objective and subjective data relating to an individual's food intake, lifestyle and medical history. It is used to determine nutritional status of an individual or population groups as influenced by the intake and utilization of nutrients and the results of this assessment is essential for identification of potential critical nutrients (at population groups at risk of deficiency); formulation of recommendations for nutrient intake; development of effective public health nutrition (PHN) programs for nutrition-related disease preventions thus, an effective determination of children's nutritional status predicts the health condition of the child's state of wellness not merely the absence of diseases .

According to the National Health and Nutritional Examination Survey (NHANES) and Centre for Diseases and Control (CDC), (2007) stated that, other nutritional assessment methods include; the clinical assessment – estimation of nutritional status on the basis of recording a medical history and conducting a physical examination to detect signs and symptoms associated with malnutrition. Biochemical assessment is a method of nutritional assessment which estimates the nutritional status on the basis of measurements of nutrient stores, functional forms, excreted forms and/or metabolic functions while the anthropometric method which is the most frequently used quantitative method is used in assessing the nutritional status of an individual by measuring human body at different age levels and degree of nutrition (https://med.libretexts.org.).

Nutritional status is generally assessed using an anthropometric index which includes, Body Mass Index-for-age, weight-for-age, height-for-age to determine the prevalence of underweight, wasted and stunted growth of an individual or population by comparing with the WHO growth standard (WHO Growth Reference Standard, 2007). However, malnutrition is also an emerging health challenge in the country. Despite global efforts for improving nutritional status of children, desired outcomes have not been achieved. Adeleye, Oluwatosin, Bamidele, Abodunrin, Odu, and Adeomi, (2018) reported the prevalence rates of underweight (36.7% and 0.0%) and (17.3% and 9.7%) of school age children from rural and urban communities of Osun state, Nigeria respectively. In the same vein Okoye, (2012) and Okoh (2013) observed high

incidence of stunting, underweight, and wasting especially among preschool children in Nsukka and Enugu South Local Government Area respectively while Opoola, Adebisi, and Ibegbu (2016) also reported Underweight (140) and Overweight (38) respectively of primary school children in Zaria, Kaduna state, Nigeria. In the same view, Zafirova and Todorovaska, (2009) stated that, this category of children at ages 6 and 7 years, is particularly sensitive since in this age period children start going to school, their lifestyle is noticeably changed and they become vulnerable to various health risk. Therefore, the study is considered relevant in the study area which seeks to assess the anthropometric indices and health status of schools aged children (6 – 7) years in the study area.

Purpose of the Study: The main purpose of the study was to determine the anthropometric indices and health status of school aged children (6-7 years) in Ibeno Local Government Area of Akwa Ibom State. Specifically, the study sought to determine:
1. The height-for-age and health status of school aged children in the study area.
2. The weight-for-age and health status of school aged children in the study area.
3. The Body Mass Index-for-age and health status of school aged children in the study area.

Research Questions: The study sought to provide answers to the following research questions:
1. What are the heights-for age and health status of school aged children in the study area?
2. What are the weights-for age and health status of school aged children in the study area?
3. What are the Body Mass Index-for age and health status of school aged children in the study area?

Null Hypotheses: Three null hypotheses were postulated and tested at 0.05 level of significance:
1. There is no significant difference in the height-for-age and health status of school aged children in Ibeno Local Government of Akwa Ibom state.
2. There is no significant difference in the weight-for-age and health status of school aged children in the study area.
3. There is no significant difference in the Body mass index-for-age and health status of school aged children in the study area.

Methodology

A cross sectional research design was employed involving quasi experimentation. This is because it's involved the use of matching instead of randomization as in the experimentation. In other words, the data collected was compared to World Health Organization standard which technically is not a control. The study was carried out in Ibeno Local Government Area of Akwa Ibom State, Nigeria. Ibeno is a riverine community occupying a vast coastal area of over 1,200 square kilometers. It has both upstream and downstream activities of the Exxon Mobil. Fishing is the prominent occupation in the area. The headquarters of Ibeno Local Government Area is located at Upenekang. Common meals consumed by residents of this community are basically sea foods. There are two communities and one clan with a total of 12 government primary schools in the study area. There are school aged children in Ibeno Local Government Area and knowledge of their anthropometric indices and health status is indispensable to forestall cases of malnutrition and death of children in the area. This justifies the relevance of this study in the area. The population for the study consisted of 755 primary school pupils aged 6-7 years in all

the 12 public primary schools in Ibeno Local Government Area of Akwa Ibom State. (Source: Ministry of Education Akwa Ibom State, 2017/2018 Academic Session).

