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MEETING THE DIETARY NEEDS OF ADOLESCENT BOARDING SCHOOL STUDENTS: A CASE STUDY AT OPOKU WARE SENIOR HIGH SCHOOL IN THE KUMASI METROPOLIS, GHANA

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AUGUST, 2016

DECLARATION

STUDENT'S DECLARATION

I hereby declare that apart from the references to other people's work which have been duly acknowledged, this project work is of the result of my own original investigation and that no part of it has been presented for another degree in this university or elsewhere.

Name of Student:

Helen Koufie (7114180022) ……..…….....…… ……..…...…….
Signature Date:

SUPERVISOR'S DECLARATION

I hereby declare that the preparation and presentation of this project work were supervised in accordance with the guidelines on supervision of project work laid down by the University of Education, Winneba.

Signature: ……..... Date: ……

(PROF. S. B. OWUSU-MINTAH)

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DEDICATION

This work is dedicated to my mum, Madam AyishetuYusif Dadzie, for her immense support for my educationand my brother Akwesi Opoku Asamoahfor the love and care he gave me during my postgraduate education.

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ABSTRACT

This work examined the dietary needs of adolescents who are boarders in a second cycle institutions in the Kumasi Metropolis. The specific objectives were to: outline the types of meals taken in the dining hall of the institutions; identify factors that determine the provision of adequate meals in the boarding institutions; and assess the perceptions of the students towards the meals taken at the dining hall of Opoku Ware Senior High School. The study employed mixed methods and used questionnaires and personal interviews to collect data on the dietary needs of the students from a sample of eighty students, ten kitchen staff and one tutor of the school. Data were meticulously gathered on key variables such as age, sex, and educational status of the kitchen staff using written questionnaires and double entered into SPSS version 16 installed on windows XP. The study revealed that meals provided at the dining hall for the students, contained all the important food groups, though the students were dissatisfied with the quality and quantity. The study also found out that inadequate and unreliable government subvention was a major constraint in the provision of adequate meals in boarding institutions in the country. It was also revealed that the students purchased other foods such as *kenkey*, *banku*, rice and beans whilst in school to supplement the meals provided at the dining hall. From the findings, recommendations made included the need for intensification of nutrition and health education in second cycle institutions on the consequences of meal skipping by the Ghana Health Services, so that these adolescent students could improve their concentration in class for better performance, having been adequately fed at the dining hall.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Second cycle education is the next level of education one go through immediately after Basic education. Institutions which offer second cycle education are known as second cycle institutions which can either be senior high or vocational/ technical school, comprised boarding and non-boarding in Ghana. According to the United Nations Educational Scientific and Cultural Organisation (UNESCO), well-managed boarding schools provide good nutrition, hygiene, sanitation, a balance daily routine of personal care, sports and recreation and study habits that children introduce to their own homes and families and to their lives as adults (UNESCO, 2005).

Students in non-boarding institutions stay with either their parents or guardians and spend about six hours each working day in school. Numerous studies have outlined the relationship between nutrition and academic achievement as well as students' behaviour, yet authorities in both health and educational sectors in Ghana give little attention to nutrition, in spite of the massive poor academic performance in schools. Students in these institutions are within the age group of 15-19 years, with some younger or older than the required age. By the WHO definition of an adolescent; a person between 10-19 years of age, majority of these students are in their middle (15-17) and late (17-21), adolescence (WHO, 2005).

Students in second cycle institutions are generally considered to be old enough to control what they eat. Parents hardly provided "take away" meals (non-boarding students), some instead provide money to purchase food whilst on campus. Those in boarding institutions may send easy to prepare dishes such as gari, shito, sardine, etcetera to augment the three square meals provided by the school. At this stage of the life cycle, what is consumed is greatly influenced by: peers, mass media, social and cultural norms, lack of nutrition knowledge while the influence of the family tends to decline (Forthing, 1991; Johnston & Haddad, 1996; Spear, 1996). This can lead to poor quality diets which are low in calories and most essential nutrients.

Mostly adolescent girls are at risk of inadequate intakes for various reasons: dieting, discrimination, early pregnancy, lower energy intake than boys (Dennison & Shepherd, 1995). The growth spurts during adolescence contribute about 15 to 20% to final adult height up to 37% of total bone mass maybe accumulated and approximately 50% to adult weight (Rees & Christine, 1989; Berdainer, 2001; Key & Key, 1994). Nutrition influences growth and development throughout infancy, childhood and adolescence; it is however, during the period of adolescence that nutrient needs are the greatest (Lifshit, Tarim& Smith, 1993), except pregnancy and lactation (Whitney & Rolfes, 2008). Optimal nutrition is a requisite for achieving full growth potential (McAnarner *et al*, 1992) and failure to consume an adequate diet at this time can result in delayed sexual maturation and can arrest or slow linear growth, adolescence provides an opportunity to prepare for a healthy productive and reproductive life, and to prevent the onset of nutrition-related chronic diseases in adult life, while addressing adolescence specific nutritional problems originating in the past (WHO, 2005). With a multitude of after

school social and job activities, they almost inevitably fall into irregular eating habits (Whitney & Rolfes, 2008).

Majority of adolescents in developing countries enter adolescence undernourished or malnourished, making them more vulnerable to disease and early death (MO-NUPA, 2011) and nutrient deficiencies. Some dietary patterns are consistently observed among adolescents and put them at risk of unhealthy eating: the consequence of snacking, usually on energy-dense but otherwise nutrient poor items: meal skipping, irregular eating pattern; and a wide use of fast food for meals and snacks. Other eating behaviours generally recognized as common among adolescents are eating away from home, and low intake of fruits and vegetables (Forthing, 1991; Pery-Humicuft & Newman, 1993; Gutierrze & King, 1993).

Although, there is a 7-year (2009-2015) National Strategic Plan for the Health and Development of adolescents and Young people, there is inadequate information regarding adolescents' dietary intake and nutritional status in Ghana. Most data are reported on fertility age group (15-49) years mostly for women and others on STIs and social factors with very little attention to dietary intake and nutritional status. The 2008 GDHS indicate the national nutritional status of women age 15-19 years to be 16.2% thin and 10.3% overweight and obese with no corresponding record for men (GDHS, 2008), it also indicated that the proportion of teenagers that have started childbearing has stayed at the same level of 13-14 percent in the past decade (1988-2008) (GDHS 2008). A study in 2011 on 100 adolescents in upper primary school children indicate 10% underweight, 7% at risk of becoming overweight and 4% overweight (Kubreizia

et al, 2011). However, the same study revealed that 65% of the participants' diet lack variability which contradict two early findings in 2010 that adolescents' consumed varied food items rich in various nutrients (Sarkah et al, 2010).

1.2 The Study Area

Opoku Ware Senior High School is located at Santasi in Kumasi. It was the first Catholic boys' school to be established in the Ashanti Kingdom. Although it is the second all boys school in the region, until its establishment, the youth from the Ashanti Kingdom and the Northern part of Ghana who wanted Catholic education had to travel south across the Pra River to attend secondary schools in the south. This meant that members of the Catholic Church who wished to have their children educated in accordance with Catholic traditions had to send them to St. Augustine's College or Holy Child College, both in Cape Coast. The original plan to establish a secondary school in the Kingdom at the initiation of the King, called for one school jointly with the Catholic Church, Methodist and Presbyterian Churches. The Catholic Church opted out of it and asked the King's blessing for the establishment of a separate school for the Catholics.

