ASSESSMENT OF NUTRITIONAL STATUS OF PUPILS IN AWKA SOUTH L.G.A, ANAMBRA STATE.

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A THESIS SUBMTTED TO POSTGRADUATE SCHOOL, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (MPH)
IN PUBLIC HEALTH.

MARCH, 2020.

CERTIFICATION

This is to certify that this work **"Assessment of Nutritional Status of Pupils in Awka South L.G.A in Anambra State"** was carried out by **Ezennia Chidimma Jane (Reg. No: 20154948068)** in partial fulfilment for the award of Master's Degree in Public Health (Health Promotion Option) in the Department of Public Health, Federal University of Technology Owerri.

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DEDICATION

This work is dedicated to Almighty God, through him, all things are possible and to my wonderful loving family, who never cease to support me.

ACKNOWLEDGMENTS

I remain eternally grateful to the Almighty God, who did not forsake me in all my rigors of life as a student. By his awesome power, he sustained and provided for me. To him is all the Glory.

My profound gratitude goes to my supervisor, Dr. (Mrs) C.O.A Amadi for her guidance, understanding and patience during the course of this work. In spite of her other commitments, she has patiently given me the adequate time and attention, her motherly advice and contributions are invaluable. Special thanks go to the diligent HOD, Prof. (Mrs.) E.A Nwoke, the Dean (SOHT) Rev. Sr. (Prof.) Evangeline Oparaocha, my co-supervisor; Dr. (Mrs.) B.O Nworuh and Mr. Greg. Iwuoha, I am deeply grateful to each one of them for constantly ensuring I go by the next step to get it right in my research work.

I am grateful to my friends and colleagues who have inspired me with their work and perseverance; Ijeoma, Peace, Chikezie and Fr. Kizito Ndugbu.

Finally, I feel greatly indebted to my family; Margaret, Obioma, Ikenna, Onochie and Chinazor who laid the solid foundation for my education through their financial and moral encouragement.

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Operational Definitions of Terms

Nutrition

Is a daily regime of healthy eating which includes all the six classes of food in their right proportions for one's activity level.

Nutrition Practices

Are those practices that can be influenced by nutrition knowledge and nutrition-related attitudes. In this study nutrition practices includes: dietary diversity score, food preservation, washing of hands before and after eating, washing of hands after visiting the toilet and washing fruits and vegetables before eating them.

Child

It refers to a person below the age of 18. This study will focus on children in primary school.

Nutritional status

The condition of the body as influenced by the food taken and determined by anthropometric measurements.

Malnutrition

It refers to over or under nutrition, nutrient imbalances or deficiencies. This study will focus on under nutrition.

ABSTRACT

A lot of reports show that there exists problem of malnutrition among Nigerian children. School age children are vulnerable to malnutrition which can negatively influence their growth and maturity, health and academic attainment. There is need then for a public health investigation of nutritional status of children requiring several re-assessments especially in volatile environment. This study is a descriptive cross-sectional study, which assessed nutritional status of primary school pupils in Awka South L.G.A, Anambra State. The data was collected from 3rd December, 2017 to 19thJuly, 2018. Primary school pupils totaling 490, aged 6-12 years old who attended to the classes 1, 2, 3, 4, 5 and 6 were measured for weight and height, the parents/caregivers of the pupils were interviewed using questionnaire. Data was analyzed on IBM-SPSS Statistics 23.0 (SPSS Inc. Chicago, USA) and Microsoft Excel 2010 was used in chart drawing. Descriptive statistics was used to summarize the data. Statistical Chi square test at 5% level was used to test for variables associated with malnutrition. Probability value (p) was used to interpret the result and p values of less than 0.05 were considered significant. We found out that, 92.2% of the respondents had a normal weight, while 3.7% were underweight, 4.1% were overweight and 1.7% was at risk of being overweight. Therefore, there is an urgent need for intensified nutrition education, dietary diversification and fortification, improved food production, processing, storage and handling techniques should be prioritized. Monitoring and evaluation of nutritional status of the pupils should be carried out periodically and most especially on non-school attendees. Supplementary support from NGO's and well-meaning Nigerians is still needed, to assist daily intake of pupils still underweight especially.

Key words: Nutritional status, Malnutrition, Pupils, Assessment.

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CHAPTER ONE

INTRODUCTION

1.1 Background Information

Nutritional status is one of the indicators in the assessment of the quality of physical and cognitive development of the school-aged child. In this regard, knowledge of the nutritional status of children has great implications on better evolution of future generations (Anurage, Syed, Payal and Bhusham, 2012). The most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory classroom performance arise due to health challenges associated with poor nutritional status in primary school-age children. Primary school age is a dynamic period of physical growth and also of mental development of the child (Opara *et al.*, 2010).

Globally, every second a person dies from chronic hunger or complications of malnutrition. Annually, the number of children who die from lack of nutrition is over 3 million (Svedberg, 2010). Children in the poorest income brackets are malnourished at twice the rate of their counterparts in the richest ones, children malnutrition is used as a hunger indication. The global prevalence rate of malnutrition among school-age children (5-14years old) was approximately 28%

that is, 171 million children (Growth and Assessment Surveillance Unit of the WHO, 2010)

Stunting is an indication of chronic undernutrition, nearly 2 in 5 (37%) children under five in Nigeria are stunted, or too short for their age. By state, stunting is lowest in Anambra (14%) and Enugu (15%) and highest in Jigawa (64%) and Kebbi (66%). Children whose mothers have no education (54%) and those from the poorest households (55%) are most likely to be stunted. In Nigeria, 7% of children under five are wasted (too thin for height), a sign of acute malnutrition. In addition, 22% of children under five are underweight, or too thin for their age. Rural children have higher levels of stunting, wasting, and underweight, compared to urban children (NDHS, 2018).

Several studies done on early childhood nutrition education (Oninla *et al*., 2007; Adekunle, 2005; Venkaiah*et al*., 2002 and Ahmed *et al*., 2013) have investigated variables that affect nutritional status of school children and adolescents from different parts of the world. However, most studies on nutritional status of children focused on those living in rural areas. There is paucity of anthropometric indices based information on nutritional status of school children in Nigerian cities. Moreover, only few studies (Okorigwe and Okeke, 2009) have dealt with Nutritional

status of Under 5 and little has been done on assessment of nutritional status of pupils in Awka South LG.A, Anambra State.

Therefore, the research questions for this study are:

i. What is the nutritional status of pupils' using BMI in Awka South L.G.A, Anambra State?

ii. What are the nutrition practices of the pupils' in Awka South L.G.A, Anambra State?

iii. What are the food consumption patterns of the pupils' in Awka South LGA, Anambra State?

iv. What is the socio-demographic status of the pupils' household in Awka South L.G.A, Anambra State?

1.2 Problem Statement

The right to adequate food is recognized by several agencies under international law (Amos, 2009). Despite this recognition, globally, half of almost 10 million children who die annually do so from a combination of malnutrition and easily preventable diseases. In Nigeria, there is increasing appreciation that it is not only the rural dwellers that are affected but also the urban poor who do not realize their right to adequate food. Attention has been drawn to the vulnerable situation of the school-aged children in the global rising food crisis on the already

precarious food security situation. The school-aged children is an important caseload of vulnerable population that needs to be addressed because of their high proportion in the total population affected. Sixty percent of Nigerian population lives in informal settlements, globally, more people are living in urban than rural areas (UNICEF, 2009). Despite efforts by the federal government for primary schools to set up feeding programme, less has been done and only a small percentage of schools have adhered to it. According to the recent records in the Anambra State Local Government Education Authority, in 2016 mostly public primary schools have feeding programs. Underweight is one of the leading underlying cause of disability and illness worldwide, especially where low feeding practices are a major cause of underweight. In Nigeria, severe acute malnutrition is responsible for 82,000 deaths annually with a significant percentage being among the urban poor (UNICEF, 2009). Children living in this area are characterized by ill health and poor nutrition due to unhealthy poor conditions and congestion that result in frequent diarrhea which can sometimes lead to death. The nutritional status of pupils in Awka South L.G.A is not well documented. Also, there is need to continually monitor nutritional status of children in these poor settlements in order to continuously inform the various stakeholders.

1.3 Objectives of Study

The main objective of the study is to assess the Nutritional Status of Pupils in Awka South L.G.A, Anambra State, Nigeria, while the Specific objectives of this study are:

i. To determine the nutritional status of pupils using BMI in Awka South L.G.A, Anambra State.

ii. To describe the nutrition Practices of the pupils in Awka South L.G.A, Anambra State.

iii. To assess the food consumption patterns of the pupils in Awka South L.G.A, Anambra State.

iv. To determine the socio-demographic status of the pupils' household in Awka South L.G.A, Anambra State.

1.4 Hypothesis of Study

i. The nutrition status of the pupils' is not significantly associated with BMI in Awka South L.G.A, Anambra State.

ii. The nutrition practice of the pupils' has no significant association with malnutrition in Awka South L.G.A, Anambra State.

iii. The food consumption pattern of the pupils' has no significant association with malnutrition in Awka South L.G.A, Anambra State.

iv. The socio-demographic status of the pupils' household has no significant association with malnutrition in Awka South L.G.A, Anambra State.

1.5 Justification of Study

1. This study is important because it seeks to assess the nutritional status of pupils in Awka South LGA, Anambra State, with the aim of suggesting adequate measures and proper solutions thus minimizing consequences caused by malnutrition.
2. The findings of the study may be of utmost significance to the academicians as the findings may provide useful information for further research and be a source of research materials or empirical data for them.
3. The research findings could also provide useful information and add value to the existing knowledge on the Assessment of nutritional status of pupils in Awka South L.G.A, Anambra State since the literature that is available show that very little has been done on the same.
4. Finally, the results of the study could be beneficial to the Ministry of Education and Sports, Head teachers, School Boards and Policy makers in developing curriculum and a programme for equipping parents of school-aged children with knowledge on good nutrition and importance of balanced diet

which is vital for good academic performance. It is expected to contribute towards enhancement of feeding programme for children.

1.6 Scope of Study

The main purpose of the study is to assess the nutritional status of pupils in Awka South L.G.A of Anambra State, southeast of Nigeria. The population of the study was limited to government owned primary school pupils within the age range of 6 to 12 years in Awka south L.G.A, Anambra State as pupils in Private schools were several folds more likely to have a normal weight. The primary schools have a population of 13,016 pupils.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Framework

Nutritional status is determined primarily by a child's growth in height and weight and is directly influenced by dietary intake. Food intake is not only a result of food availability at the household level, but also of dietary quality and quantity and feeding practices.

In addition, the Nutritional status of children is highly dependent on several factors they include food consumption pattern, nutrition practices, socio-economic status and anthropometric measurements. These in turn affect the dietary diversity, food reserves and agricultural practices. Therefore, the outcome is healthy children and excellent performance (See figure 1.1).

The conceptual framework in figure 1.1 provides a holistic analysis of the causes of malnutrition.

The causes of malnutrition are a combination of inadequacies in food, Socio-demographic status and Nutrition practice. Even in conditions where food is available and purchasing power may be sufficient, poor monotonous diets low in quantity, quality and dietary diversity of foods is often a major contributing factor.