The sample size for the study was 75 pupils, which is 10%of the population. Purposive and cluster sampling techniques were used in determining the respondents for the study. Purposive because only pupils aged 6 -7years constituted the sample for the study. The twelve primary schools were grouped into 3 clusters across the two communities and one school each was randomly selected through cap and draw sampling to obtain three primary schools from the following communities; Iwuochang, Atabrikang and Okoroutip. Twenty-five pupils each were selected from each of the primary schools through simple random sampling technique to attain a sample size of 75 respondents comprising of 36 boys and 39 girls. Three instruments were used to obtain data for the study. A nine item oral interview question schedule which sought information on the demographic characteristics of the pupils and their parents; a bathroom scale and a meter rule. The bathroom scale was used to determine the weight of the respondents while the meter rule was used to measure their heights for the purpose of assessing their anthropometric indices.

The researchers were assisted by three research assistance to interview the pupils as well as measure and record their heights and weights. The body weight of each child in light clothing and without shoes was taken using a portable bathroom scale while the height was measured using a meter rule as the subject stood without shoes and the readings were taken accordingly. The body mass index was then computed for each pupil from the height and weight measurements. The value of each pupil's Body Mass Index was obtained by dividing the weight value by square of the height in (kg/m^2). The height- for-age and weight-for-age measurements of the pupils were recorded and compared with the World Health Organization (WHO) reference growth standards 2007 (https://www.WHO.int). Data obtained was analyzed using descriptive statistics and t-test. The research questions were analyzed using frequency and percentages and the results presented on bar chats while the null hypotheses were tested using one sample t-test at 0.05 level of significance. The results obtained were compared with WHO reference growth standards (2007) which indicates the following:

| Gender	Height-for-age	Weight-for-age	Body Mass Index-for age
Boys	1.22m	22.82kg	$15.20kg/m^2$
Girls	1.21m	22.35kg	$15.60kg/m^2$

Results
Research Question 1: What are the heights-for-age and health status of school aged children in the study area?
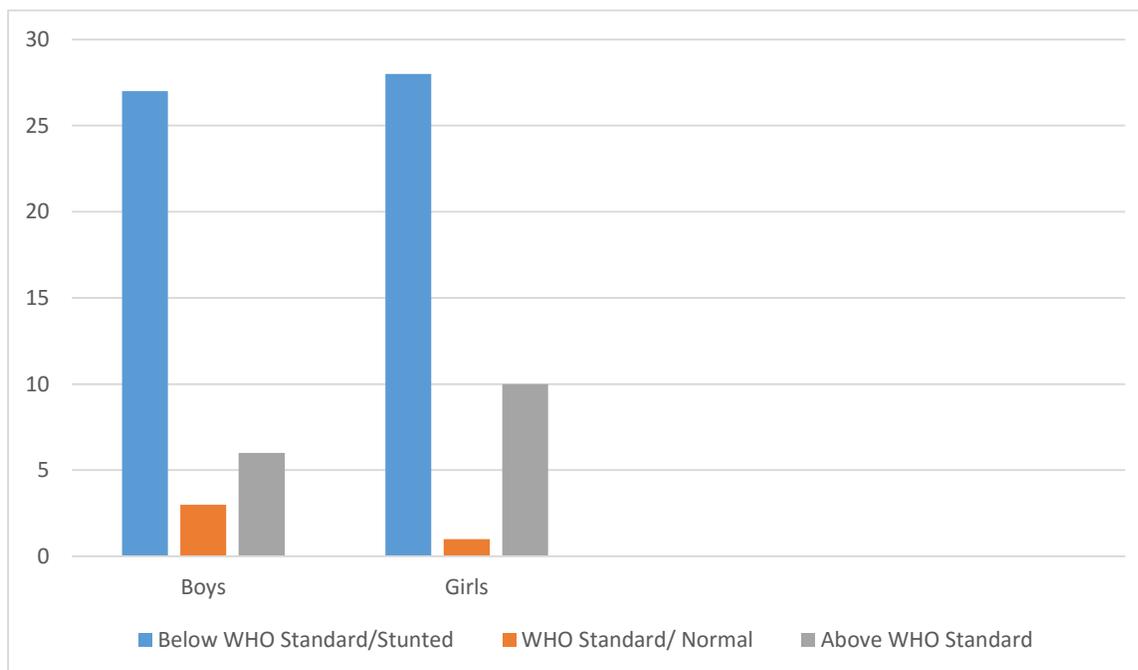
Fig. 1: Chat Showing Height-for-age and health status of school-aged children in Ibeno Local Government Area of Akwa Ibom State