At a meeting held on 31 January 1951, a decision was taken to build a Roman Catholic Mission secondary school. The government was to provide all the funds for the building of the school. The school was meant for 360 students with a possible expansion to the Sixth Form. It was to be developed according to a ten-year development plan, and the final cost was estimated at £250,000. An expatriate construction firm, Fry, Drew and Company, was awarded the contract to build classrooms, dormitories, laboratories, and administration block and staff bungalows.In addition to the housemaster, each house

has a house prefect and an assistant.who are chosen from the oldest year. There are house gatherings once a week and usually happens in the morning before classes. The housemaster and boys had an opportunity to make announcements during house meetings; the boys get the opportunity to voice their views and express grievances.

Each house participates in weekly morning mass at the school chapel on rotational basis. Many inter-house competitions occur, mostly in the field of sport. For much of the school's history, first year boys have to act as servants, to older boys. Their duties mostly included cleaning and running errands for their seniors.

1.3 Statement of the Problem

Although the importance of school feeding in health and nutrition is well recognized, little work has been done on the nutritional quality of diets consumed by students in second cycle boarding institutions. The paucity of information on the dietary diversity and nutritional status of adolescents in Ghana is serious and merits further investigation. This study thus seeks to examine the dietary diversity and nutritional status of boarding students in Kumasi Metropolis. Their nutritional status will be compromised if their diet is not diverse, hygienically prepared and consume, the portion size consumed and not engaged in physical activity. The capacity of second cycle institutions to provide good nutrition is uncertain. Therefore, the study investigated meals in the selected school.

1.4 Objectives of the Study

The main objective of this study is to examine the dietary needs of adolescents who are residential in a second cycle institutions in the Kumasi Metropolis, while the specific objectives are to:

- outline the types of meals taken in the dining hall of the institutions;
- identify factors that determine the provision of adequate meals in the boarding institutions; and
- assess the perceptions of the students towards the meals taken at the dining hall of Opoku Ware Senior High School.

1.5 Research Questions

The study will attempt to answer the following questions:

1. What types of meals are taken in the dining hall of this second cycle institutions?
2. What factors determine the provision of adequate meals in the boarding institutions?
3. What are the perceptions of the students towards the meals taken at the dining hall?

1.6 Significance of the Study

There is paucity of information on the dietary and nutritional status of adolescents in senior cycle institutions in Ghana. The information gathered from this study may guide in menu planning and general decision making in various second cycle institutions. The findings would be useful to other institutions including the Ghana health service, organizations that are into school feeding and adolescent health programs such as

World Food Program (WFP), Association of Church Based Development Projects NGOs (ACDEP), and Catholic Relief Service (CRS).

The high dietary requirements of nutrients for this delicate period in the lifecycle cannot be overemphasized. Additional concentration therefore needs to be paid to this group because they are in a transitional period where puberty begins and develops habits which may probably be maintain in later life. Findings of this study would be critical in designing of targeted programs to prevent intergenerational malnutrition which is a menace to the battle against malnutrition in developing countries. The extra demands of nutrients to support the rapid growth spurts associated with puberty is very critical in order not compromised growth and development as well as prevent complications in later life. Moreover, information on the nutritional status and dietary of adolescents is scarce and the growth references for this age group are inadequate. Therefore when more information is gathered, it will add up to the existing information which could serve as a guide for future research works in this field and similar fields.

The findings of this research may be essential in the future research on individual dietary diversity and inclusion of local foods on the 24-hour dietary recall tool. Information will be gathered on factors influencing provision of adequate diets in boarding institutions. In addition, the information will be core in assessment regarding the effects of residential status of students in second cycle institutions on their nutritional requirements and dietary habits.

1.7 Delimitations of the Study

The study should have covered as many Senior High Schools as possible to allow for comparison of meals between two or more senior high schools, but due to time and resource constraints, the study will be limited to Opoku Ware Senior High School in the Ashanti Region of Ghana. It will also be limited to kitchen staffs and students in the selected school only.

1.8 Organization of the Report

This report will be organized into five chapters. It starts with chapter one which talks about the background of the study, problem statement, aim and objectives of the study, significance of the study and delimitations. Chapter two dealt into literature surrounding the area of the study. Chapter three covers the methodology used in gathering data for the study. The findings of the survey are presented and analysed in chapter four, while chapter five covers summary of the key findings, conclusion and recommendations made.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers a review of literature on nutrition and feeding of students in boarding school. The literature review covers the concept of malnutrition, dietary diversity, measuring nutritional status and dietary intake of adolescents, food habits of adolescents in developed and developing countries, and health related factors affecting adolescents .Also discussed in this chapter is the conceptual framework used for the study, which is an adapted version of the conceptual model of food access (Sharkey *et al*., 2010).

2.1 Nutritional and Dietary Needs of the Adolescent

The period of adolescence is a time of very rapid growth and high demands for nutrients and energy. The rapid growth period starts at the age of 10 or 11 for girls and at the age of 12 or 13 for boys and continues for about 2.5 years. Adolescents need high intakes of calories, vitamins and minerals, especially iron, calcium, vitamins A, C and D. During this time, boys and girls begin to reach puberty (gaining sex characteristics to mature into men and women) and nutritional needs start to differ, although good nutrition is essential for both sexes to grow into healthy adults. Energy needs of adolescents are influenced by activity level, basal metabolic rate, and increased requirements to support pubertal growth and development. Basal metabolic rate is closely associated with the amount of lean body mass. Adolescent males have higher

caloric requirements since they experience greater increases in height, weight, and lean body mass than females (Story *et al*, 1992).

One day dietary recall data from the third National Health and Nutrition Examination Survey (NHANES III), 1988-94 showed a mean energy intake of 1793 calories/day for females ages 12-19 and 2843 calories/day for males ages 12-19(Troiano *et al*, 2000). Using CSFII data, Subar and colleagues (Subar *et al*, 1998) showed the top 10 sources of energy among teens were milk, breads, cakes/cookies/donuts, beef, cereal, soft drinks, cheese, chips, sugar, and chicken. In NHANES III, beverages provided 21% of energy intake, with soft drinks alone providing 8% caloric intake among adolescents. The adolescent growth spurt is sensitive to energy and nutrient deprivation. Chronically low energy intakes can lead to delayed puberty or growth retardation (Pugliese *et al*, 1983; Lifshitz, 1988) Insufficient energy intake may occur because of restrictive dieting, inadequate monetary resources to purchase food, or secondary to other factors such as substance abuse or chronic illness.

Foods that contribute the most carbohydrate to the diets of adolescents include (in descending order) yeast bread, soft drinks, milk, ready-to-eat cereal, and foods such as cakes, cookies, quick breads, donuts, sugars, syrups, and jams (Subar *et al*, 1998) Major sources of total and saturated fat intakes among adolescents include milk, beef, cheese, margarine, and foods such as cakes, cookies, donuts, and ice cream (Subar *et al,* 1998). Milk for instance, provides the greatest amount of calcium in the diets of adolescents, followed by cheese, ice cream and frozen yogurt (Subar *et al*, 1998). The most common

dietary sources of iron in diets of adolescents included ready-to-eat cereal, bread, and beef.

The top five dietary sources of vitamin A in the diets of adolescents are ready-to-eat cereal, milk, carrots, margarine, and cheese. Beta-carotene, a precursor of vitamin A, is most commonly consumed by teens in carrots, tomatoes, spinach and other greens, sweet potatoes, and milk (Subar *et al*, 1998). On average, adolescents who use tobacco and other substances have poorer quality diets and consume fewer fruits and vegetables, which are primary sources of vitamin C. Adolescents are also noted of their excessively unhealthy foods and drinks, adolescents also do not consume enough nutritious foods. Numerous studies have found that adolescents do not eat nutritious foods.