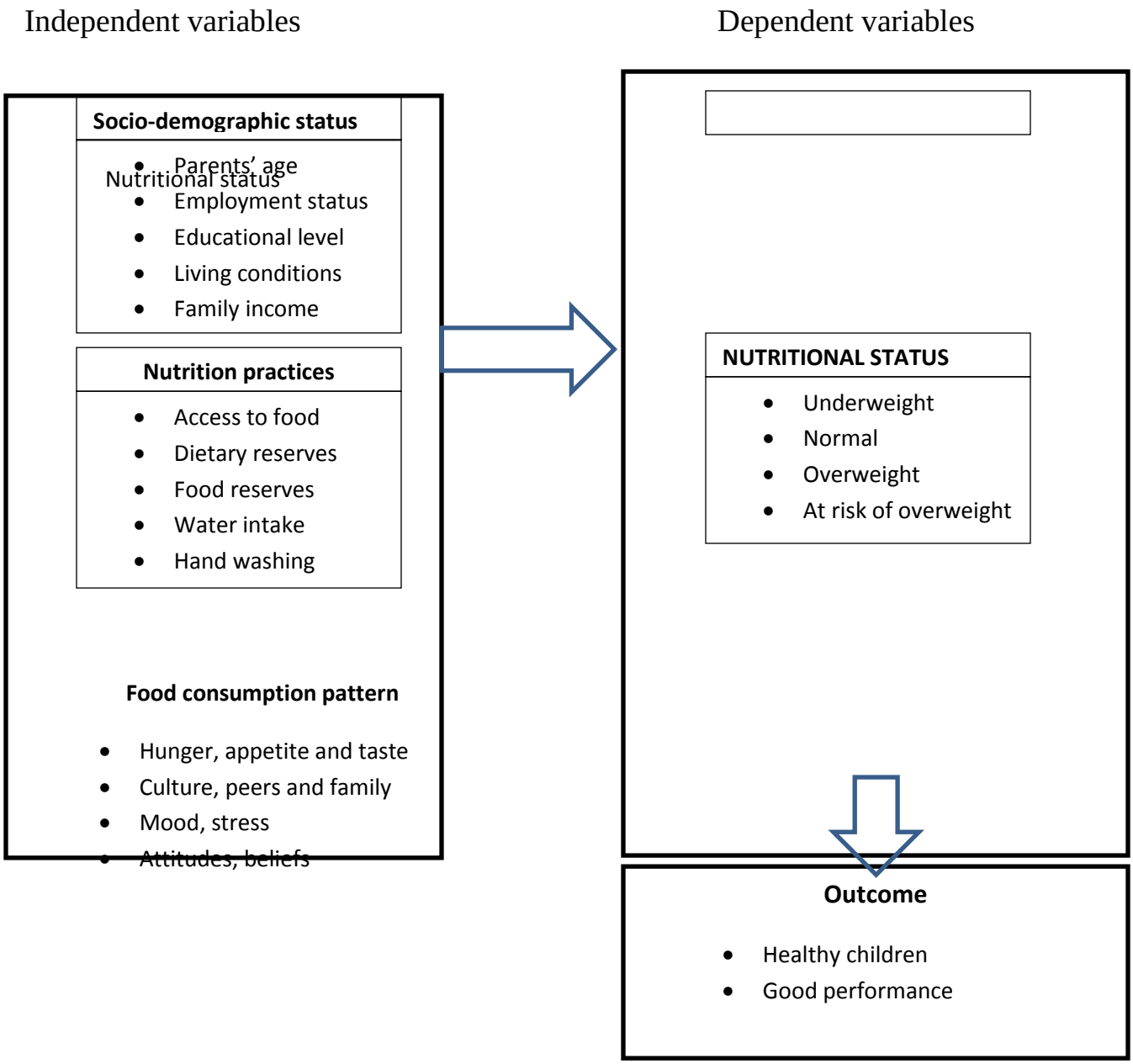

Figure 2.1: Conceptual framework showing the assessment of nutritional status of primary school children.

Source: Adopted from Grantham –Mc Gregory *et al*., (1998).

2.2 Theoretical Studies

2.2.1 Maslow's Theory

This study is attached on Abraham Maslow's theory of needs (1943). Maslow proposed a theory of needs based on a hierarchal model of which the basic needs appear sat the bottom while higher needs at the top; (physiological, safety, love, esteem and self-actualization). The most fundamental and basic four layers of the pyramid contains what Maslow called deficiency needs. Here, the individual does not feel anything if the needs are met, but feels anxious if they are not met (Snowman and Blehler, 2011). Needs beyond the deficiency needs are called growth needs, when fulfilled, they do not go away, and rather they motivate the individual further.

Maslow (1943) cited in Kasenene (1999) that physiological needs such as food and water are the primary drives which need to be satisfied before a person can actually realize any need for a secondary desire. According to Kasenene (1999), Maslow advanced another theory of Motivation in 1968 which argued that students will always have the need to learn after all the physiological needs are satisfied. Maslow therefore concluded that learning is secondary to bodily needs and any attempt towards learning requires satisfaction of physiological or bodily needs as an important pre-requisite. In this study such needs included Nutritional status and

balanced diet, food consumption patterns and practices. This theory can be shown diagrammatically as seen in figure 2.1

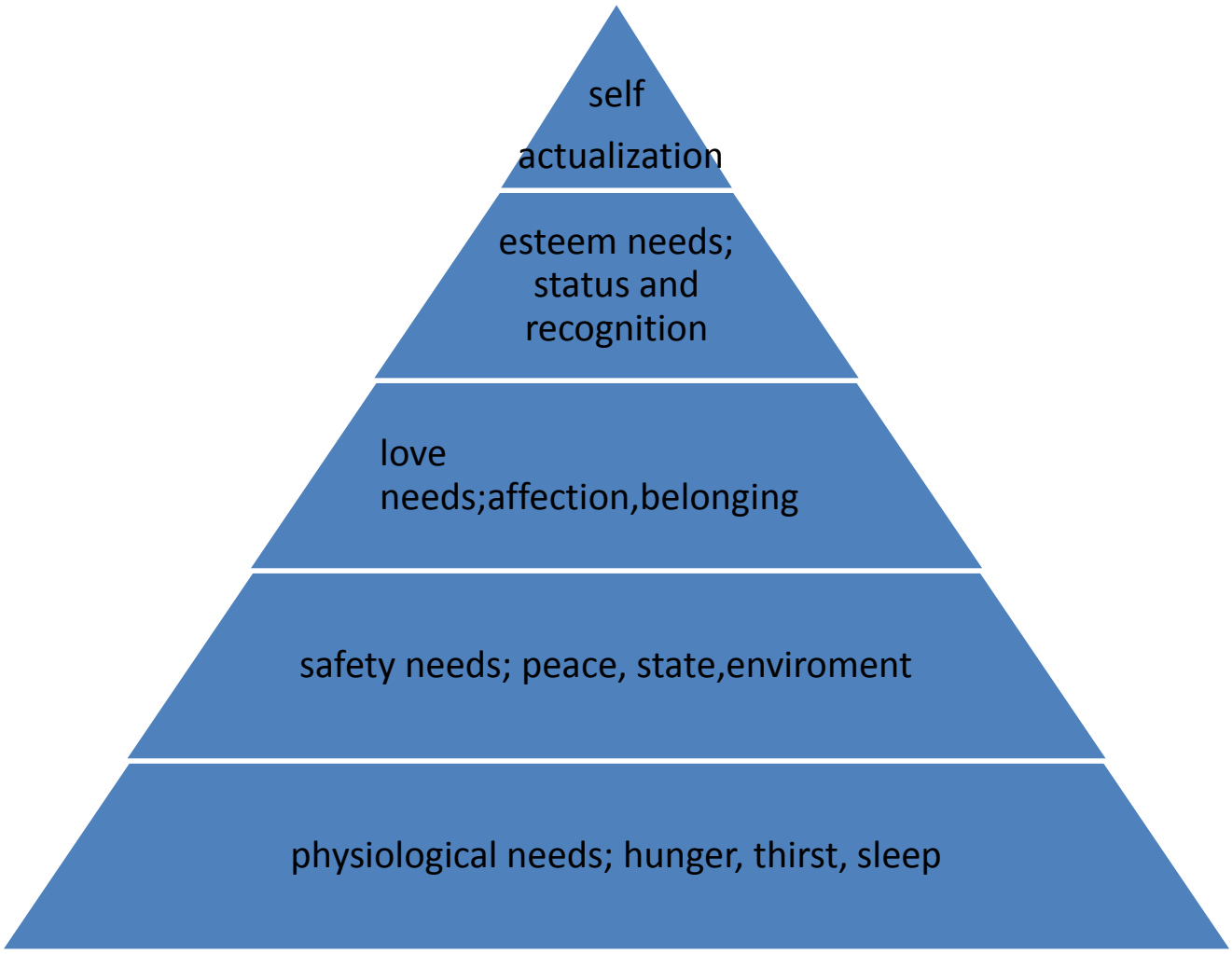

Figure 2.2: Maslow's Hierarchal Model of Basic Needs.

Source: Okumbe (2007) Educational Management Theory and Practice.

All the above needs were summarized into students' nutritional needs which include nutritional status and dietary intake which encompasses the physiological needs of man. Maslow's theory of needs based on hierarchical model can be applied in a school setting whereby hunger, thirst and sleep could have a great impact on the well-being of a student. Once the physiological needs are met, the students can improve on their academic performance.

2.2.2 Precede-proceed Model

The PRECEDE-PROCEED model is a program planning model, which uses an ecological approach to health promotion. This model provides a framework of step-by-step phases that help practitioners to plan, implement, and analyze a program and its effectiveness. The PRECEDE model was developed by Dr. Lawrence W. Green and colleagues in the 1970's to address the inadequacy of direction and adequacy of public health promotions to sufficiently plan before implementing the needed interventions.

The name is an acronym that stands for Predisposing, Reinforcing, Enabling Constructs in Educational or Environmental Diagnosis and Evaluation. It wasn't until 1991 when Dr. Green and Dr. Marshall Kreuter developed the PROCEED portion of the model to include the ecological aspect to the model. The PROCEED acronym stands for Policy, Regulatory, and Organizational Constructs in

Educational and Environmental Development. Therefore, the acronyms represent the different factions within each planning, implementing, and evaluating phase.

Phase one: Social assessment means social diagnosis of the target population. To carry out a social assessment, this study involves the use of hand delivered survey, which will be distributed to local stakeholders (Head teachers, Teachers, Parents and Government representatives). Survey questions will focus on demographic information and also, information about the availability, utilization and access to food, in order to achieve the primary goal of this assessment which is to test the hypothesis that school-age children in Awka South L.G.A Of Anambra State suffer from a high prevalence of malnutrition, because of a lack of access, unavailability, and insufficient utilization of food.

Phase two: The aim of the epidemiological assessment is to collect primary data to determine the overall health status of the targeted population. It is important to note that the literature focuses on measuring the physical manifestation of malnutrition because of their simplicity and accuracy. This study utilizes anthropomorphic measures to determine the prevalence of malnutrition among the targeted population.

Phases three and four: This study is based on the information gathered in the quantitative assessment, by focusing more on qualitative data. Understanding the prevalence of malnutrition in a target population is insufficient, this portion of the

assessment examines the factors that contribute to malnutrition to answer the question "why?" The target of the third and fourth phases of the precede-proceed model is to determine the behavioral, ecological, environmental and educational components to malnutrition.

The Precede-Proceed model is the best choice for the proposed assessment design of this study, for many reasons: First, it has shown efficacy in many different health settings. Secondly, this model has shown to have a positive effect on intervention development at the local level (Phillips *et al*., 2012). Finally, the Precede-Proceed model can be modified to be problem based and also, follows a systematic comprehensive process. Malnutrition is a complex issue that relates to many different aspects of a community such as social norms, personal behaviors, environmental factors, biology, ecology, geography and many other factors contributing to malnutrition. The Precede-Proceed model is therefore relevant to this study in the sense that it accounts for these different factors by laying out a phase-by-phase framework that assesses the social, epidemiological, environmental, political, and then behavioral elements of a community, which is necessary for a complete assessment of the nutritional status of the school-aged children.

2.3 Empirical Studies

2.3.1 Balanced Diet and Nutritional Status of School-aged Children

A child who is fed properly on a balanced diet develops faster than who is not. Such a child is ever active and is always regular in school attendance, very motivated and above all appears healthy. He / She becomes attentive in class as most of his/ her senses, if not all are active and functional (The Sunday standard, 2011). Proper nutrition is essential for growth, health, development and one's well-being since food is essential need for the survival of man (Ake-Tano *et al.*, 2011).