Figure 1, shows the height-for-age and health status of pupils in the study area. Findings revealed that there were 36 boys and 39 girls. The data showed that, out of the 36 boys, 27 had heights below the WHO standard of 1.22; three of the pupils had the WHO standard height-for their age while six pupils had heights that were above the WHO standard. This result implies that 27 (75%)of the boys in the study were stunted. The figure also shows that out of the 39 girls measured, 28 were below the WHO standard of 1.21; one of the pupils had the WHO standard height-for their age while 10 pupils had heights that were above the WHO standard. Based on this result it could be deduced that (71.8%) of the girls were stunted.

Research Question 2: What are the weights-for-age and health status of school-aged children in the study area?
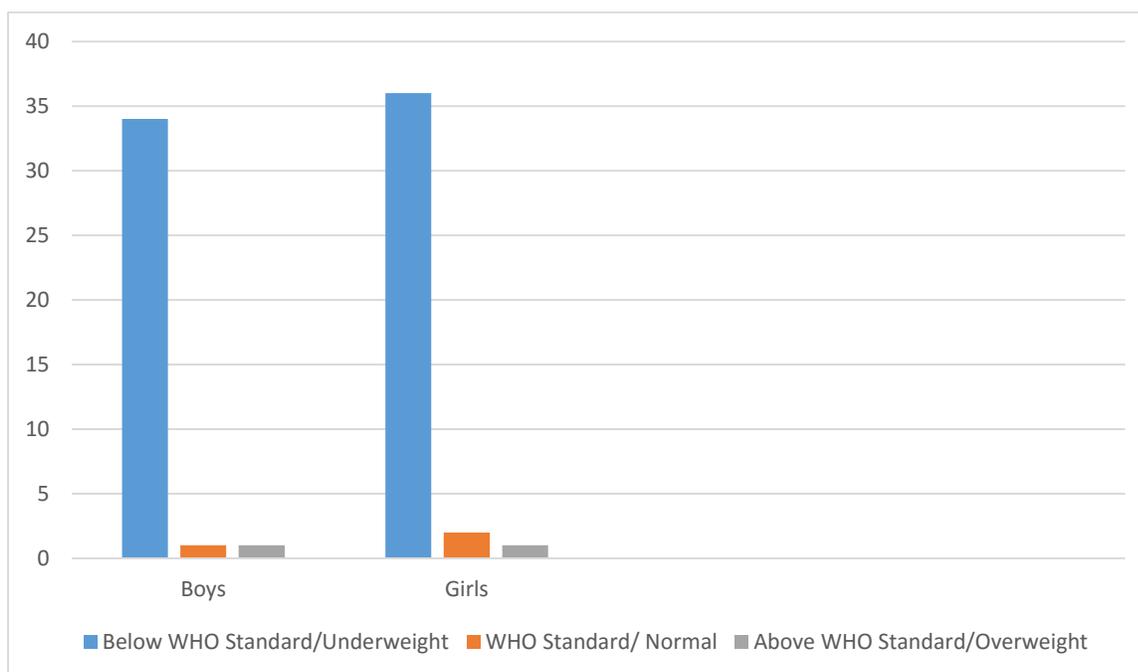
Fig. 2: Chat Showing Weight-for-age and health status of school-aged pupils in Ibeno Local Government Area of Akwa Ibom State

Figure 2, shows the weight-for-age and health status of pupils in the study area. Findings revealed out of the 36 boys weighed, 34 weighed below the WHO standard of 22.82kg; one pupil respectively had the WHO standard weight-for their age and above. This result implies that 36 (94.4%)of the boys in the study were underweight. The figure also shows that out of the 39 girls weighed, 36 weighed below the WHO standard of 22.35kg; two of the pupils had the WHO standard weight-for- age while one pupil's weight was above the WHO standard. Based on this result it could be deduced that (92.3%) of the girls were underweight.