In one study, only 2% of children were found to meet the dietary nutrient required (Story &Neumark-Sztainer, 2005).These eating habits, if not corrected, can continue well into adulthood (Shaw, 1998; DeBate, Topping, & Sargent, 2001). Adolescents who eat with their families generally consume more nutritious meals throughout the day, compared to those who eat alone or with friends (Story &Neumark-Sztainer, 2005). According to Delisle *et al.*,(2004), iron, zinc, calcium and vitamin A are key deficiencies among adolescents. The health status of an individual in general depends largely on his/her nutritional status which intend is being influence by eating pattern, lifestyles factors, and infection in few cases, past malnutrition, low body nutrient stores and teenage pregnancies.

2.2 The Concept of Dietary Diversity

Dietary diversity refers to the number of foods consumed across and within food groups over a reference time period (Ruel, 2003). Dietary diversity is a qualitative measure of food consumption that reflects households and institutions access to a variety of foods, and is also a proxy for nutrient adequacy of the diet of individuals (FAO, 2011). Dietary diversity (DD) relates to nutrient adequacy (coverage of basic needs in terms of macro and micro nutrients) and to diet variety/balance, which are two of the main components of diet quality. DD is thought to reflect the adequate intake of essential nutrients either at the household level (HDD), in which case it can be measured by a HDD score (HDDS) or by a Food Consumption Score (FCS), or at the individual level (IDD), in which case it can be measured by an IDD score (IDDS) (UNSCN, 2008).

A study in Iran used a dietary diversity score adapted from the DQI-R to consider dietary adequacy amongst adolescents aged 10 to 18 years old showed that the dietary diversity score correlated well with the mean adequacy ratio for 12 nutrients ($r = 0.42$, $P<0.001$) and that there was a statistically significant correlation between the nutrient adequacy ratios of most nutrients with the dietary diversity score (Mirmiran et al., 2004). Hence, dietary diversity has long been recognized by nutritionists as a key element of high-quality diets. Increasing the variety of foods across and within food groups is recommended by most dietary guidelines, in the United States (U.S.Department of Agriculture Human Nutrition Information Service 1992) as well as internationally (WHO/FAO, 1996), because it is thought to ensure adequate intake of essential nutrients and thus to promote good health. Additionally, with the current recognition that dietary factors are associated with increased risks of chronic diseases,

dietary recommendations promote increased dietary diversity along with reducing intake of selected nutrients such as fat, refined sugars, and salt (Ruel*et al*, 2002).

2.3 Dietary Pattern and Nutritional Status of Adolescents

Several studies mostly in developed countries outlined that adolescents engaged in unhealthy dietary patterns such as snacking, skipping meals, low intake of fruits and vegetables, milk and dairy products, as they strive to establish themselves as adults in society. According to the National Adolescent School Health Survey (US Dept Health and Human Services, 1989), more than 50% of the respondents missed breakfast, 90% snack, with only 39% reported eating nutritious snacks. A study in Austria (Nowak &Speare, 1996) indicated inadequate intake of fruits, vegetables and dairy products among adolescents. In the USA, adolescents frequently had intake of vitamin A, vitamin E, calcium, magnesium and zinc below recommended levels (Johnson et al, 1994). In Nigeria, for example, it was reported that street foods contributed 21% (boys) and 29% (girls) of adolescents' energy intake, 50% of dietary protein, 64% of calcium, and almost 60% of vitamin A (Oguntona& Kanye, 1995)

According to Gursoy *et al*, (2008), a psychosocial factor that affects almost all of the students is the "taste and sensory perception of food". The second noticeable factor is the "health and nutritious value of food". The time conserved and the convenience in the preparation of food is one of the lifestyle factors that affect more than half of the students. The cost of the food was also found to have an effect. Among the third group of factors categorized as "media", the leading factor is advertisement, effective in one

third of the students. Among boys and girls, there was no statistical difference in the type of meal skipped.

2.4 Malnutrition among Adolescents in Ghana

The 2008 GDHS indicated that the nutritional status of women age 15-19 years is 16.2% thin and 10.3% overweight and obese with no corresponding record for men (GDHS 2008). It also indicated that the proportion of teenagers that have started childbearing has stayed at the same level of 13-14 percent in the past decade (1988-2008) (GDHS 2008). A study in 2011 on 100 adolescents in upper primary school children in Tamale indicated 10% underweight, 7% at risk of becoming overweight and 4% overweight (Kubreizia *et al*, 2011). However, the same study revealed that 65% of the participants' diet lack variability which contradict two early findings in 2010 that adolescents' consumed varied food items rich in various nutrients (Sarkah *et al*, 2010)

2.5 Dietary Patterns of Students in Boarding Schools

Selection and choice of food is determined by an individual's dietary patterns. However, group dietary patterns are those aspects of food habits which deal with the number of meals eaten by groups such as those in boarding houses, who prepares the food, what times of day the food is eaten and who eats with who (Barasi *et al*, 1987). The food patterns of a country are moulded by her agricultural resources, technological progress, buying power and cultural patterns (Krause *et al*, 1972). In addition, the socio-economic conditions, nutrition knowledge and food related attitudes are known to influence food patterns (Sukhumsivum *et al*, 1998). The number of meals prepared and their timing during the day is also culturally determined. Barasi and Mottram(1987) found that

people in the Western countries such as the United States accept the pattern of three meals a day, such as that given to students in boarding school, as normal, but in some cultures as found by Uddoh, (1980), as few as one meal a day is eaten in some homes.

Messer (1989) also observed similar patterns in other African societies. She found that for most of the day, such families fed on palatable wild fruits to alleviate the accompanying hunger brought about by this pattern of eating. As well as prescribing how many times meals can be eaten, cultural identity also determines who should eat with whom and what portion of the food each member should eat. Unlike the structures of Western meals, Ghanaians do not often differentiate between foods for breakfast, lunch and supper. However, this is not so in boarding schools, where breakfasts are lighter than lunch and dinner. It could also be noted that in some Ghanaian homes, left over foods from the previous evening's meal might be eaten for breakfast the following day. Specific foods are not reserved for specific courses within a meal because all dishes are served and eaten simultaneously. Fruits normally do not form part of the normal meals in the Ghanaian home. They are usually eaten as snacks when they are in season and are cheap. Students from low or middle income families or from families where mothers work outside the home may have meal patterns similar to the one described above.

Even so Stare and McWilliams (1977) found that the increasing independence and mobility of adolescents lead to modification of their dietary patterns. The influences of parents no longer completely dominate and determine food consumption, hence when students leave their homes for boarding houses, their dietary pattern changes. Guthrie

(1971) has presented factors that may contribute to the poor food habits observed during the teen years as failure to eat breakfast or some other meal of the day, lack of time for regular meals, drinking no milk, lack of supervision in the selection of meals, eating away from home, an overriding fear of obesity especially among girls and a concern that certain foods will aggravate adolescent acne. Most of these factors may not be applicable to Ghanaian adolescents.

2.6 Developmental Characteristics of Adolescents that Affect Food Habits

Adolescence is a range of years during which the individual grows from a child to an adult (Runyan, 1976). Psychologists identify this period as a stage during which the individual attempts to develop an understanding of himself and to find a way of relating to the adult world. The nutritionist, however, views this period as a time for significant growth in a physical sense rather than the psychological growth involved in the development of self-identity (McWilliams, 1975; Hurlock, 1978). According to McWilliams (1975), adults become very concerned about the adolescent period because behaviour patterns at this time are different from other times in the life of the individual. For instance, for many adolescents, the peer group is the dominant influence on thought and behaviour and therefore, most teenagers' food habits are influenced by the peer group. (Runyan,1976). Again Hamilton and Whitney, (1988), identified adolescence as a well-known time of rebellion which extends to all aspects of life styles including feeding. Mead, (1943), noted that adolescents demonstrate their independence by refusing to eat what is good for them. Lavik, (1981), also showed that this period is one of increasing social activity. This often leads adolescents in boarding

schools to reject foods they consider to be monotonous or unpalatable and can be a cause for strikes or demonstrations.