Good nutrition helps to improve child survival, promote healthy growth and development. Good nutrition aid by contributing to better cognitive and economic development, reduce mortality rate and the risk of chronic diseases such as cardiovascular disease, diabetes, hypertension, even in adulthood (OMS, 2010).

Anthropometric assessment; It is the physical measurement of the human body and is commonly used to estimate the nutritional status of children. Anthropometry measures have been extensively used for identification and classification of children suffering from protein-energy malnutrition (PEM). Different anthropometric measurements are merged as ratios or indices such as weight-for-age, weight for height and height for age (John Pietsch, 2007).

Height-for-Age (H/A): H/A is an indicator of past or chronic malnutrition. H/A cannot be used to measure short term changes in malnutrition. Deficits in L/A or H/A are signs of stunting. Stunting usually results from extended periods of inadequate or insufficient food intake, disease or a combination of both, especially during the periods of greatest growth for children when the slowing of skeletal growth results in reduced stature (Aisbitt, 2007). Stunting begins in utero; therefore, the pro-pregnancy health and nutritional status of women and the nutrition and health of mothers during pregnancy is paramount. Stunting is a result of a process over time; most of the damage occurs before the age of two. Emphasis should be on the prevention (Smith and Haddad, 2000). Stunted growth is a reduced growth rate in human development. It is a primary manifestation of malnutrition in early childhood, also including malnutrition during fetal development brought about by the malnourished mother. In developing countries, stunted growth is a common problem affecting a large percentage of children. Once established, stunting and its effects typically become permanent.

Most stunted children will never gain the corresponding body weight. Stunted children may never regain the height lost as a result of stunting. In addition, it also leads to premature death later in life because vital organs were not fully developed during childhood (Brown, 2006).

Weight-for-Height (W/H); These Anthropometric indices helps to identify children suffering from recent or acute malnutrition. It is used to examine short term effects that are recent and also rapid weight loss associated with a period of starvation and/or severe disease (Raheela *et al*, 2002).

Wasting: This occurs as a result of weight going down significantly below the weight expected of a child of the same length or height. Wasting indicates current/acute malnutrition of a child of the same length or height. It indicates current/acute malnutrition resulting from feeding practices, diseases and infection, or, more so, a combination of these factors. Wasting in population groups and in individual children can change rapidly and shows marked seasonal patterns associated with changes in food availability or disease prevalence (John Pietsch, 2007).

Weight-for-Age (W/A): Low weight-for-age identifies the condition of being underweight at a specific age. W/A may reflect both past (chronic) and present (acute) under nutrition. However, it is unable to distinguish between the two (Smith and Haddad, 2000). W/A is often used to identify the nutritional condition of underweight, which is a composite measure of stunting and wasting. Study in Nepal shows that almost one third of children (30%) were underweight, as judged by a z score for weight for age less than -2SD. Twelve children (6%) were severely underweight (Z score <-3 SD). Just a little bit above 15 % of the studied children were severely malnourished, having a z score less than and 3 standard deviations.

Body Mass Index (BMI): Body mass index is defined as the individual's body weight divided by the square of their height. The formula universally used in medicine produce a unit of measure of kg/m2. WHO International System of Unit Formula BMI can also be determined using a BMI chart, which displays BMI as a function of weight (horizontal axis) and height (vertical axis) using contour lines for different values of BMI or colors for different BMI categories (Brown, 2006).

Frequent use of the BMI is to assess how much an individual's body weight departs from what is normal or desirable for a person of his or her height. Excess weight or deficiency may, in part, be accounted for by body fat (adipose tissue) although other factors such as muscularity also affect BMI significantly. Human bodies rank along the index from around 15 (near starvation) to over 40 (morbidly obese) (Aisbitt, 2007). This statistical spread is usually described in broad categories such as underweight, normal weight, overweight, obese and morbidly obese. The particular BMI values used to demarcate these categories varies based on the authority, the CDC and the WHO (John Pietsch, 2007). It regards a BMI of less than 18.5 as underweight and may indicate malnutrition, an eating disorder, or other health problems. BMI greater than 25 is considered overweight and above 30 is considered obese. These ranges of BMI values are valid only as statistical categories when applied to adults, and do not predict health issues (Aisbitt, 2007).

Table 2.1: WHO Body Mass Index Classification for Adult

Starvation	less than 15
-Underweight	from 15 to 18.5
-Normal weight	from 18.5 to 25
Overweight	from 25 to 30
Obese:	from 30 to 40
Morbidly Obese:	- greater than 40

The U.S. National Health and Nutrition Examination Survey of 2004 indicate that 59% of American men and 49% of women have BMIs above 25. Extreme obesity — a BMI of 40 or more was found in 2% of the men and 4% of the women. There are differing opinions on the threshold for being underweight in females. Doctors' quote anything from 18.5 to 20 as being the lowest weight, the most frequently stated being 19. A BMI nearing 15 is usually used as an indicator of starvation and the health risks involved. BMI less than 17.5 being an informal criterion for the diagnosis of anorexia nervosa (Eboh and Boye, 2006).

Body Mass Index-for-age at children: BMI is a calculation that uses a child's height and weight to estimate how much body fat he or she has (Raheela *et al*., 2002). BMI is used differently for children. It is calculated the same way as for adults, but then compared to typical values for other children of the same age bracket. Instead of set thresholds for underweight and overweight, the BMI percentile allows comparison with children of the same sex and age. A BMI that is less than the 5th percentile is considered underweight and above the 95th percentile as overweight. Children with a BMI between the 85th and 95th percentile is considered to be at risk of becoming overweight or obese (Brown, 2006). Recent studies in England have indicated those females between the ages of 12 and 16 have a higher BMI than males by 1.0 kg/m^2 on the average (Theobald, 2004). The following classification using

Body Mass Index (BMI) for children Graph from WHO-NCH will get Percentile BMI with following classification (John Pietsch, 2007):

-≤5 Percentiles curve from growth chart: Underweight

->5 to 85 Percentiles curve from growth chart: Healthy weight / Normal

->85 to 95 Percentiles curve from growth chart: At risk overweight

->95 Percentiles curve from growth chart: Overweight.

Good nutrition is important for physical, intellectual and emotional development. Therefore, the nutritional status of a person is a measurement of the extent to which his/ her physiological needs for nutrients are being met. In addition, it is also the state of health of a person which is the product of a balance between nutrient intake and effective utilization by the body system. In Asia for instance, more than 70% of children with protein energy malnutrition exist. Malnutrition is a public health problem of significant importance in developing countries (Asres and Eidelman, 2011).

Although food is very important, it has most times been lacking in the qualitative and quantitative point of view, resulting in the emergence of malnutrition. Indeed, school-aged children are younger and more vulnerable to the effects of malnutrition than their older individuals. Globally, the African region has the highest estimated

prevalence of stunting (20.2-48.1%) and has the lowest rate of improvement (Bellisle, 2004). Nutritional status is therefore an area of great concern for study among school children and a threat to their academic performance and even later development and productivity.

In Anambra State, previous nutritional surveys have shown high incidences of malnutrition among pre-school age children. A study carried by Okorigwe and Okeke (2009) forward a 7.7% incidence of stunting among pre-school age children in the same state by the National Center for Health and Statistics (NCHS) criteria. A study in the state recorded a prevalence of 6.9% by the same criterion (Akubugwo *et al.*, 2013). This work is intended at estimating the current prevalence of malnutrition in Awka, Anambra State.

The survey report results of the national nutrition survey conducted in the month of February to 5th May, 2014 to assess the nutritional and also health status of children under 5 years of age shows overall malnutrition rates among under five children are still very high. However, one in three children is underweight, one in thirteen acutely malnourished.

2.3.2 Nutrition practices of the pupils.

Schools should provide an excellent setting for positively influencing children. The children needs must be targeted at their earlier age for dietary interventions.

Furthermore, sound nutrition education programme are included in the curriculum, children will have opportunities to expand their nutrition knowledge and learn to select healthy food choices at schools, homes and in restaurants (Lytle *et al.*, 2006). Educational programme may enable children to grasp the significance of health-related problems (Zhan *et al.*, 2005).

Nutrition information if well-presented gives specific behavioral directives, will positively affect the food choices of children (Florence *et al.*, 2008).

Proper and balanced nutrition has been said to have favorable effects on educational attainment (Zhuo *et al*., 2009). It is expected that a well-nourished child will learn more readily than a poorly nourished child. Iron helps with the production of red blood cells that carry oxygen around the body. A similar study done on short term fasting and its effects on problem solving in 9 to 11 years old children in France revealed that those with less nutritious diets performed worse on a standardized literary assessment (Medhig *et al.*,2006). It also revealed that those who missed breakfast were also more easily distracted by stimuli irrelevant to the task at hand. This study showed that variations in the timetable of dietary intake could affect specific processes such as attention and concentration during study.

A study carried out in America looked specifically at fats in the American diet as the customary diet of American children observed that, there is significant increase in

total fat, saturated fat and cholesterol level. The study further identifies associations with fat intake, psychosocial and cognitive functioning in U.S school-aged children, since it had been ascertained whether and how specific fats may affect social and cognitive development (Zhang *et al.*, 2005). It is a common knowledge and everyday observation that children who are on a poor diet show little activity and lack of energy. A lot of children do not get enough of the right food to eat. They do not grow well; they become ill and may even die. They do not grow up as clever, as healthy or as tall as they should be (Anwar *et al.*, 2006).

A researcher assessed the effect of underweight on the nature of cognitive impairments and also, on the rate of cognitive development (Kar *et al., 2008)*. The study examined if malnutrition would result in a concentrated impairment and retardation in the rate of development of all cognitive processes and also, if these effects could be present for some specific cognitive processes. The effects of malnutrition on cognitive processes were also looked at in relation to impairment without affecting the rate of development and its effect on the rate of development of the cognitive process itself. The participants were categorized as being malnourished or adequately nourished in the age groups of five to seven years old and eight to ten years old.

2.3.3 The food consumption patterns of the pupils.

The dietary intake of school children are being influenced by many complex factors such as the schools, the local food environment, peer influence, government guidelines and policies that regulate school meals and the broader food environment which is influenced by food production, distribution and advertising (Wang *et al*., 2010).

School sanitation is very important in the life of a student. General cleanliness is a preeminent requirement for improved sanitation (Ayieko and Midikila, 2010). The floor should be washed, windows cleaned and walls maintained clean. Attention should also be given to general drainage system, water supply and toilet facilities. In most developing countries, the sanitary conditions are often not good enough. It is usually characterized by the absence of proper functioning water supply, sanitation and hand washing facilities World Bank, (2005). Around 5.4 million youths globally do not have access to safe drinking water and use mainly unprotected surface water from rivers, ponds or dams (UNICEF, 2006). Further findings revealed that over two million youth do not have access to any type of toilet facility. This lack of safe water, poor hygiene practices and lack of sanitation services were reported to be the major causes of morbidity among children (Ajani, 2010). Inadequate access to safe water and sanitation services couple with poor hygiene practices reduces the life expectancy. When it comes to schools, the (World Bank, 2005) warns that schools that lack access to basic water supply and sanitation services will have an increased

incidence of major diseases among students. Poor health is an important underlying factor for low school enrollment, absenteeism, poor classroom performance and early school dropout. Sanitation related diseases like malaria, diarrhea, worm infection, eye infection, skin diseases and many more account for roughly half of the entire outpatient visits in the country and the major cause of mortality and morbidity (FMOH, 2006).

Medical centers can clearly attest to this since these centers keep receiving sick students. The most common disease treated is malaria since stagnant water which is a breeding ground for mosquitoes is part of the school compound and this is as a result of poor sanitation. Once sanitation is substandard occupants are most likely to spend more time in hospital. Therefore, this makes the environment unsafe where diseases are transmitted with mutually reinforcing negative impacts for the dwellers in this context students, families and school's development. A Study conducted in Kenya shows that those poor sanitary conditions in which people become accustomed to poor hygiene are dangerous to the psychological upbringing and to the learning process of their children (Ddungu, 2011). A study conducted in Nigeria aimed at investigating the conditions affecting quality living and successful learning revealed that a clean environment allows student to concentrate on reading books usually in silent environment (Bener, 2006). These revelations were later confirmed by UNICEF which reiterated that good sanitation and hygienic standards have a

good influence on growth and development of the child, school attendance and the rate of school drop outs (UNICEF, 2006; Vivas *et al.*, 2010).