Research Question 3: What are the Body mass index-for-Age and health status of school- aged children in the study area?
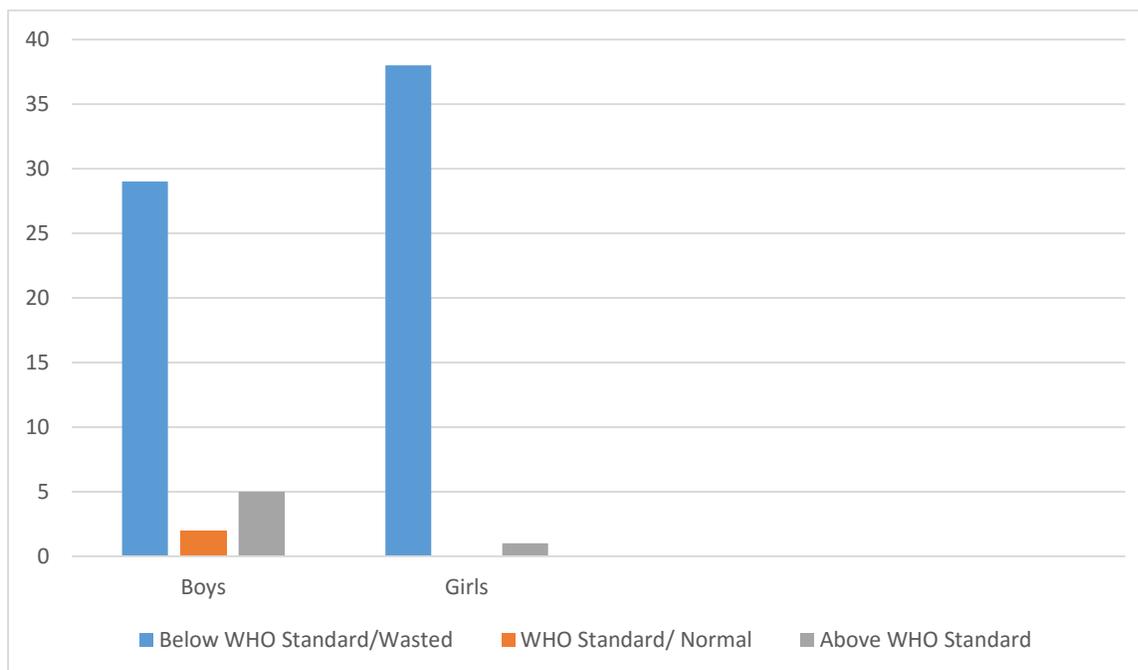
Fig. 3: Chat Showing Body Mass Index-for-age and health status of school-aged pupils in Ibeno Local Government Area of Akwa Ibom State

Figure 3, shows the Body mass index-for-age and health status of pupils in the study area. Findings revealed that 29 of the boys had BMI that were below the WHO standard of $15.20kg/m^2$; two pupils had the WHO standard body mass index-for their age while five pupils had body mass index-for their age that was above the WHO standard. This result implies that 29 (80.5%) of the boys in the study were wasted. The figure also shows that 38 of the girls had BMI that were below the WHO standard of $15.60kg/m^2$; none of the girls had the WHO standard BMI for their age while one pupil had a BMI that was above the WHO standard. Based on this result it could be deduced that (97.4%) of the girls were wasted.