These activities, according to Spindler (1963), may keep them away from home longer. Their need for establishing independence from parents and their mobility lead to some modification in their dietary patterns (Hurlock, 1978), which Spindler (1963), found to have changed their food habits for the worse. At this period also, the body image (the total spontaneous inner feelings and concepts of the body), is of special importance to them (Lavik, 1981). Lavik reported that the role played by this body image in the life of the adolescent, serves as an important bridge to food, eating habits and nutrition and that a kind of equilibrium exists between identity, body image and nutrition. Changes and disturbances in any of these aspects may have a far reaching effect on the other. For instance, an identity crisis in an adolescent provoked by psychological problems in the family may result in either obesity or anorexia nervosa. On the other hand, nutritional deficiencies can burden the adolescent and her family with psychological problems and social conflicts.

The changes in body shape and size and the development of other related structures during adolescence begin in individual girls at any age from eight to thirteen years. In boys, such changes occur approximately two years later (Whitney &Cataldo, 1983). Meredith (1967) noted that in addition to the variation in the timing of adolescent changes, the sequence of these changes is different in each individual. This wide variation, as observed by Dwyer (1981), causes much concern to the adolescent because

he dislikes being too different from his peers. Early as well as late maturation may cause psychological problems too, especially with boarding students..

2.7 Nutrient Needs of Adolescents in Boarding School

Adolescents vary in their nutritional needs as well as in the timing of growth and maturation, especially in boarding school (Basley *et al*., 1968). The most obvious difference is an increase need for nutrients during the adolescent growth spurt regardless of the age at which this occurs. The increase in girls' nutritional needs is correspondingly early since they generally begin their pubertal changes about two years earlier than boys. The Food and Nutrition Board of the National Academy of Sciences of the United States has given the recommended dietary allowances separately for boys and for girls, with higher figures for boys. Stare and McWilliams (1977) justified the higher figure for boys by the rapid growth rate, greater ultimate body size and generally greater physical activity of boys during this period. They also observed that males experience very rapid gain in lean tissue and in mineral skeleton with resulting increases in needs for protein, iron, calcium and zinc, which reside in lean body mass or skeleton.

Females also experience a smaller increase in lean body mass but greater increase in adipose tissue and thus their needs for these nutrients are less (Dwyer, 1981). The recommended allowances for calories, proteins, calcium and iron for the Nutrient requirements in this second decade of life are more closely related to physiological than chronological age since they are affected by growth and the resulting alterations in body composition and physiology. Adolescence is thus a critical period for proper nutrition, especially when they are not within parental control. Adequate

nutrition during adolescence can improve the lives of tomorrow's children. Adolescent boys and girls who have poor dietary habits may suffer improper growth of body organs and systems and any children born of such boys and girls even in their adulthood may be adversely affected (Mcginly, 1980). Hence the nutrient needs of adolescents in boarding school should be taking care of for them to grow normally.

2.8 Nutrition Knowledge of Adolescents in Second Cycle Institutions

Indusogie *et al*., (1980), mentioned that there is a need to develop a level of sound public knowledge and responsible understanding of food that will promote maximum nutritional health. According to them, in order to utilize food to the greatest benefits, the individual must have some basic understanding of food and nutrition. Even though nutrition is one of the oldest and most practised science by man, many people, especially students in second cycle institutions, who are neither studying home economics nor the health and biological sciences, have little or no basic understanding of food and nutrition in relation to requirements for health (Indusogie *et al*., 1980) A survey done in the United States indicate that young children have a fairly good grasp of the basic principles of nutrition and are both receptive to and capable of learning more about nutrition and its relationship to health.

For instance, surveys conducted by the International Food Information Council (IFIC) of 9-15 year olds show that children in this age group demonstrated a good understanding and awareness of the basic principles of nutrition and health. The majority in the survey were found to be familiar with the basic food groups and could identify all of them. Also a study of 5116, 5-18 year old school children, showed that

most of those surveyed were generally aware of the health effects of dietary fat, fibre and cholesterol (Resnicowet*et al*., 1991). Studies done in Ghana by Agyeman-Mensah(1980) and Duwuona-Hammond (1978) showed that students who study science subjects had only fair knowledge in nutrition. The studies also showed that location and seasonality affected access to nutritional balance in food available to adolescents, especially those in boarding houses. This therefore leads us to the conceptual framework for this study, which is a model of food access.

2.9 The Conceptual Framework

As mentioned earlier, the conceptual framework for discussing this study was based on the food access model by Sharkey *et al*. (2010), shown in Figure 2.1. This conceptual model is based on the work on access to healthcare and provides a framework for understanding food access to households and boarding schools. This model shows that access to healthful or healthy food is the result of the relationship between the retail food environment and potential consumers. It suggests that food choice and healthful eating are influenced by available (potential access) and utilized (realized access) shopping opportunities as well as intermediaries (facilitators) in the food supply chain. Characteristics of the food environment include the number, type, size, and location of food stores; availability (supply) of food categories (e.g., fresh fruits); and variety of different items within a category (e.g., different types of fresh fruits). Others include the price, quality of food items as well as availability of government subsidy (barrier) to supplement what boarding students pay for feeding.

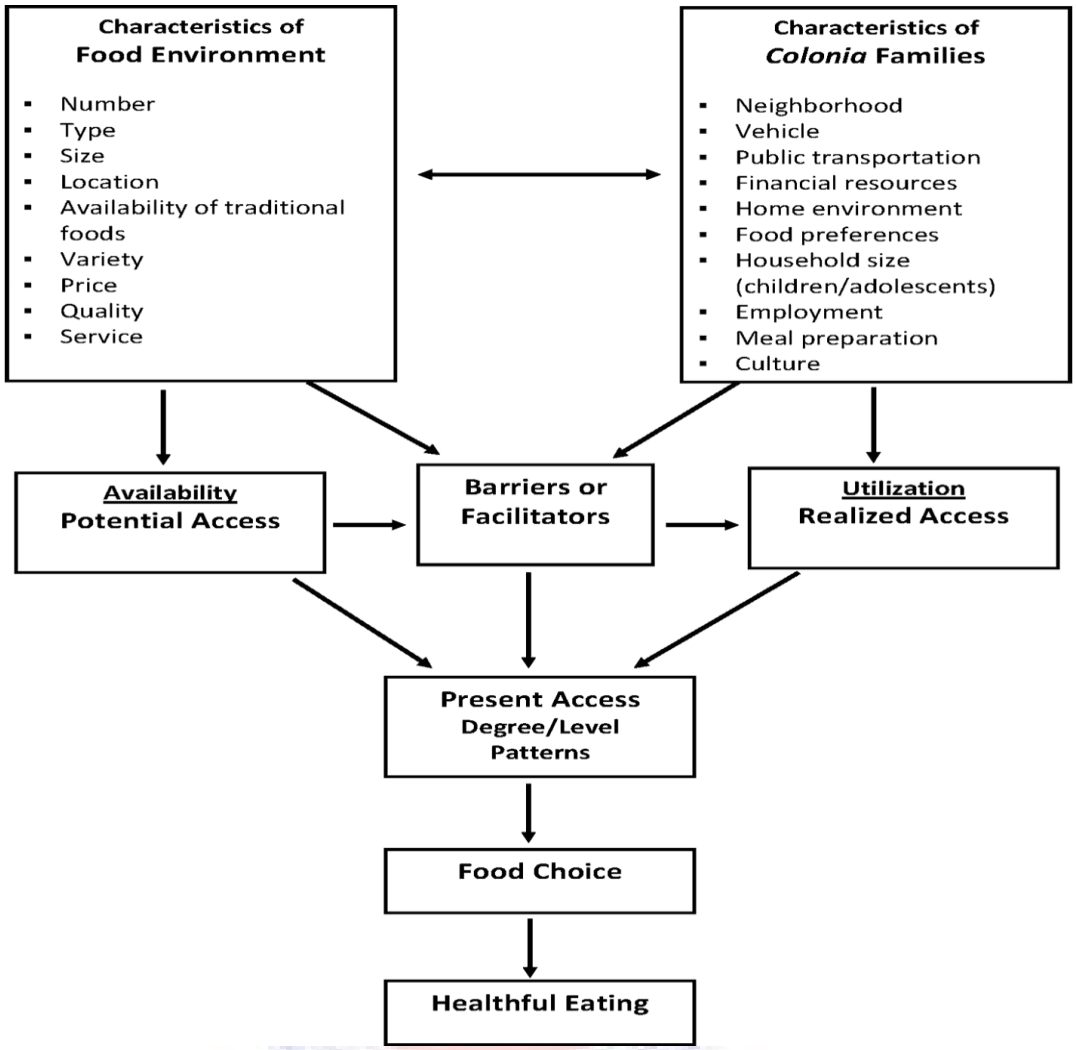


Figure 2.1: The Conceptual Model of Food Access

Source: Sharkey et al. (2010).