Regular and frequent consumption of high-calorie foods, such as fast foods, baked foods and vending machine snacks, contribute to weight gain. High fat foods are dense in calories, loading up on soft drinks, moreover, candy and desserts also can cause weight gain. This is because such foods and beverages are high in sugar and calories. (Kempster,2006). A recent study in the journal for pediatrics showed that fast food consumption results in a greater intake of fats and calories and decreased intake of foods and vegetables. King (2009) in his study stated that the percent fruit and raw vegetables grade six children consumed steadily declined from 1999 to 2008. For any given meal, at least 30 % of children are eating approximately 200 calories more which adds up to 6 pounds of fat per year. Many researchers are of the opinion that children should be protected from these fast food choices every day, making it difficult to support a healthy eating (Kopelman, 2005). These upper sized portions are increasing along with the supper-sized kids with supper sized problems (Kempster, 2006). Where foods are ample, appetite not necessarily hunger triggers eating (Wardlaw *et al*., 2007).

This affects children because children are more attracted to these high energy dense foods, because they are richly available, very palatable and sweet, but may not

satisfy their appetite as they keep wanting more (Mayo Clinic, 2008).The situation is worsened, because the internal and external signals system is not perfect and body weight can increase overtime if a careful balance output is not maintained (Warldaw *et al*., 2007).

Although data from the National food survey shows that household energy intakes have fallen since 1979, there has been a concomitant change in the type of food consumed in particular there has been an increased intake of high fatty foods. Three years randomized controlled study of 1,704 3rd grade children which provide two healthy meals a day in combination with an exercise programme and dietary counseling all failed to show a significant reduction in percentage body fat. This was partly due to the fact that even though the children believed they were eating less, their actual calories consumption did not decrease with the intervention. At the same time, observed energy expenditure remained similar between them. This occurs even though dietary fat intake decreased from 34% to 27% (Cabello *et al*., 2008).

A study of 5,106 children showed similar results even though the children were on an improved diet, there was no effect found on the BMI (Nades, Store and Lythe, 2009). But irrespective of these, in a study of 548 children over 19 months period shows that soft drink consumption may contribute to childhood obesity for the

likelihood of obesity increase by 1.6 for every increase in soft drink consumption per day (James, 2005).

In another similar study, the frequency in the consumption of fruit juice was higher among obese children compared with control (Miliaela *et al*., 2009). These beverages may contribute to the development of obesity in children through the dietary energy that they provide and the relatively high glycolic index of fruit beverages may explain this association at least in part (Morris and Zemelmo, 2009).This is because foods with high glycemic index (high carbohydrate foods that causes rise in blood glucose level) tend to increase insulin output from the pancreas which in turn increases blood triglycerides, smaller low density lipoproteins (LDL) particles, which are more prone to lead to cardiovascular disease, increased fat deposition in adipose tissue, increased tendency for blood to clot, increased fat synthesis in the liver and more rapid return of hunger after a meal and thereby increasing the incidence of obesity (Wardlaw *et al*., 2007).

According to several studies' childhood obesity from junk food consumption is a major problem because children who eat junk food products consume over 150 extra calories daily. These junk foods include pizza, popcorn, burgers, meat pies, hamburgers and French fries. They eat them more than their parents and rarely eat fruits and vegetables that are good to their health. Literatures have revealed that a

diet that consists of meals having high postprandial (Post-Meal) blood sugar causes a person to become overweight. Heavy consumption of sugary food raises blood sugar level which in its turn makes one obese (Williams, Philbrick, &Backer, 2007). Whether the situation is the same with the primary schools in Awka, Anambra State was the concern of this study.

2.3.4 The Socio-demographic Status of the Pupil.

Parents are the first teacher in their children's lives. Parental level of education is an important predicator of children's education and behavior outcome (Davis Kean, 2005).

The level of education influences the parents' knowledge, beliefs, values, and goals about childbearing, so that a variety of parental behaviors are indirectly related to children's school performance (Joan and Smrekar,2009). For instance, higher socio-economic status and high levels of education may enhance parents' ability to become involved in their children's education and also enable parents to acquire and model social skills and problem-solving strategies conducive to their children's school success.

Parent influences the level of education in their children, the knowledge they have about work and difference occupation, the beliefs and attitudes they have to working and the motivation they have to succeed (Olusoga, 2008). Pupils whose parents work

in professional occupation generally outperform other pupils as they are able to provide all materials and assist in doing homework (Alexander, 2012). They are also familiar with the syllabus. The strength of the relationships between parents' occupation and pupils' performance varies considerably across all children. These parents give their children a lot of encouragement that help them to read more than their counterparts who work in either unprofessional occupations or the informal sector.

There is a significant difference in children's academic performance of children whose fathers are involved in their schools between those whose fathers did not get involved due to different occupations (Mwoma, 2013). Children in lower-Income families have worse cognitive, socio behavioral and health outcome. The academic attainment between children from the poorest and the richest backgrounds grow particular fast during the primary school years. By age eleven, only around three quarters of the children from the poorest families reach the expected level of upper primary as compared to 97% of children from rich families. Furthermore, children from poor families who performed well at age seven were more likely to perform better than their peers from better-off families in upper primary below age eleven. On the same note, the children who performed badly from poor families at age seven were more likely to improve their ranking compared to children from rich background (Anastasia and Telklemariam, 2011).

The study carried out by Erick (2009) identified parental income to be an important factor upon which the academic and vocational successes of secondary school students lie. The researcher found parental income not to be sufficient to sustain the academic and personal social life of the student in sub-rural school areas.

Parental income to a large extent affects the psychological balance in the classroom. It causes low concentration, low perception, frustration, sickness, and emotional disability in academic performance of the school children. Deprivation of the child's essential needs may lead to poor performance in the school work. A series of questions were asked to parents and guardians about the financial circumstances surrounding children's school enrolment in Tanzania and the results were based on financial problems militating against sending their children to school (Onzima, 2011).

Poverty is one of the contributing factors of children's dropout in rural areas of China (Mark, 2011). In Nigeria, about 7.3 million children are out of school and 62 % of the total children out of school are made up of female children mostly due to poverty of their households (UNICEF, 2004).

Children need lots of energy because they are growing, a varied and nutritious diet is essential for their development. However, like adults, if they take in more energy, in the form of food than they use up, the extra energy is stored in their bodies as fat. It is not good to be fat, but that has not prevented an obesity epidemic from occurring

among America youth. Childhood obesity increased from 5 percent in 1964 to about 13 percent in 2004. Today, it is about 20 percent and rising (Reilly 2005).

Childhood obesity is recognized as a global epidemic, the concern about childhood obesity is not simply aesthetic but because of the fact that obesity acquired during growth is detrimental to the health and well-being of affected child. Obesity in children is different from obesity in adults in some important respects. The main difference is that all children and adolescents need to grow, for example, during puberty, a child's weight will double and their heights increase by 20% the etiology of obesity lies in deranged energy balance. If adults are in energy balance, they will neither gain nor lose weight. In children, growth is only possible if energy intake (food and drink) exceeds energy output (resting, metabolic rate and activity).

Excess energy is stored in new tissue, with increasing degree of positive energy balance, excess adipose tissue will be formed and stored and is difficult to treat (Cameron and Demerath 2006). Just with many conditions, childhood obesity can be brought on by a range of factors which act in combination with the other. As obesity occurs when intake of energy exceeds energy expenditure, there exist multiple etiologies for this in balance; hence the rising prevalence of childhood obesity cannot be addressed by a single etiology (Grundy, 2009). The market rise in children obesity prevalence has coincided with a major change in how children

spend their time, resulting in both a decrease in exercise and an increase in sedentary behavior. The causes of changes are complex and cumulative. This is associated with increased time spend in watching television, playing computer games, browsing the internet and also, using the telephone and reductions in the amount of physical education and physical activity carried out in schools and at home.

There may be a wider societal ad political context to these changes, this includes, the loss of school playing fields, the lack of safe environment or neighborhood in which to walk and cycle to school or even for physical play in the home, some transport policies that favors driving above cycling or walking, food industries that targets children with advertisements for high energy foods and health promotion policies that fails to target appropriate dietary change and address issues of health in quality.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The study is population based descriptive survey study design. The design is appropriate for the study because it deals with the assessment of nutritional status of pupils' in Awka South LGA, Anambra State.

3.2 Area of Study

The study was carried out in Awka South Local Government Area (LGA) of Anambra State, Nigeria. It is made up of nine towns, namely, Amawbia, Awka, Ezinato, Isiagu, Mbaukwu, Nibo, Nise, Okpuno and Uwuawulu. There are three major streets that span this area, which include the Zik Avenue, Works Road and Arthur Eze Avenue. In the past, the people of Awka South LGA were well known for blacksmithing. Now, they are respected among the Igbo people of Nigeria for their technical and business skills.

Awka is a town in Awka South L.G.A, it is the seat of government, and has a lot of prominent people both home and abroad while Amawbia is home to the state house that is Governor's lodge and the State Prisons. Nise have notable infrastructures like

WAEC (West African examination council) state head office and St. Paul University College situated there.

Isiagu community is a town in Awka south local government area. It is one of the agricultural areas in the state with rich fertile soil for farming. It is believed to be one of the ancient towns in South Eastern Nigeria (Igbo land). The community has a history of peaceful co-inhibition and strong cultural heritage.

Awka is the capital of Anambra State, Nigeria with an estimated population of 301,657 as of 2006 Nigerian census. It is located Latitude N 6 12'25" and Longitude E 7 04'04". Strategically, Awka is located halfway between two major cities in Northern Igboland, Onitsha and Enugu which has informed its choice as an administrative center for the colonial authorities and today as a base for the Anambra State government. Over time, the town become famous for metal works and its blacksmiths were prized throughout the region for making farming implements etc.

3.3 Population of Study

The population of study of this work was drawn from the 43 government owned primary schools in Awka South L.G.A, comprising of a population of 13,016pupils (Awka South LGA Education Authority Statistical Records, 2016).

3.4 Sample Size and Sampling Technique

3.4.1 Sample Size

The sample size comprised 490 pupils drawn from the study population of 13,016 pupils from the 43 government owned primary schools. This sample 490 pupils was considered high enough for generalization considering Adukwu (1998) assert that for population up to 1000, 20 per cent sample will do; up to 5000, 10 per cent sample will do and up to 10,000, 5 percent or less were appropriate samples for an educational research. A sample less than 5% (490 pupils divided by 13,016 multiplied by 100=3.8 percent) out of 13016 pupils was considered adequate for this study.

3.4.2 Sampling Method

The multistage sampling technique was used to select three communities which harbor the urban primary schools namely Amawbia, Awka, and Okpuno. There are 43 primary schools (23 urban and 20 rural schools) in Awka South L.G.A and a total of 6 schools (Udoka B/S Awka-1148 pupils, Community B/S Amawbia-603 pupils, Igwedimma B/S Amawbia- 667 pupils, Igwebueze11 ifite-Awka-150pupils, Udodimma B/S Okpuno- 698 pupils and Okochi Migration Farmers Okpuno-127 pupils) were drawn from the three communities through purposive sampling because they were relevant and appropriate for this study. Each of the 6 schools sampled was

stratified into six classes, primary 1-6. (Majority of the classes had more than one stream and a stream comprising about 18 to 25 pupils). Then, 14 pupils were randomly sampled from each class using the class register; this gave 84 pupils from each school and approximately 490 pupils from the six schools sampled. The number sampled was based on age range of 6-12years.

3.5 Instruments for data collection

Anthropometric indices: That is weight for age (underweight, overweight and at risk of overweight).