Null Hypothesis 1: There is no significant difference in the height-for-age and health status of school aged children in Ibeno Local Government Area of Akwa Ibom State.
Table 1: t-test Analysis of the Difference in the Height-For-Age and Health
            Status of Pupils

Variable	N	$\bar{X}$	SD	t-cal	df	t-crit.	Decision
Height-For-Age and Health Status	75	1.183	0.053	4.465	74	1.664	S

df=74; S=Significant

Table 1, shows a one sample t-test analysis of the difference in height-for-age and health status of school aged children in the study area. The t-calculated (4.465) is greater than the t-critical (1.664) at 74 degree of freedom and 0.05 level of significance. This result has caused the null hypothesis to be rejected and the alternate accepted which implies that, there is a significant

difference in the height-for-age and health status of school aged children in Ibeno Local Government Area of Akwa Ibom State.

Null Hypothesis 2: There is no significant difference in the weight-for-age and health status of school aged children in the study area.

Table 2: t-test Analysis of the Difference in the Weight-For-Age and Health Status of Pupils

Variable	N	$\bar{X}$	SD	t-cal.	df.	t-rit	Decision
Weight-For-Age and Health Status	75	19.08	2.005	15.117	74	1.664	S

df=74; S=Significant

Table 2, shows a one sample t-test analysis of the difference in weight-for-age and health status of school aged children in the study area. The t-calculated (15.12) is greater than the t-critical (1.664) at 74 degree of freedom and 0.05 level of significance. The result has caused the null hypothesis to be rejected and the alternate accepted which implies that, there is a significant difference in the weight-for-age and health status of school aged children in the study area.

Null Hypothesis 3: There is no significant difference in the Body mass index-for-age and health status of school aged children in the study area.

Table 3: t-test Analysis of the Difference in the Body mass index-for age and Health Status of Pupils

Variable	N	$\bar{X}$	SD	t-cal	df	t-crit.	Decision
Body mass index-for age and Health Status	75	13.67	1.301	11.514	74	1.664	S

df=74; S=Significant

Table 3, shows a one sample t-test analysis of the difference in body mass index-for-age and health status of school aged children in the study area. The t-calculated (11.514) is greater than the t-critical (1.664) at 74 degree of freedom and 0.05 level of significance. This result has caused the null the hypothesis to be rejected and the alternate accepted which implies that, there is a significant difference in the body mass index-for-age and health status of school aged children in the study area.

Discussion of Findings
The study aimed at assessing the anthropometric indices and health status of school aged children in Ibeno Local Government Area of Akwa Ibom State. Findings revealed that 75% of the boys and 71.8% of the girls in the study area were stunted; 94.4% of the boys and 92% of the girls were underweight while 80.5% of the boys and 97% of the girls were wasted. The results of the null hypotheses revealed that, there was a significant difference in the Height-for-age, Weight-for-age, Body mass index-for-age and health status of the pupils at 0.05 level of significance.

Prevalence of underweight from this study (94.4% and 92%) respectively was high and when compared with that of Asiegbu, Asiegbu, Onyire, Ikefuna and Ibe (2017) for primary school children in Abakaliki metropolis if Ebonyi State, it was found to be much higher. The findings is also consistent with that of Atawodi, Aliyu, Abbas, and Iloino (2015) who reported that 80% of school aged children in Kawo district of Kaduna metropolis were underweight. The high prevalence of underweight from this study could be attributed to poverty, low socio-economic status of the parents, poor social services and poor health services as reported by Dewey (2006). Ibeno is a riverine as well as a rural community in Akwa Ibom State and the major occupation of the dwellers is fishing which accounts for the low socio-economic status and poor nutrition education of the residents thus impacting on the feeding pattern of the populace with the resultant effect of underweight for school aged pupils in the area.

The findings of the study also revealed that the nutritional status of the respondents was below the class regarded as underweight using the World Health Organization (WHO) BMI norms. When the BMI-for age and health status of the school children were compared, the result showed that the BMI had a significant influence on the health status of the school aged children. This shows that BMI is a significant predictor of health status. This study correlates with that of Hausman, Johnson, Davey and Poon (2011) who stated that Body Mass Index (BMI) is significantly associated with health condition. The low BMI, or underweight status which is prevalent among the school children sampled is associated with an increased risk of mortality and poor dietary habits. The relatively high prevalence of malnutrition observed in the study area may also be attributable to the inadequate dietary intake of food.