In the study area, food for the boarding schools is available in larger quantities, and transportation is not much of a problem due to good roads to food production areas .However, the situation is not the same during the lean season, when some food items are not available. Especially fresh fruits and vegetables such as oranges, water melon that provide vitamins to the adolescent students are not available most parts of the year,

when they are not in season. These problems (barriers) may affect access to food available to students in boarding schools.

2.10 Conclusion

The literature review has covered important topics in nutrition in meals available to adolescents in boarding schools. The subtopics reviewed included nutritional and dietary needs of adolescents, the concept of dietary diversity, which is a qualitative measure of food consumption that reflects households and institutions access to a variety of foods. Other topics reviewed were Dietary Pattern and Nutritional Status of Adolescents in various countries including the USA, Austria and malnutrition among adolescents in Ghana. Also discussed were developmental characteristics that affect food habits and nutrient needs of adolescents in boarding school as well as nutrition knowledge of adolescents in second cycle institutions. The chapter ended with a discussion of the conceptual model of food access, which constituted the framework for discussing the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The study was an analytical study conducted to examine the dietary intake and nutritional status of resident students in Opoku Ware Senior High Schools in Kumasi Metropolis. The study also explored factors affecting the provision of adequate diet in this institution. Data for the study were collected from 18th to 28thNovember, 2015.

3.2 Research Design

The study employed mixed methods of quantitative and qualitative analysis, with the use of questionnaires and personal interviews to collect data on the dietary needs of the students and its effect on their performance. These approaches were adopted because they offered the best means of obtaining valid data for the study. The advantages of the research methods and tools far outweighed their disadvantages in sourcing and analysing data from the field. Best (1991) described qualitative studies as those in which the descriptions of observation is not ordinarily expressed in quantitative terms but not suggesting that numerical measures are never used; rather, other means of descriptions are emphasized. Sidhu (2002) and Altrichter, Posch, and Somech (1995) explain that qualitative research emphasizes holistic description of whatever is being observed rather than comparing the effects of a particular treatment while Ary, Jacobs and Razavie (2002) assert that qualitative inquiry seeks to understand human and social behaviour from the “insider’s perspectives”. This means that in qualitative inquiry,

there should be vivid description of phenomena. According to Best (1995), qualitative inquiry seeks to portray the complex pattern of whatever is studied in sufficient depth so that whoever has not seen it may have the opportunity to understand whatever is being studied. The study adopted the case study approach for in-depth study of how, why and what of diet that students at this level of the educational level have and its effect on the wellbeing of the students.

Description of data in this kind of research design method according to Cohen and Manion (1997) emphasizes data in the form of words rather than numbers. That is to say, emphasis is on rich description of people, events and whatever happens in the research setting. This means that in qualitative inquiry, data must be thoroughly described in detail so that "outsiders" may be able to understand whatever has been done. On the other hand,there is room for collection of data in numerical terms although this may be done in rare cases. This is in line with Hitchcock and Hughes' (1995) assertion that qualitative research deals in words and meanings while seeking to maximize understanding of events and facilitating the interpretations of data. This brings in Ary, Jacobs and Razavieh's (2002) explanation that the purpose of qualitative research which emphases the typically rich descriptive and subjective character of data, makes qualitative data analysis a very different enterprise than statistical analysis.

3.3 The Target Population and Sample Size

Population in research refers to the aggregate or totality of objects or individuals regarding which inferences are to be made in a sampling study (Sidhu 2002). The total population of adolescents who are in study institutions within the Kumasi Metropolis

is 951 comprising boys. However, due to resource constraints, a sample size of 317 was calculated at 95% confidence interval, with a precision of 5% and a power of 80%. Students were stratified and categories as boarding and non-boarding students. The Opoku Ware Senior High Schools was purposively selected for the study. After calculating the number of students to be selected from each participating school, the number of students to be selected from each class all boarders that would add up to reach the sum that has been selected with systematic and simple random sampling technique. This yielded 80 as total number of respondents surveyed.

3.4 Sampling Technique Used

According to Sidhu (2003), sampling is the process of selecting a representative unit from a population. Similarly, Cohen and Manion (1994) expand this definition by explaining that in sampling, the researcher endeavours to collect information from a smaller group or subset of the population in such a way that the knowledge gained is representative of the total population under study.

3.5 Instrument for Data Cpllection

Ary, Jacobs and Razavieh (2002) refer to instrumentation as a process used to solicit information in research. There are a number of research instruments but considering the nature of the study and the data required, questionnaire, interviews and observation were combined and found to be most suited to this study for purposes of triangulation. As Cohen and Manion (1994) state, triangulation is the use of two or more methods of data collection techniques in a study while Brenner and Marsh (1985) assert that triangulation techniques in social sciences attempts to map out or explain more fully,

the richness and complexity of human behaviour by studying it from more than one standpoint.

Characteristics, advantages and disadvantages of these instruments were also taken into account in employing them to gather the requisite data for the study. Combining them made triangulation and validation of the data possible as different sources were consulted in order to overcome inherent weaknesses of each of the techniques to improve the authenticity of the study.

3.5.1 The Questionnaire

Sidhu (2003) defines a questionnaire as a form prepared and distributed to secure responses to certain questions. In other words, it is a device for soliciting answers to questions listed on a form which the respondent fills by himself. According to McMillan and Schumacher (1993), a questionnaire is an instrument which is presented to solicit reactions, beliefs and attitudes. However, Leedy (2000) looks at a questionnaire from a different perspective as a commonplace instrument for observing the data beyond the physical reach of the observer which for example, may be sent to human beings who are thousands of miles away and whom the researcher may never see.

Since the respondents for the study were large in numbers, the researcher found it necessary to administer questionnaire. It was appropriate for questionnaire to be administered so that all the subjects could be reached within a short time. Moreover, the result from the piloted instruments revealed that the sample participants were more

proactive in the answering of the questionnaire than the interviews. The researcher adopted both open and closed form of questionnaire to overcome inherent weaknesses of each form. The final instruments were given to colleagues for corrections and finally to the supervisor for further editing to ensure error free questions. The instruments, after all the necessary corrections, were piloted in the sample school. The instruments were administered to the accessible group after all the necessary corrections were made.

3.5.2 Personal Interview

According to McMillan and Schumacher (1993), an interview consists of a direct verbal interaction between the interviewer and the subject. Similarly, Ndagi (1997) also explain that interview is unique in that it involves the collection of data through direct verbal interaction between the interviewee and the interviewer. In the same way research interview has been defined by Leedy (1997) as two-person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information. The interviews were used to solicit information from the participants that take decision on the type of food the students eat and what influence those choices. Interview was therefore considered as the best alternative to gather data from them.