Weight: The weight of primary school children was measured using a weighing scale machine. The school children were asked to stand on the weight scale bare footed and weight was recorded in kg.

Height: It was determined using a stadiometer, the researcher ensured that the pupil stood on the basal part of the device with feet together; the shoulders, the buttocks, and the heels had to touch the vertical measuring board. The pupil stood with their eyes in the Frankfort horizontal plane.

Questionnaire for the Respondents

Questionnaires were used to collect data from the respondents. The instrument questioned them on their food consumption pattern and nutrition practices.

3.6 Validity of Instrument

The content of the instruments (weighing balance, stadiometer and the questionnaires) was validated by the supervisor who, reviewed it for face validity as well as content validity, made suggestions, corrections and checked for the relevance of the items to the research questions as well as the objectives of the study. This was done to ensure that the instrument measured exactly what it was designed to measure.

3.7 Reliability of Instruments

Test-retest reliability methods were used to determine consistency of the questionnaire to be administered. The researcher tested the reliability of the instrument during the pilot stage in Udoka basic school, Awka. Using test-retest to estimate the degree to which the same results could be obtained with repeated measure of accuracy of the same concept (Njeru and Orodho, 2006). In the test re-test, the developed instrument is administered twice with an interval of two weeks and the results compared (Height-130 cm and Weight-17 kg).

3.8 Method of Data Collection

The questionnaire was administered to the respondents after an informed consent was obtained. The literate respondents were allowed to fill the questionnaire

themselves but for non-literate respondents, the questions were read in local language (Igbo) and their responses were filled by the researcher and her assistants.

Weight for age: The pupils were asked to stand on the weight scale bare footed and weight was recorded in kg.

Weight for age: The pupils were asked to stand behind the stadiometer bare footed and height was measured in cm. Furthermore, the BMI is calculated by the pupils' body weight divided by the square of their height.

3.9 Method of Data Analysis

Data was analyzed on IBM-SPSS Statistics 23.0 (SPSS Inc. Chicago, USA). Descriptive statistics was used to summarize the data and Microsoft Excel 2010 was used in chart drawing. The frequencies of the results were computed and presented in a table of distribution and were all expressed as the percentage of the distribution. The prevalence rate of malnutrition among the pupils studied was presented on a pie chart. Statistical Chi square test at 5% level was used to test for variables associated with malnutrition and Probability value (p) was used to interpret the result and p values of less than 0.05 were considered significant.

3.10 Ethical considerations/Informed Consent

Ethical approval was obtained from FUTO School of Health Technology ethics committee, and also from Awka South Local Government Education Authority.

Written informed consent was obtained from all the participants before being allowed to participate in the study (See Appendix 2). The researcher ensured that the nature and purpose of the study, the methods used, possible benefit were well explained to the respondents to enable them give their informed consent for their active participation in the studies. The respondents were assured that the information they gave would be used for research purposes only and that it would be treated with utmost confidentiality.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Results

4.1.1 Distribution Characteristics of the Pupils Studied

There were altogether a total of 490 pupils studied, in six different schools. The average age of the pupils was 8.8 years at a corresponding standard deviation (std.dev) of 1.9 years. In terms of sex of the children studied, 53.1% were females while 45.0% were males. Significant socio-demographic of the parents factors found to have associated with nutritional status of the pupils include mother's age, marital status, mother's education level, father's education level, mother's job type and father's job type.

Table 4.1: Distribution Characteristics of the Pupils Studied

Characteristics	Frequency	Percent%
School		
Udoka Basic School Awka	80	16.3
Igwebueze 11 Ifite-Awka	81	16.5
Igwedimma Basic School Amawbia	81	16.5
Community Basic School Amawbia	80	16.3
Udodimma Basic School Okpuno	80	16.3
Okochi Migration Farmers Okpuno	88	18.0
Total	490	100
Age in Years (mean=8.78)		
10 or less years	352	71.8
>10 years	138	28.2
Total	490	100
Gender		
Male	230	46.9
Female	260	53.1
Total	490	100

4.1.2 Nutritional Status of Pupils using BMI in Awka South L.G.A, Anambra State

There were altogether a total of 490 pupils studied, in six different schools. Their nutritional status was such that 18(3.7%) were found to be underweight, 452 (92.2%) were found to normal and 20 (4.1%) were found to be overweight (Table 1). Hence the clear majority of the pupils in Awka South LGA have normal weight while there remain some concerns on the availability of underweight and also overweight children in the area.

Further classification on the normal weight of the pupils indicates that 1.7% of the pupils are at the risk of being overweight (Figure 1).

Table 4.2: Nutritional Status of Pupils using BMI in Awka South L.G.A, Anambra State

Percentile Classification	Nutritional Status	Number	Percent (%)
< 5th percentile	Underweight	18	3.7
5 – 94th percentile	Normal weight	452	92.2
95 -100 percentile	Overweight	20	4.1
Total		490	100

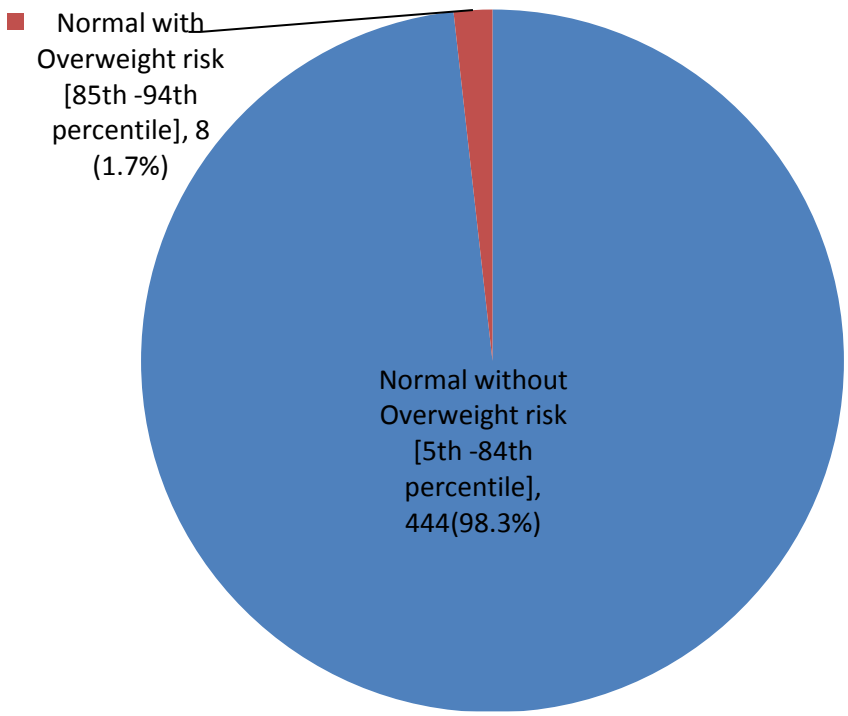

Figure 4.1: classification on the normal weight with and without risk of overweight among pupils in Awka South LGA, Nigeria.

4.1.3: Influence of Age, Sex and School attending on the nutritional Status of Pupils in Awka South LGA. Anambra

The average age of the pupils was 8.8 years at a corresponding standard deviation (std.dev) of 1.9 years. Among the children that were underweight, clear majority of them (88.9%) were the 10 years old or less. Similarly, among the class of the normal nutritional status children, majority (70.4%) were the 10 years or less old. Among the overweight, 90% fall within 10 or less years (Table 4.2). The age of the child was found as a significant factor associating with his or her nutritional status ($p=0.042$, $\chi^2 =6.339$).

In terms of sex of the children studied, 53.1% were females while 45.0% were males. For the underweight children, more were females (55.6%) than males (44.6%). Similarly, more female children (53.1%) showed normal weight than male ones (46.9%), while the rate for the overweight were found to be balanced between male and female children (50% apiece). However, the sex of the child was not found as an influencing factor associated with his or her nutritional status in this study ($p=0.942$, $\chi^2 =0.120$).

On Table 4.2, the school of study were found as a significant associating factor of nutritional status of the pupils studied ($\chi^2 =76.171$, $p<0.0001$). Eighteen children were underweight of which they were found only in two schools, with 12 (66.7%) of them coming from Udoka Basic School Awka and 6(33.3%) from Community

Basic School Amawbia. For the twenty overweight children, 12 (60%) were from school Igwedinma Basic School Amawbia and 4(20%) from school Community Basic School Amawbia while 10% each were found from IgwebuezeII Ifite-Awka and Okochi Migration Farmers Okpuno.

Table 4.3: Influence of Age, Sex and School attending Nutritional Status of Pupils in Awka South LGA. Anambra

	Underweight		Normal Weight		Overweight		Total	
	N	**%**	**n**	**%**	**n**	**%**	**N**	**%**
Age: mean =8.78, std.dev= 1.93								
Sex								
Male	8	44.4	212	46.9	10	50.0	230	46.9
Female	10	55.6	240	53.1	10	50.0	260	53.1
Total	18	100	452	100.0	20	100.0	490	100
	χ^2 =0.120	p=0.942						
School								
Udoka Basic School Awka	12	66.7	68	15.0	0	0.0	80	16.3
Igwebueze II Ifite-Awka	0	0.0	79	17.5	2	10.0	81	16.5
Igwedinma Basic School Amawbia	0	0.0	69	15.3	12	60.0	81	16.5
Community Basic School Amawbia	6	33.3	70	15.5	4	20.0	80	16.3
Udodimma Basic School Okpuno	0	0.0	80	17.7	0	0.0	80	16.3
Okochi Migration Farmers Okpuno	0	0.0	86	19.0	2	10.0	88	18.0
Total	18	100	452	100	20	100	490	100
	χ^2 =76.171, p <0.0001*							

Note: * indicates statistical significant at 5%

4.1.4 Association between parent's socio-demographic factors and nutritional status of the pupil studied

Significant socio-demographic of the parents factors found to have associated with nutritional status of the pupils include mother's age ($p=0.010$, $\chi^2= 16.764$), marital status ($p=0.016$, $\chi^2= 12.179$), mother's education level ($p<0.0001$, $\chi^2= 21.089$), father's education level ($p=0.002$, $\chi^2= 16.720$), mother's job type ($p<0.0001$, $\chi^2= 15.567$) and father's job type ($p=0.002$, $\chi^2= 8.798$).

Among the mothers less than 20 years of age, 10.2% of their children were found to be underweight, which is quite high compared to what was found in other age groups (Table 3). The school pupils from married parents showed slightly higher percentage in underweight (3.8%) than the ones from single parents (3.6%) but the ones from the divorced or separated parents recorded largest percentage of overweight of 12.8% compared to 2.5% and 7.1% respectively found for pupils from married and single parents.

The underweight pupils were more for mothers of primary education level (10.9%) and fathers of primary education level (7.7%), compared to the proportion for children of other higher education levels for the mother and the father. The underweight was higher for pupils from mothers with unskilled jobs (7.2%) than for the ones with skilled job mothers (1.4%). Similar result was obtained for fathers

where the underweight level for the unskilled job parents' pupils was found to be 6.3%, but was 2.2% in pupils whose parents are doing skilled jobs.