The prevalence of stunting (75% for boys and 71.8% for girls) recorded in this study is higher than the prevalence rates of 52.7 and 50.0% recorded in Makurdi and Jos North in Nigeria, respectively (Agbo, Envuladu and Zoakah, 2017; Goon, Toriola, Shaw, Amusa, Monyeki and Akinyemi, 2011). It is also much higher when compared with 10.34% amongst school-aged children in Jos East Local Government of Plateau State, Nigeria (Abah, Okolo, John, Ochoga and Adah, 2017). The reason for the wide differences between the high prevalence of stunting recorded in this study and that from previous studies might have to do with the larger sample size and older age of the participants from those studies. Stunting is the most prevalent form of malnutrition observed among school aged children, and it is similar to what has been documented by other authors (Abdulkarim, Otuneye, Ahmed, and Shattima, 2014; Fetuga, Ogunlesi, Adekanmbi, and Alabi, 2011).

The result from this study also showed that (80.5% boys and 97% girls) of the pupils studied were severely malnourished (wasted). The prevalence is alarming and can result to increase risk of deaths among children. Wasting is an indicator of acute malnutrition that can occur due to recent infection or weight loss due to periodical variation of food supply (Gabre *et al*., 2019). This finding is in agreement with the study of Ekpa, Okpanachi, Mohammed and Iyayi (2017) that 75% of primary school children in Kogi State were severely malnourished. The prevalence of wasting from this study was higher than 16.2% for Gabre *et al*. (2019) among under-five children in Pastoral communities of Northeast Ethiopia. A prevalence of wasting between 5-8% indicates a disturbing nutritional situation, while prevalence greater than 10% corresponds to a serious nutritional emergency (Atawodi *et al*. 2015).

The observed differences in wasting, stunting and underweight of the study population as compared to other studies may also be related to study instruments such as the reference indices used, secular/time trends and socio-cultural factors. Eze, Oguonu, Ojinnaka and Ibe (2017) stated that factors of societal influence are most likely to influence the nutrition of the school age children. Srivastava, Mahmood, Srivastava, Shrotrinya and Kumar (2012) further added that ignorance and difficult conditions of life such as poor quality drinking water, sanitation and overpopulation which are obtainable in rural areas and slums were likely to result in improper food habits and low healthcare use thus predisposing children living under such conditions to a high risk of health and nutritional problems. This study was conducted in a rural setting with poor living conditions than may not be found in urban areas. This therefore buttresses the high prevalence if stunting, underweight and wasting amongst the school aged children.

There were notable differences in the nutritional status with different gender categories. This is consistent with the study of Srivastava *et al*. (2012) who reported significantly higher prevalence of underweight and wasting in females than males. This difference was attributed to study frame, family setups and gender bias due to parental preferences for male children in some societies. This therefore implies that the males received better care and possibly feed better than the girls. In contrast, Eze *et al*. (2017) reported that males were more wasted than females. This study also agrees with that of Gebre, Reddy, Mulugeta, Sedik and Kahssay (2019) who reported that male children had 1.9 times higher risk to develop stunting as compared to female children. According to a systematic review conducted by Abdulahi, Shab-Bidar, Rezaei and Djafarian (2017) in Ethiopia, male children were highly vulnerable to malnutrition when compared with female children and this was attributed to difference in the frequency of eating, energy expenditure and exposure to health problems.

Conclusion: The focus of the study was to assess the anthropometric indices and health status of school aged children in Ibeno Local Government Area of Akwa Ibom State. Findings revealed that the pupils had differing levels of malnutrition such as underweight, stunting and wasting. Based on these results the researchers conclude that malnutrition is prevalent among school aged children in Ibeno Local Government Area of Akwa Ibom State.

Recommendations: Based on the findings of the study, the following recommendations are made;
1. Parents should be educated on the nutritional needs of the children and the kind of foods that should be given to school aged children to help them grow properly.
2. Regular weight and height measurements should be taken in schools to monitor the growth and development of the children and where significant deviations occur, such children should be referred to a health facility for further medical attention to circumvent mortality.
3. Malnutrition is mostly caused by poverty; therefor the government should focus on improving the living standard of the people especially in the rural areas so that parents can adequately take care of the needs of their children.

4. The School Feeding Programme introduced by the Federal Government should be implemented in all the public primary schools in all Local Government Areas in the State to checkmate cases of malnutrition in school aged children.

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