3.6 Data Collection

The questionnaires comprised close and open responses. The questionnaires were designed under the supervision of a senior researcher after a thorough examination of literature on the issue. It had not been adapted from a specific questionnaire. The questionnaire has not been validated for reproducibility or validity. The questionnaire has been pilot tested on 30 students in one government senior high school that is located

in the Metropolis. From the results of the pilot study, and the time necessary to complete the questionnaire was estimated to be 45-60 minutes. The questionnaire contained six sections all of which were responded by participants. Section F was administered to both students and staff to assess factors affecting the provision of adequate diet. **Section A:** Socio-demographic characteristics: age, religion, ethnicity, parents educational level, and parents occupation. **Section B**: Dietary intake: 24 hours dietary recall, reasons for missing meals, breakfast, lunch, and supper at home/dining hall, and frequency of snacking. **Section C:** Motivators and Barriers to eating balanced healthy diet; what stops one from eating a well-balanced healthier diet, what encourage you to make improvements to the way you eat, types of food often buy at school, and one main reason for choice of food purchased at school. **Section D:** Health and sickness/socio-economic status: illness suffer in the past two weeks, where they seek treatment, source of drinking water, kind of toilet facility, source of lighting for the household, type of fuel use for cooking, and household assets. **Section F:** Factors affecting the provision of adequate diet: factors affecting the quality and quantity of food provide for boarders. The 24 hour dietary recall part of section B of the questionnaire was administered twice to respondents, a week day and week end. Respondents were verbally asked of atypical days.

3.7 Limitations of Study

This study focuses solely on adolescents characteristics in government residential second cycle institutions with both residential students and non-residential students. These characteristics included types of meals provided at the dining hall and dietary diversity among others. It also focused on factors affecting the provision of adequate

diets in these institutions. The study therefore did not examine socio-political structures that support or affect the nutritional status and dietary intake of adolescents. In other words, the impact of health, agriculture, educational and leadership structures and their influences on nutritional status and dietary intake of adolescents were not directly examined under this study. This research did not assess the exact portion size consumed and for that matter the nutrient density of participants foods. Though the researchers endeavour to minimize recall bias but this was not completed achieved.

3.8 Ethical Consideration

A formal permission was sought from the Department of Home Economics, University of Education, Winneba to carry out this study. Formal permission for data collection and information about the numerical distribution of students of the school and class was obtained from the Kumasi Metropolitan branch of Ghana Education Service in formal interviews by the researchers as well as formal correspondence via the Head of Department of Home Economics. Consent of head teacher of the schools was sought formally and dates were arranged for the study. The purpose, methods and the eventual use of the study findings was explained to the respondents. They were assured of confidentiality of their responses and right to refuse to participate was made known to them.

3.9 Data Analysis

Data collected were cleaned, coded and analysed using Statistical Package for Social Sciences (SPSS) version 20. A template was designed and data double entered. Entered data were run in frequency tables and variables cross tabulated for purpose of estimating descriptive and inferential trends. The figures were produced using the Microsoft Excel programme.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

This chapter presents analysis of the data collected from respondents, who were either staff or students of the study setting. The outcome of the thesis was based on both the quantitative and qualitative approaches of investigations used. As was mentioned in chapter three, the sample size of the study respondents was 80.The first section of the analysis will contain the analysis of the socio-demographic characteristics and background information of the respondents. This is then followed by main objectives of the survey. Finally, the last section discusses the summary of overall views of the respondents on Dietary Needs of Boarding School Students Opoku Ware Senior High School in the Kumasi Metropolis, Ghana. Then, the second section of the analysis will discuss the responses of the study.

4.2 Socio-Demographic Characteristics of the Respondents

This section begins with the presentation and analysis of the data on the gender distribution of the respondents. It must be noted that since the school is a boys' school, all the respondents were males. A total of 80 students and workers took part in the questionnaire survey with the mean age was 18.2±1.6 years with the minimum and maximum ages of 14 and 20 years respectively. A significant higher proportion of the students were boarders. The next variable to be discussed is the age distribution of the respondents. This is shown on Table 4.1.

Table 4.1: Age Distribution of the Respondents

Age in Years	Frequency	Percentage
12 – 15	29	36.25
16 – 20	46	57.5
20 and above	5	6.25
TOTAL	**80**	**100**

Source: Field Work, November 2015

With regards to the age distribution of student's respondents, as shown in Table 4.1, the ages comprised a large number of relatively young students aged between 16 and 20 years. This is the typical age distribution expected of Senior High School pupils in Ghana. 5 students and all the workers (6.25%) out of the total students respondents were aged 20 years and above. The data also shows that 29 (36.25%) of the total respondents were aged between 12 and 15 years.

This distribution indicates that there is the presences of many young adolescents who could further their education at the tertiary level after they have completed SHS. Thus, should there be any school dropouts, the cause will be attributed to other reasons rather than the student's ages. The next section discusses the category of staff distribution of the respondents. To conduct fair discussions, the staffs were grouped in two levels. The groupings were kitchen staff and teaching Staff.

4.2.1 Age Distribution of Kitchen staff

The age distribution of the kitchen staff respondents also comprised a dominant number of 6 (representing 46.1%) of relatively young aged between 31 and 40 years and only 1 teacher aged 51years and above (representing 7.7%), shown on Figure 4.1. The results also shows that 2 of the kitchen staff (representing 15.4%) were aged 41 and 50 whereas 4 (representing 30.8%) of the total kitchen staff respondents were below the age of 30. Figure 4.1 shows the distribution of kitchen staff distribution according to their age.

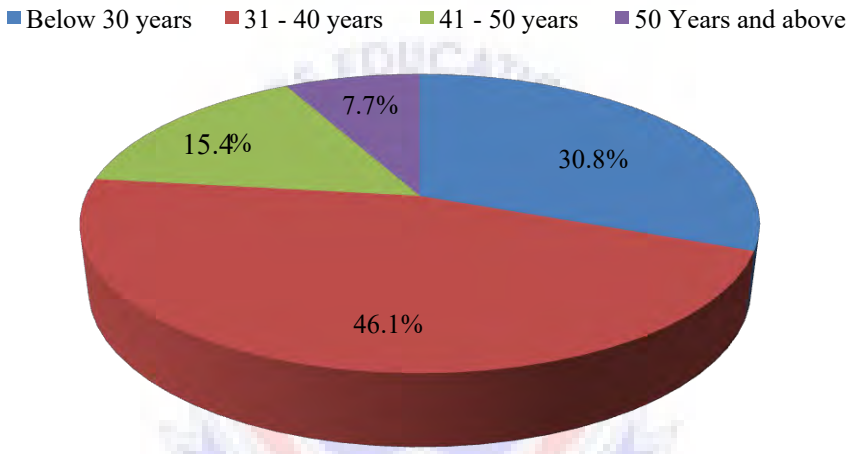


Figure 4.1: Age Distribution of Kitchen Staff

Source: Field Work, November 2015

This age distribution on Figure 4.1 shows the presence of relatively young aged below 50 years and below, with many years of active service ahead of them before retirement. The presence of these young staff could serve as role models for many younger students in the Senior High Schools. However the level of experience and competence of these younger staff and how they matter in the Kitchen is another researchable area that could be looked into.

4.3 Dietary Intake and Nutritional Status of Respondents

The FAO validated 11-item food groups frequency questionnaire (FFQ) was used to assess dietary intake. Dietary intake was quantified based on 24 hour and 7-day dietary diversity score (usual food consumption in the past one week) preceding the study was assessed and classified into low and high diversified food intake.

4.3.1 Food Habits of Respondents

Food habits of adolescents could be quite varied. Meal patterns, food preferences, meal skipping and snacking were aspects of food habits investigated in this study. On the meal patterns of the respondents, the meals eaten daily by the students are presented in Table 4.2.