Table 4.4: Parents socio-demographic Factors and Nutritional Status of the Pupil Studied

Socio-demographics	Underweight <5th percentile		Normal (5–94th percentile)		Overweight (95-100 percentile)			χ^2	p-value
	n	%	n		n	%	Total		
Mothers Age									
< 20-41+	18	3.7	452	92.2	20	4.1	490	16.76	0.010*
Parents marital status									
Married	14	3.8	344	93.7	9	2.5	367		
Single	3	3.6	75	89.3	6	7.1	84		
divorced/separated	1	2.6	33	84.6	5	12.8	39		
Total	18	3.7	452	92.2	20	4.1	490	12.18	0.016*
Education Level (Mother)									
Primary	11	10.9	84	83.2	6	5.9	101		
Secondary	5	1.9	255	95.1	8	3.0	268		
Tertiary	2	1.7	113	93.4	6	5.0	121		
Total	18	3.7	452	92.2	20	4.1	490	21.09	<0.0001*
Education Level (Father)									
Primary	7	7.7	75	82.4	9	9.9	91		
Secondary	8	2.5	301	95.3	7	2.2	316		
Tertiary	3	3.6	76	91.6	4	4.8	83		
Total	18	3.7	452	92.2	20	4.1	490	16.72	0.002*
Mothers Job type									
Unskilled	14	7.2	168	86.6	12	6.2	194		
Skilled	4	1.4	284	95.9	8	2.7	296		
Total	18	3.7	452	92.2	20	4.1	490	15.57	<0.0001*
Fathers Job type									
Unskilled	11	6.3	154	87.5	11	6.3	176		
Skilled	7	2.2	298	94.9	9	2.9	314		
Total	18	3.7	452	92.2	20	4.1	490	8.80	0.012*

Note: * indicates statistical significant at 5%

4.1.5 Nutrition practices in relation to nutritional status of pupils studied

Significant nutritional practices observed in this study were a**mount of water taken every day (**$p < 0.0001$, $\chi^2 = 80.51$), hand washing after toilet ($p < 0.0001$, $\chi^2 = 25.52$), hand washing before handling food ($p < 0.0001$, $\chi^2 = 222.0$) as well as hand washing before eating any food $p < 0.0001$, $\chi^2 = 56.79$) and refuse disposal pattern ($p < 0.0001$, $\chi^2 = 24.13$). Up to 96.9% of the pupils that drink much water every day have normal weight compared to 72.2% on the ones that drink little. Among those that wash hands after toilet, 96.8% showed normal weight, and similar result was obtained on those that do wash hands before handling foods, where 95% had normal weight (Table 4).

Table 4.5: Nutrition Practices in Relation to nutritional Status of Pupils Studied

Boiled water intake everyday	Total	Underweight		Normal		Overweight		χ^2	p value
		number	%	number	%	number	%		
Yes	150	2		142		6			
No	100	8		86		6			
Not always	240	8		224		8			
Total	490	18		452		20		9.190	0.057
Amount of water taken everyday									
Much	400	1	0.3	387	96.8	12	3.0		
Little	90	17	18.9	65	72.2	8	8.9		
Total	490	18	3.6	452	90.4	20	4.1	80.51	0.0001*
HANDWASHING									
Hand washing after toilet									
Yes	350	5	1.4	336	96.0	9	2.6		
No	140	13	9.3	116	82.9	11	7.9		
Total	490	18	3.7	452	92.2	20	4.1	25.52	0.0001*
Before handling food									
Yes	200	4	2.0	191	95.5	5	2.5		
No	270	5	1.9	260	96.3	5	1.9		
Sometimes	20	9	45.0	1	5.0	10	50.0		
Total	490	18	3.7	452	92.2	20	4.1	222.0	0.0001*
Before eating any food									
Yes	380	4	1.1	369	97.1	7	1.8		
No	110	14	12.7	83	75.5	13	11.8		
Total	490	18	3.7	452	92.2	20	4.1	56.79	0.0001*
Refuse Disposalpattern									
Composite pit	170	4	2.4	160	94.1	6	3.5		
Open field	280	9	3.2	263	93.9	8	2.9		
Bin	40	5	12.5	29	72.5	6	15.0		
Total	490	18	3.7	452	92.2	20	4.1	24.13	0.0001*

Note: * indicates statistical significant at 5%

4.1.6 Food consumption pattern and nutritional status of pupils studied

Cereals consumption was found as a significant factor of child's nutritional status ($p < 0.0001$, $\chi^2 = 16.60$). Underweight is more for the less cereals consumption children (6.7%), yet overweight was found more for the same group (7.4%). Tubers consumption was found as another significant factor ($p < 0.0001$, $\chi^2 = 20.33$); children than consumes less of it were more in underweight (9.3%). Similar results were obtained in vitamin A fruits, fish, milk, fats/oil, sweets and snacks, all of which were statistically significant in this study (Table 4.5).

Table 4.6: Nutritional Status and Pupils' Food Consumption Pattern

	Total	Underweight		Normal		Overweight		χ^2	p value
		N	%	n	%	N	%		
Cereals consumption (Often)									
Yes	300	5	1.7	288	96.0	7	2.3		
No	190	13	6.8	163	85.8	14	7.4		
Total	490	18	3.7	451	92.0	21	4.3	16.68	0.0001*
Vitamin A: rich vegetables									
Yes	150	3	2.0	139	92.7	8	5.3		
No	340	15	4.4	313	92.1	12	3.5		
Total	490	18	3.7	452	92.2	20	4.1	2.48	0.289
Tubers									
Yes	340	4	1.2	320	94.1	16	4.7		
No	150	14	9.3	132	88.0	4	2.7		
Total	490	18	3.7	452	92.2	20	4.1	20.33	0.0001*
Vitamin A-rich fruits									
Yes	60	8	13.3	51	85.0	1	1.7		
No	430	10	2.3	401	93.3	19	4.4		
Total	490	18	3.7	452	92.2	20	4.1	18.73	0.0001*
Iron rich-organs									
Yes	100	2	2.0	92	92.0	6	6.0		
No	390	16	4.1	360	92.3	14	3.6		
Total	490	18	3.7	452	92.2	20	4.1	2.091	0.351
Fish									
Yes	110	8	7.3	100	90.9	2	1.8		
No	380	10	2.6	352	92.6	18	4.7		
Total	490	18	3.7	452	92.2	20	4.1	6.810	0.033*
Legumes									
Yes	290	8	2.8	274	94.5	8	2.8		
No	200	10	5.0	178	89.0	12	6.0		
Total	490	18	3.7	452	92.2	20	4.1	5.051	0.080
Milk									
Yes	420	3	0.7	401	95.5	16	3.8		
No	70	15	21.4	51	72.9	4	5.7		
Total	490	18	3.7	452	92.2	20	4.1	73.94	0.0001*
Oil/fats									
Yes	90	1	1.1	79	87.8	10	11.1		
No	400	17	4.3	373	93.3	10	2.5		
Total	490	18	3.7	452	92.2	20	4.1	15.57	0.0001*
Sweets									
Yes	470	14	3.0	443	94.3	13	2.8		
No	20	4	20.0	9	45.0	7	35.0		
Total	490	18	3.7	452	92.2	20	4.1	69.01	0.0001*
Snacks									
Yes	180	13	7.2	152	84.4	15	8.3		
No	310	5	1.6	300	96.8	5	1.6		
Total	490	18	3.7	452	92.2	20	4.1	24.23	0.0001*

Note: * indicates statistical significant at 5%

4.2 Discussion

Several studies have linked consumption of a diverse diet to improved nutrition status and health, stating that dietary diversity is significantly associated with anthropometric indicators (Arimond and Ruel, 2004). In this study, cereals consumption was found as a significant factor of child's nutritional status $p < 0.0001$. Underweight was more for the less cereals consumption children (6.7%), yet overweight was found more for the same group (7.4%). Tubers consumption was found as another significant factor $p < 0.0001$, children that consumed less of it were more in underweight (9.3%). Similar results found in this present study were obtained in vitamin A rich fruits, fish, milk, fats/oil, sweets and snacks, all of which were statistically significant.

In another Nigeria study conducted by Ajani (2010) in Southeast revealed that the predominant food groups in the diet were: cereal/grains (92%), root/tubers (59%), legumes/nuts (63.5%), fish (57.1%), vegetables (48%), meat (33%), while a large majority (99%) consumed oils/fat in soups/stews. Findings from the research revealed that factors such as availability and accessibility of food affected food consumption at the household. Some pupils stated that they consumed meat, milk and egg because it was locally available, culturally accepted and affordable to the family. Foods which were least consumed included fish and eggs. The low

consumption of these foods was attributed to the fact that they were locally unavailable and expensive.

According to this study, almost all the pupils (98.2%) consumed water every day, and 18.9% of the pupils reported that they take little water at home. It should be noted that, lack of ready access to a water source may limit the quantity of suitable drinking water that is available to a household.

Almost all the pupils washed hands before eating (93.9%), after visiting the toilet (92.9%) and before handling food (93.9) with 82% of the pupils reported to wash hands in all the three occasions. This finding agrees with a study conducted by Vivas *et al*., 2010) on hygiene practices among children in Angolela primary school in Ethiopia which showed that most (99.0%) of the respondents washed hands before eating while 46% washed hands after eating. (Vivas *et al.*, 2010). Possible reasons for differences in the study could be because of differences in the sample size, and area of study.

Findings in this study, revealed that among the mothers less than 20 years of age, 10.2% of their children were found to be underweight, unlike what was found in other age groups. The school pupils of married parents showed slightly higher percentage in underweight (3.8%) than the ones from single parents (3.6%) but the ones from the divorced or separated parents recorded largest percentage of

overweight of 12.8% compared to 2.5% and 7.1% found for pupils from married and single parents.

It was found that underweight pupils were more for mothers of primary education level (10.9%) and fathers of primary education level (7.7%), compared to the proportion for children of other higher education levels for the mother and the father. This was observed in a study by Parmenter *et al.* (2000) on demographic variation in nutrition knowledge, where they indicated a linear relationship between knowledge and education levels, with scores being lowest for people with no formal education while those with degrees scored 32 highest. These findings concur with those of Ayieko and Midikila (2010) in Sabatia Division, Vihiga District in Western Province of Kenya, on food distribution and how it impacts on child nutrition that low levels of education constrained knowledge required to select nutritious foods. It is also important to note that there were low cases of separation within the study population. This implies that most of the pupils are raised within a family set up. Studies have shown that the family is the basic unit where nutrition knowledge is learned and practiced (FAO, 2005). This could possibly be a suitable avenue for nutrition education especially if parents are empowered with appropriate nutrition information.

The underweight was higher for pupils from mothers with unskilled jobs (7.2%) than for the ones with skilled job mothers (1.4%). Similar result was obtained for fathers

where the underweight level for the unskilled job parents' pupils was found to be 6.3%, but was 2.2% in pupils whose parents are doing skilled jobs

Considerably, findings from the research show that the self-employed parents were involved in: running small scale businesses and farming while some of those employed worked as casual laborers in the farms and construction sites. Overall, this could lower the purchasing power of food leading to lower levels of nutrition knowledge and dietary diversity and thus, could possibly lead to overdependence on school meals or on food aid at household level.

In terms of sex of the children studied, the study found that 53.1% were females while 45.0% were males. It was however different from findings from work done in Bangalore were male (58.0% to female 40.1%) was found (Hassan and Mond, 2011). This shows that female education is fast gaining grounds and is a trend which should be encouraged. For the underweight children, more were females (55.6%) than males (44.6%). The rate was similar compared to studies from India and Pakistan was overall prevalence of underweight was as high as 51.7% and 46.4% respectively (Medlig *et al*, 2006). A study ascribed the disparity between the male and female child that males are better fed than their female siblings, the "lions share" of the meat/fish will always go to the males (Ijarotimi and Odeyemi, 2012). Similarly, more female children (53.1%) showed normal weight than male ones (46.9%), while the rate for the overweight were found to be balanced between male

and female children (50% apiece). However, the sex of the child was not found as an influencing factor associated with his or her nutritional status in this study ($p=0.942$, $\chi^2 =0.120$).

The underweight was higher for pupils from mothers with unskilled jobs (7.2%) than for the ones with skilled job mothers (1.4%). Similar result was obtained for fathers where the underweight level for the unskilled job parents' pupils was found to be 6.3%, but was 2.2% in pupils whose parents are doing skilled jobs. This is in keeping with findings elsewhere (Srivastava *et al*, 2012) and goes to show that economically empowered parents provide better nutrition and health for their off-springs. A study confirmed that better economic situation can be a primary cause for better growth of school children because economic situation usually influences the kind and quantity of food consumed (Ahmed *et al*, 2013).