Table 4.2 Number of Meals taken by Respondents

No. of Meals Eaten Daily	Frequency	Percentage
One	1	1.25
Two	1	1.25
Three	78	97.5
Total	**80**	**100**

Source: Field Work, November 2015

From Table 4.2, almost all the respondents ate three meals a day at school. This was not surprising because going to the dining hall for their meals, was compulsory.

Regarding the types of meals eaten, it was revealed that breakfast consisted mainly of rice porridge or corn dough porridge with or without bread and with no protein rich

food. Lunch and supper were mainly rice, *'kenkey'* or *'gari'* served with stew or soup. A close look at the meals consumed at the dining hall of the school showed breakfasts consisting of foods which provide mainly carbohydrate. This suggests that some of them probably do not obtain adequate amounts of proteins and other nutrients.

For some of the respondents therefore, the breakfast provided in the school was not meals they liked. It is therefore likely that they would not eat such breakfast. This could further compound the problem of low nutrient intake envisaged. Students' preference for imported foods like cornflakes and oats was documented by Agyeman-Mensah (1987) in his study at Achimota School in the Greater Accra Region. Almost thirty years later, similar preferences were found among respondents in Secondary School in the Ashanti Region. It could be said that students prefer these foods because of the convenience in storing and preparing them or because it showed how affluent they are since most of them come from affluent backgrounds.

4.3.2 Food Preferences of the Students

Details of foods liked or disliked by the students were examined. The discussion of food preferences was done in the food groups. The respondents liked include eggs, chicken, milk, beef and fish. Fruits and vegetables liked are pineapples, oranges, *' nkontomire'* and cabbage. The respondents said they like yam, sweet potatoes and plantain. The cereals liked are wheat in the form of bread, oats, rice and corn. Respondents do not like millet and sorghum. In the legume group they prefer groundnuts and cowpeas and disliked Bambara beans and soya beans. Respondents liked all types of oils except Palm kernel oil.

4.3.3 Food Restrictions of Students

Although the respondents seemed to like a wide variety of foods, there were a few restrictions as to what they could or could not eat. Sixty-seven per cent had no food restrictions or taboos in their families. They were free to eat any food of their choice. However, some were not allowed to eat some plant and animal foods like pork, snail, grass cutters, crabs, mushrooms, sorghum and beans. Incidentally, these were foods which are not served in the schools so the restrictions would have no effect on their food intake at school. The majority of those who have food restrictions did not know the reasons why they were restricted from eating the foods.

4.4: Dietary Diversity of Students Based on the Frequency of Food Consumption

The frequency of consumption of various foods would be used here to describe dietary diversity of respondents, as follows: Regarding Animal Products, fish and meat were eaten daily by respondents. Fifty-two percent of them also ate meat a few times a week. Other animal products consumed weekly or a few times a week included chicken, sardines, eggs and milk. It will be recalled that these were the animal products liked by the respondents. As regards legumes, beans and groundnuts were eaten a few times a week. Bambara beans and soya beans were not popular among the adolescent respondents hence most of them never ate them.

With regard to root crops and plantain, the most frequently consumed root crops were plantain, yam and cassava, consumed on a daily basis. Regarding Fruits and vegetables, majority of the respondents (60%) ate bananas, oranges and pineapples often. Pawpaw,

mangoes and watermelons were eaten seasonally by most of the respondents, while 46.4% of respondents ate garden eggs, *nkontomire* and other leaves a few times a week respectively. In Ghana vegetables always form part of the stews and soups that accompany the staple foods. This is why tomatoes and pepper were omitted from the list of foods.

Regarding Fats and Oils, Refined vegetable oil, palm oil, margarine and groundnut oil were popular among the respondents. Coconut oil and palm kernel oil were not eaten as much. Among the cereals mostly consumed daily by the respondents were wheat as bread (52.9%) Rice (42.9%) and corn (35.7%). Corn flake was eaten a few times a week by 43% of the respondents. Cereals such as maize, millet and sorghum were never eaten by 37% and 47% of the respondents respectively, probably because they were not familiar foods.

4.5 Foods Usually Eaten Between Meals

It was interesting to note that at school, well over half of the respondents consume *'gari'* either mixed with sugar and milk or with '*Shitto'*. Gari was the food normally taken to school and eaten by the students as it was the cheapest supplement for dining hall meals. Some of the students from affluent homes brought corn flakes and rice crisps, which they at times ate between meals.

The cooks indicated that they often saw the students at times buying and eating some fruits such as bananas and oranges, which they thought was good for them as these fruits are not always provided for the students as part of their meals at the dining hall.

4.6 Nutrition Knowledge of Respondents

The data on knowledge nutrition of respondents are presented in Figure 4.2.

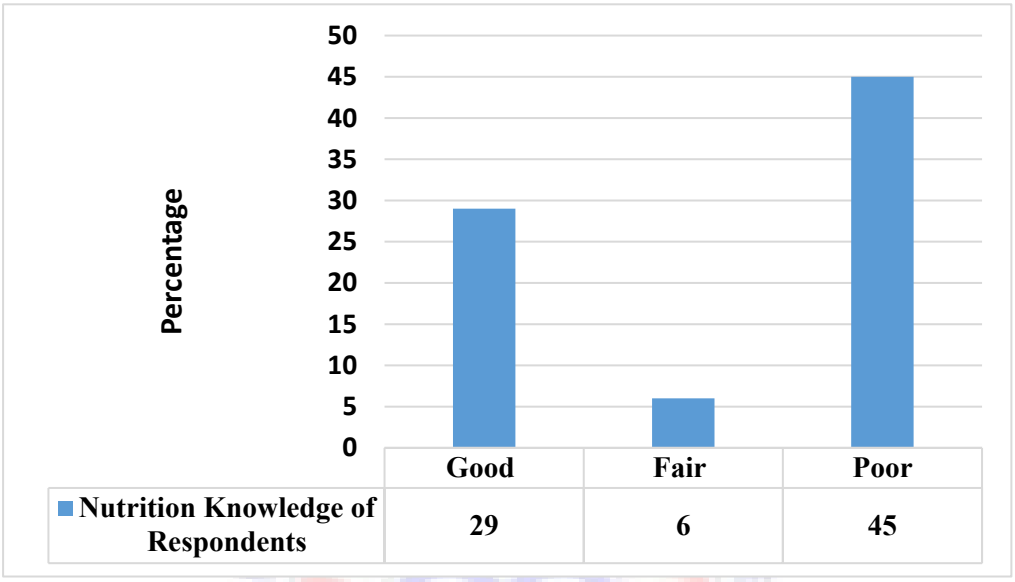


Figure 4.2: Students Knowledge of Nutrition

Source: Field Work, June 2016

Generally, as indicated on Figure 4.2, the knowledge of the students about nutrition was very poor. Only the Science students and a few of the Agric students had some good nutrition knowledge. There was not much difference between the performance of respondents in the co-educational schools in the rural area and that in the urban area. This indicates that in this study, location of school may not be a factor as to how much nutrition knowledge students have. Regarding the nutritional knowledge of the students, the cooks and stewards indicated that the students were aware of the nutritional value of the food they are served with, as they asked for the improvement of

their meals by the inclusion of certain food items that are sometimes absent from their meals such as eggs.

4.6 Assessment of Quality of Dining Hall Meals

Using literature values, the calorie, protein, calcium and iron contents of dining hall meals were analysed. The study shows that the energy values of the meals for the day were rather low. Calcium and iron values were low probably because of the predominantly cereal dishes served. Energy values were as observed in this study, very high as the students were very active and must as such be provided with high energy foods. There was however low level of calorie intake, which could jeopardize their development since it has been documented that nutritional deficiencies, either of individual nutrients or of total energy intake, retard physical growth and maturation (Read, 1973).