The prevalence of overweight (4.1%) and at risk of overweight (1.7%) in this study was low when compared with children in developed countries. The reasonable cause is, those high calorie foods are hardly affordable. Another plausible explanation is that the Nigerian children may have been engaged in more physically demanding activities compared to their contemporaries in developed countries. Majority of the children walk to school daily regardless of the distance and this may have enhanced their physical activity level (Anniks and Leon, 2006). In the communities were this work was done, most of the mothers are farmers and most children accompany their

mothers to the farm and partake in farming activities. The results showed that majority of the pupils consumed carbohydrate diets as compared to proteins, fruits and vegetables; this is similar to what was obtained in some other studies (Ijarotimi and Odeyemi, 2012), the reason for this could be due to the high cost of protein rich foods, fruits and vegetables. A high proportion of the respondents took snacks in-between meals especially pastries. Few took either fruits or groundnut (legumes). The use of fruits and nuts as snacks should be promoted and made readily available in the homes. Access to sugar sweetened beverages that are patronized by a high proportion of children, which was reported in this study should be minimized in order to reduce their consumption. Frequent consumption of sugar sweetened beverages will increase the caloric in-take of the children and could result in weight gain which might predispose the respondents to overweight and obesity and their consequences.

The large proportion of normal weight school aged children when compared with the UNICEF child growth standards (2004) is encouraging as it indicates that over two-thirds of the respondents likely have optimal nutritional status.

CHAPTER FIVE

CONCLUSION, RECOMMENDATION AND CONTRIBUTION TO KNOWLEDGE

5.1 Conclusion

We found that among the children that were underweight and also, overweight clear majority of them (88.9%) were the 10 years old or less in Awka South Local Government Area, Anambra State, Nigeria. There is, thus, a need for public enlightenment towards promoting healthier lifestyle choices such as good nutrition and increased physical activities including screening of disease conditions early in childhood. In addition, the use of fruits and nuts as snacks should be promoted by making these readily available in the homes instead of the less healthy alternative of sugar sweetened beverages. This can be done by encouraging home and/or community gardening.

5.2 Recommendations

In Nigeria lack of awareness and Poverty seem to be at the center of the problem of childhood malnutrition. Malnutrition will continue to present a serious threat to the development and growth of Nigerian school-aged children and the future of national development, until the socioeconomic status of the vast majority of Nigerians improves significantly. There still exist significant variations in the level of maternal

and child malnutrition across rural/urban settings, geopolitical zones, and agro-ecological bands in Nigeria.

The researcher makes the following recommendations based on the findings of the study.

i. There is a pressing need for a national food consumption and nutrition survey, with resources and processes put in place to conduct one regularly. Starting from even primary school, Nutrition education is vital in educating households to engage in proper dietary practices for all household members, and most especially children in the formative stage of their lives. Specifically, there is urgent need to encourage the regular consumption of fruits, vegetables, animal proteins, eggs, and milk cannot be over emphasized.

ii. There is also a need to develop food composition tables that specifically capture the foods consumed by different people and groups. It is important to know what is consumed, what these foods are composed of, and in what quantities in order to make appropriate policy decisions, particularly on how to encourage certain value chains, or design interventions to plug nutrition gaps for vulnerable people groups.

iii. The Nigerian government needs to exert deliberate efforts to ensure compliance with food fortification standards of selected staple foods with Vitamins and Minerals.

iv. Better advertising, labeling and packaging of fortified foods needs to be engaged by the government and its partners so that even poorly educated households like those in this sample would be able to recognize these foods in order to be able to make informed nutrition choices.

v. Intensified nutrition education, dietary diversification and fortification, improved food production, processing, storage and handling techniques should be encouraged.

Suggestions for Future Research

Further epidemiological studies incorporating both school and non-school attendees are required to determine acute malnutrition.

5.3 CONTRIBUTION TO KNOWLEDGE

The nutritional status of school-aged children impacts their health, cognition, and subsequently their educational attainment. The school is an opportune setting to provide health and nutrition services to disadvantaged children and thus, influence nutrition interventions for this age group.

REFERENCES

Abidoye, R.O. and Ihebuzor, N.N. (2013). Assessment of nutritional status using anthropometric methods on 1-4 year old children in an urban ghetto in Lagos, Nigeria.*Nutritional Health*, 15:29-39.

Adekule, L. (2012). The effect of family structure on a sample of malnourished urban Nigerian children.Food and nutritionaffairs, population division New York.26:230-3.

Ahmed, F., Zareen, M., Khan, M.R., Bann, C.P., Haq, M.N and Jackson, A.A. (2013).Dietary patterns, nutrient intake and growth of adolesecent girls in urban Bangladash. Public Health Nutrition.1:83-92.

Ahmed, F., Bhuyan, A.H., Shaheen, N. Baruas., Margghs, B.M. and Jackson, A. (2014).Effect of sociodemographic conditions and growth of urban school children of Bangledesh. European journal of clinical nutrition; 45: 327-330.

Aisbitt, B. (2007). Facts behind the headlines Obesity – should we blame our genes? British Nutrition Foundation, London, UK *Nutrition Bulletin* 32 (3), 183–186.

Ajani, S.R. (2010). "An Assessment of Dietary Diversity in Six Nigerian States", Afr, J. Biomed. Res, Vol 13, 161-167.

Ake-Tano, O., Ekou, F.K., Tetchi, E.O., Koffi, K.B., Oussou, K.R., Kpebo, D., Coulibaly, T and Koffi, K. (2011).Determination de la malnutrition chez les enfants de moins de 5 anssuivisaI'institut national de santé publique Cote d' Ivoire. *Med. Afri. Noir*.58(2):93-99.

Akubugwo, E.I., Okafor, I.N., Ezebuo, F.C and Nwaka, A.C. (2013).Comparative Prevalence of Low Levels of Nutritional Indicators Using NCHS and WHO Reference/Standards.*International Journal of Research and Reviews in Pharmacy and Applied Science* 3(3): 413-431.

Alexander, C. (2012). Influence of socioeconomic and educational background of parents on their childrens' education.*International journal of scientific and research publications*, volume 3.

Amos, O. (2009), The Urban and peri-urban dairy industry: Research and Policy; International Livestock Research Institute (ILRI), Kenya.

Anastacia, N. and Teklemariam, A. (2011).Social-cultural and economic factors affecting primary education of Maasai girls in Loitoktok District, Kenya. *Western Journal of Black Studies* 88(2) 253–275.

Annik, S. and Leon, F. (2006). What is the relationship between child nutrition and school outcomes?

Anurage, S., Syed, E.M., Payal, M.S and Bhushan, K., (2012). Nutritional status of school aged children-A scenario of urban slums in India: Archives of public health. 70:8.

Anwar, H.N., Muhammad, I.Z. and Hussein, S. (2006).Health screening of primary school children; a case study of district Sargodha, Pakistan. Pakistan Journal of social sciences :4(1-2):40-47.

Asres, G. and Eldelman, A. (2011). L evaluation nutritionnelle des enfantsethopiens beta-Isreal: uneenquete transversal. *Col. Med. Heal. Sci*. 6(4):171-6.

Ayieko, M. and Midikila, K.F. (2010). Factors associated with stunting among children according to the level of food insecurity in the household: a cross-sectional study in a rural community of southeastern Kenya 15(1), 441.

Azubuike, J.C and Nkanginieme, K.E.O. (2007).Pediatrics' and Child Health in a tropic Region.2nd Edition. African Educational Services Owerri. 250.

Bellisle, F. (2004).Effects of Diet on Behavior and Cognition in children. *British Journal of Nutrition* suppl. 2: S227-S232.

Bener A. (2006).Prevalence of obesity, overweight and underweight in Qatari adolescents. Food and Nutrition Bulletin 27(1): 39-45.

Brown, P.H. (2006). Parental Education and Investment in Children's Human Capital in Rural China. *Journal Economic Development and Cultural Change*. Vol. 54: 759-89.

Cabello, B., Clay, T. & Davis, SM. (2008). Pathway, a school based randomized controlled trial for the prevention of obesity in American Indian school children. *American Journal of Clinical Nutrition, 78(5):* 1030-1038.

Cameron, N. & Demerath, E.W. (2006).Growth, Maturation and the development of obesity. Smithgorde. Publishers London. pp. 34-54.

Child Survival Partnership, (2013).The Lancet under nutrition series. Tracking progress on Child and Maternal Nutrition, A survival and development priority, Unicef 2009.

Chizoba,O. and Okeke, E. (2015). Nutritional Status of Preschool Children Aged 2-5 years in Aguata L.G.A. of Anambra State, Nigeria. International Journal of Nutrition and Metabolism 1(1)9-13.

Davis Kean, P.E. (2005).Family psychology institute for social research, USA; 19(2):294-304.

Ddungu, L (2011). Accomodation facilities and job performance of primary teachers in Rakai district. Unpublished dissertation Makerere University, Kampala, Uganda.

De Onis, M., Blossner, M. and Borghi, E. (2011). Prevalence and trends of stunting among pre-school children, 1990–2020. Department of Nutrition for Health and Development, World Health Organization, Geneva, Switzerland; 15(1):142-8.

De Onis, M., Onyango, A.W., Borghi, E., Siyam, A., Nishida, C and Siekmann, J. (2007).Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Org.* 85(9):660–667.

Eboh, L.O. and Boye T.E. (2006). Nutrition Knowledge and Food Choices of Primary School Pupils in the Niger – Delta Region Nigeria Department of Health and Physical Education, Faculty of Education, Delta State University, Abraka, Nigeria. *Pakistan Journal of Nutrition*; 5 (4): 308-11.

Eric, F.B. (2009). Long-term effects of parents' education on children's educational and occupational success; Medion family interactions, child aggression, and teenage aspirations. N. I. H. Public Access Merrill Palmer (Wayne State University Press). 55 (3); 224-249.

Federal health in the context of the intergrated maternal, Newborn and Child Health Strategy, Second edition.Ministry of Health (FMOH). (2011). Saving newborn lives in Nigeria: Newborn

Fiona, S.W., Mccullough., Seunghee Yoo and Paul Ainsworth. (2004). Food Choice, Nutrition Education and Parental Influence on British and Korean Primary School Children. *International Journal of Consumer Studies*, 28, (3): 235-244.

Florence, M.C., Asbridge, M. and Veugelers, P. (2008).Diet quality and academic performance. *Journal of School Health*.78 (4): 209-215.

Government Area of Ogun State, Nigeria (2008). Research journal of medical Sciences; 2(2): 61-64.

Grundy, S.M. (2009). Multifactorial causation of obesity. Implications of prevention *American Journal of Clinical Nutrition,* 67: 5635-5725.

Hassan, I, M. (2011). An assessment of nutritional status of the children of government Urdu higher primary schools of Azad Nagar and its surrounding areas of Bangalore: Archives of applied science research, 3(3):167-176.

Hassan, I. and Mond Abdul, H.A. (2011). An assessment of nutritional status of the children of government Urdu higher primary schools of Azad Nagar and its surrounding areas of Bangalore: Archives of applied science research, 3(3):167-176.

Ijarotimi O.S, Odeyemi A.O. (2012). Prevalence of food insecurity among rural communities and its effects on nutritional status of children (8-15 years) in Ondo state, Nigeria. Journal of medicine and medical sciences; vol 3(10); 005-015.

James, W.P., (2005). A Public health approach to the problem of obesity. *International Journal of Obesity and Related Metabolic Disorders,* 19: 537-545.

Joan, M.T. and Smrekar, C.W. (2009). Influence of Parents level of Education, influence on child's educational aspirations and attainment. *Br. J. Med Res.* 3:1062-73.

John, B. Pietsch. (2007). Measurement of Nutritional Status in Children with Cancer.

Kar, B., Rao, S and Chandramouli, B. (2008).Cognitive development in children with chronic protein energy malnutrition. Behavioural and Brain Functions. 4:31

Kasenene, E.S. (1999). Funding and the management of students' welfare at Islamic University in Uganda. Unpublished dissertation, Makerere University.

Kempster, L. (2006). Declaring war on obesity: a fight that can be won. Immerge consulting. *Medical Clinical Journal,* 6(3): 122-138.

King, A.C. (2009). Community intervention for promotion of physical activity and fitness. *Exercise and sport sciences reviews*, 19:211-259.

Kopelman, P.G. (2005). Clinical obesity in adults and children. Blackwell publishing. p. 493.

Mark, G.N. (2011). Issues in the conceptualization and measurement of social-economic background: Do different measures generate different conclusions? Social Indicators Research. 104 (2):225-251.

Maslow, A.H. (1943). *A preface to motivation theory*. *Psychometric* median York Harper and brother.

Maslow, A.H. (1963): *Toward a psychology of being* (2nd edition) Princeton Nor *strand*.

Mayo Clinic.(2008). Childhood obesity.www.ext.colostate.edu/pubs/foodnut09317.html.

Medhi, G.K., Barua, A. and Mahanta, J. (2006). Growth and Nutritional status of school age children (6-14years) of tea Garden Workers of Assam; journal of Human ecology: 19 (2):83-85.

Miliaela, T., Ann, M.F., David, A.H., Nancy, R. &Rafuel, P. (2009). Bio behavioural factors are associated with obesity in Puerto Rican children. *International Journal of Obesity, 22:* 62-66.

Ministry of Education Awka (2016). Official gazette: Records of schools and population: Ministry of education, Awka.

Mugenda, O.M and Mugenda, A.G. (2008). *Research Methods: Quantitative and Qualitative Approach*. Nairobi: Lake Graphics services.

Mwoma, B.T. (2013). Are educated fathers more involved in children education? Research findings on father's involvement in Gucha District, Kenya. *Prim. J. Soc. Sci*. 2(1):185-189.

Nades, D.R., Store, E.J. & Lythe, LA.(2009). Three year maintenance of improved diet and physical activity. *Arch pediatric and Adolescent medical journal,153(7):* 695-704.

National Population Commission (NPC) Nigeria.(2013). *Nigeria Demographic and Health Survey*. National Population Commission and ICF Macro. Calverton, Maryland, USA.

Njeru, H.N. and Orodho, A.J.(2003).*Access and Participation in Secondary School Education in Kenya*: *Emerging issue and Policy Implication*, Regal Press Kenya Ltd, Nairobi Kenya.

Odunayo, S.I and Oyewole, A.O. (2006).*Risk factors for malnutrition amongst rural Nigerian children*. *Asia Pacific Journal.* Clinical nutrition, 15:491-495.

Okoroigwe, F. and Okeke, E. (2009). Nutritional Status of Pre-school children aged 2-5 years in Aguata L.G.A of Anambra State. *International journal of nutritional and metabolism*. 1(1):009-013.

Okumbe, J.A. (2007).Educational Management: Theory and Practice. Nairobi University press. 30.

Olusoga O.J., Abisola, R.S. Oluwakemi, C.S. (2008). Evaluation of the nutritional status of primary one pupils in Abeokuta South Local Area of Ogun state, Nigeria. *Research Journal of Medical Sciences;* 2(2): 61-64..

OMS.(2010). Alimentation du nourrissonet du jeuneenfante. Aide-memoire N^0 342, GeneveSuise.

Oninla, S.O., Owa, J.A., Onayade, A.A. and Taiwo, O. (2007).Comparative study of urban and rural Nigerian school children.*Journal of Tropical Paediatrics*. 53 (1):39-43.

Onyango A.W. (2003). Dietary diversity, child nutrition and health in contemporary African communities. Rev. Comp. Biochem. Physiol., 136, 61-69.

Onzima, R. (2010). Parents' Socio-economic status and pupil's educational attainment. Case study of St. Jude Primary School in Malaba town council-Uganda. New York 16 December 1966 international covenant civil and political Rights.

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.

Phillips, J., Rolley, J and Davidson. P. (2012). Developing Targeted Health Services Interventions Using PRECEDE-PROCEED Model: Two Australian Case Studies. Nursing Research and Practice

Raheela, M.A. (2002). The Nutritional Status of School-Aged Children in an Urban Squatter Settlement in Pakistan. *Pakistan Journal of Nutrition* ; 1(3): 121-23

Raheela, M.A., Mian., Mohammed Ali., Paola A., Ferroni and Peter (2002). Underwood the Nutritional Status of School-Aged Children in an Urban Squatter Settlement in Pakistan. *Pakistan Journal of Nutrition*; 1(3): 121-23.

Reilly, J. (2005). Early risk factors for obesity in childhood: Cohort study. *British Medical Journal, 330, 1357* www.bmj.com.

Smith, L.C., Haddad L. (2000). Explaining child malnutrition in developing countries: A cross sectional analysis. Washington: International Food Policy Research.

Snowman, J and Blehler, R (2011): Psychology applied to teaching. Boston: Houghton Mifflin.

Srivastava, A., Mahmood, S.E, Srivastava, P.M. (2012). Nutritional status of school-age children-A scenario of urban slums in India; Archives of public health: 70(8).

Svedberg, P. (2010). An end to world hunger poverty and under nutrition. American *Journal of Public Health,* USA. 298

The Sunday standard. (2011). (online).www.sundaystandard.info

Theobald, H.E.(2004). A whole diet approach to healthy eating. *British foundation nutrition bulletin*; 29 (1): 44-9.

UNICEF Final report (2004). Socio-cultural and economic barriers to schooling in Southern Sudan.

UNICEF, (2006).*School sanitation and hygiene in Uganda*. The status of school hygiene in Uganda. Ministry of Education and sports.

United Nations (2009).*World mortality report*. Department of economic and social development.

United Nation Development Program (UNDP), (2013). Nigeria Millennium Development Goals Report, United Nations 2013.

Venkaiah, K., Damayanti, K., Nayak, M.U and Vijayaraghavan, K. (2002).Diet and nutritional status of adolescents in India. Eur.J. of Clinical Nutrition. 56:1119-25

Vivas, D., Saluja N, and Garg S.K (2010).Nutritional status of urban primary school children in Meerut, *The international Journal of Epidemiology*; 8(1).

Wang, Y., Beydoun, M. A., Li, J., Liu, Y and Moreno, L.A. (2010) Do children and their parents eat a similar diet? Resemblance in child and parental dietary intake: systemic review and meta-analysis. *Journal of Epidemiology and Community Health.*22

Wardlaw, G.M., Hampl, J.S., Disilvestron, AD. (2007). Perspective in Nutrition. (6th ed), McGraw Hill. New York, 250 – 255.

Williams, B.C., Philbrick, J.T., Backer, D.M. (2004). Patient based system for describing ambulatory medicine services using diagnosis clusters, *Journal of International Medicine, 6,* 57-63.

World Bank. (2005). World development indicators: The World Bank Group. (online) http://devdata.worldbank.org/wdi2005section1-7.html. Accessed on 2 Aug. 2017.

Zhang, J., Hebert, J and Muldoon, M. (2005).Dietary fat intake is associated with psychosocial and cognitive functioning of school-aged children in the United States. *The Journal of Nutrition*. 135:1967-1973

Zhuo Q, Wang Z, Piao J, *et al*. (2009). Geographic variation in the prevalence of overweight and economic status in Chinese adults.*Br Journal of Nutrition;* 102:413-8.

APPENDIX A

SECTION A: ANTHROPOMETRIC DATA SHEET

Data-recording form for Anthropometric measurements

Sex (M/F) _____ DOB (dd/mm/yyyy) _____

Age (months) _____

NAME	MEASUREMENTS	IST READING	2ND READING	AVERAGE	BMI
	Height (cm)				
	Weight (kg)				

QUESTIONNAIRE FOR RESPONDENTS

The purpose of the study is to assess the nutritional status of pupils in Awka South L.G.A, Anambra State.

SECTION B: ADMINISTRATION DETAILS

Name of interviewer …….

Name of school …….

Name of community ……..

Respondents name ……

Class ……

Date of interview ……..

SECTION C: DEMOGRAPHIC INFORMATION

Name of household	Relationship	Sex	Age	Education level	Marital status	Occupation

Relationship: Father, mother, grandmother, grandfather, sister, brother, aunt, uncle

Occupation: Unpaid family worker, unskilled private worker, unskilled public worker, skilled private worker, skilled public worker, business.

Education: Primary school, secondary, tertiary, no schooling

Sex: male, female

Marital status: married, single, separated, divorced

SECTION D: SOCIO-ECONOMIC STATUS

Tick the appropriate box as [ ]

1. Out of which material is the roof of your house made
   a. Mud[ ] b. Corrugated iron [ ] c. Tiles [ ] d. Grass [ ] e. Others (specify)……
2. Which of the following items does your family own?
   (a) Radio [ ] (b) television [ ] (c) bicycle [ ] (d) vehicle [ ] (e) others (specify)….
3. Which one of the following is the main source of fuel for cooking in your family? (a) firewood [ ] (b) charcoal [ ] (c) electricity [ ] (d) gas [ ]
4. Which of the following is the main source of lighting used in your family?
   (a) Electricity [ ] (b) lamp [ ] (c) candle [ ] (d) other (specify) ……
5. What is the main source of food for your family?
   (a) Own production [ ] (b) purchased from market [ ] (c) donations and gifts by churches, NGOs and government [ ] (e) other (specify)

6. Which is the main source of drinking water in your family?

   (a) Rain/tanks [ ] (b) stream/river [ ] (c) tap inside the house [ ] (d) tap in the compound [ ] (e) borehole [ ]

7. What type of toilet do you have at home? (a) traditional pit latrine [ ] (b) flash toilet [ ] (c) no toilet latrine [ ] (d) other (specify) ……..

SECTION E: FOOD CONSUMPTION PATTERNS

Food group consumed	Did you consume food from any of these groups in the last 24 hours (from this time yesterday to now?) include any snacks consumed (indicate yes or no)	What is the main source of the dominant food item consumed: own production purchases gifts from friends/ family borrowed gathering/wild others (speicify)
Type of food:		
Cereals and cereal products (eg maize, spaghettic, rice, wheet, bread, pasta		
Vitamin A rich vegetables and tubers: pumpkins, carrots, sweet potatoes, cassava		
Other vegetables (eg tomatoes, onions, cabbages)		
Vitamin A rich fruits: ripe, mangoes, paw-paw, watermelon, oranges		
Iron rich: liver, meat, egg		
Fish: dried fish, smoked or fried fish		
Pulse legumes or nuts (eg beans, cowpeas)		
Milk and milk products (eg cow milk and powdered milk)		
Oils/fats (eg butter, margarine)		
Sweets: sugar, honey sweetened juice		

SECTION F: NUTRITION PRACTICES

1. Do you drink water every day? (a) Yes [ ] (b) No [ ]
2. If yes how many cups/glasses do you drink per day? _____
3. Do you boil the water you drink in your home? (a) Yes [ ] (b) No [ ]
4. During which of the following occasion do you wash your hand?

Occasions	Indicate Yes or No	If No give a reason
After visiting the toilet		
Before handling food		
Before eating		

5. Where do you throw garbage at home? (a) Composite pit [ ] (b) open field [ ] (c) other (specify) ……..
6. Where do you take the food that remains at home after a meal?
   (a) Throw away [ ] (b) use the following day [ ] (c) nothing remains [ ]
   (d) Store the food and consume for the next meal [ ] (e) other (specify) …..
7. Are there clubs which support nutrition in your school? Name them

APPENDIX B

INTRODUCTORY LETTER TO THE RESPODENTS

Through

School of Health

Federal University of Technology

Owerri.

Dear respondent,

I am a student at the Federal University of Technology, Owerri taking MPH course. In partial fulfillment of the course requirement, I am conducting a research on 'The nutritional status of pupils in Awka South L.G.A, Anambra State'.

With regards I request you to spare a few minutes to fill in the questionnaire as diligently as possible. The information in this questionnaire will be strictly confidential and will not be used for any other purpose than for this research. Your assistance in facilitating this research will be highly appreciated.

Yours faithfully,

Ezennia, Chidimma Jane.