The low calorie content of the meals was mostly the result of the small quantity of food given to respondents. For those respondents who did not eat any snacks at school, this low calorie intake could affect their growth. The high values of calcium and iron were due to the predominantly cereal and legume diets of those schools. However, cereals and legumes are known to contain *phytates*, which often makes calcium and iron unavailable to the body (Bingham, 1978).

Looking at the overall picture of nutrients provided by the schools studied, it could be said that except for energy the school provide more than 2/3 of the recommended nutrient intakes for protein, calcium and iron. According to Gibson, (1989) this would

be regarded as adequate since RNI of all nutrients are inflated to cater for individual differences. She however, cautioned that the more habitual the low intakes and the longer the duration, the greater the risk of nutrient deficiency. Since the quality and quantity of the meals eaten by respondents remain the same throughout the term, the respondents may be at risk.

4.6.1 Respondents' Comments about Dining Hall Meals

When the respondents were asked whether their dining hall meals were adequate, over 57% said their meals were inadequate .When asked to comment or give reasons why they said the meals were inadequate, comments shown in Figure 4.3 were given.

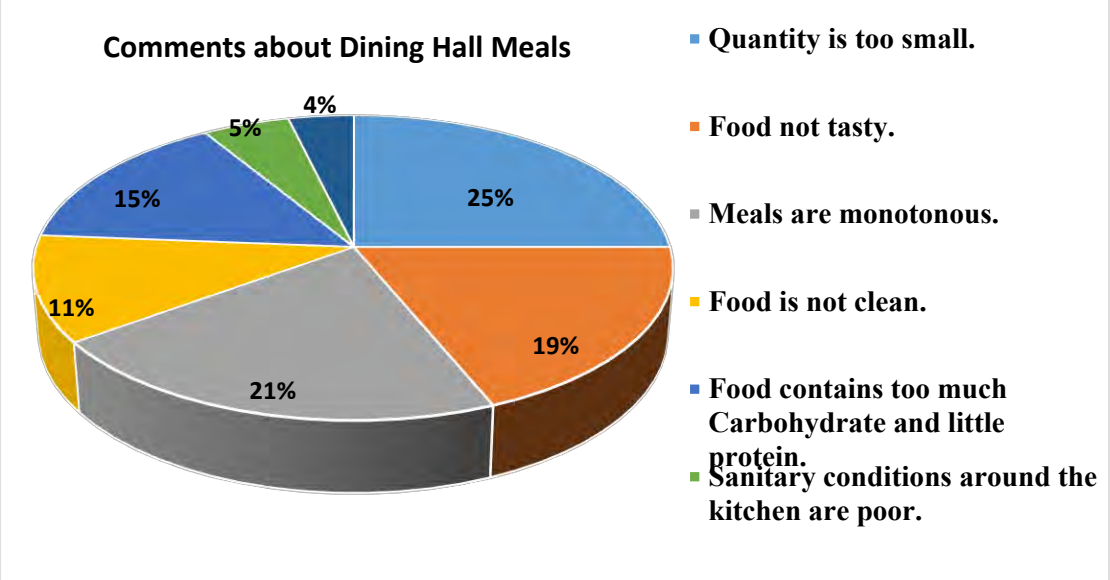


Figure 4.3: Respondents' Comments about Dining Hall Meals

Source: Field Work, November 2015.

The most common reason given for the inadequacy of dining hall meals were the quantity being too small, the food not being tasty and the food being monotonous (65%). Only a few students (11%) considered the good nutritional value of the meals.

Certainly, these are clear reasons why students' intake of nutrients was low. Since only few of them considered the nutrient content of the meals, it reflects their nutrition knowledge as well. It must be emphasized that it is only when students are able to relate their food intakes to their general health and wellbeing, that the nutritional considerations for eating food would outweigh considerations of palatability and likes or dislikes.

Responding to the comments of the students on the quality and quantity of food provided at the dining hall, the cooks indicated that they used whatever food items available to cook for the students. They further indicated that being mothers themselves, they did everything to ensure that their food was adequate for all the students, some of whom eat and left some of the food. Some of their statements were: “As a mother myself, I ensure that the students do not go to bed on empty stomach”. Another cook said, “some of the students are pampered at home so they want to be fed with chicken beef, which is expensive to buy on the market”.

4.6.2 Meal Frequency of Boarders

The boarders mostly take all the three meals as presented in Table 4.3. It was noted that some students do not always take meals, even among the boarders. The most frequent reasons given for missing meals were “I didn't feel like eating” and “I don't like the taste and aroma of the food served” (Table 4.3).

Table 4.3:Frequency of Students to the Dining Hall for Meals

Breakfast	Frequency of Meals	Percentage (%)
Always	68	85.0
Sometimes	10	12.5
Not at all	2	2.5
Total	**80**	**100**

Source: Field Work, November 2015

Table 4.4 shows that most of the respondents have breakfast before attending classes. Breakfast was the most observed meal and was attributed to the compulsory nature of it for all students in the boarding house. Taking breakfast is known to improve concentration, learning and school performance. Regarding the early completion of the cooking of food at the kitchen, especially breakfast and lunch, the cooks interviewed, indicated that they work hard to ensure that meals are prepared on time, so that the students will have more time to attend classes.

Regarding the types of meals provided at the dining hall, the cooks indicated that they made sure that the right food given them are prepared for the students. They intimated that they ensure that the food provided is so palatable that the students will enjoy the meals. In a similar way, majority of the respondents always had lunch, as shown in Figure 4.4.From Figure 4.4, it was revealed that 91% of the student's responses indicated that they always take lunch at school, while 1% indicated that they do not take in lunch at school.

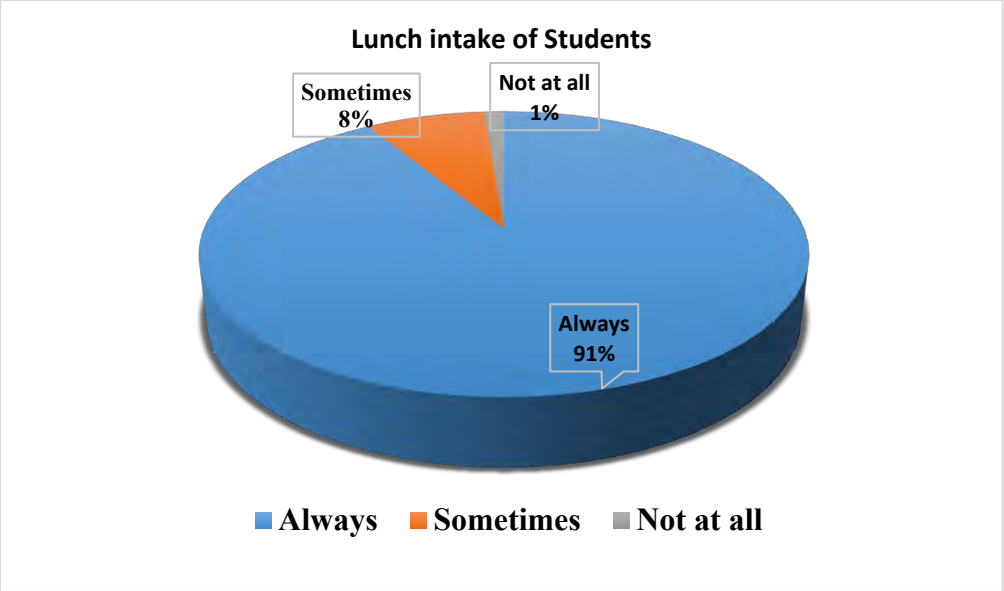


Figure 4.4: Frequency of Lunch intake by Respondents

Source: Field Work, November 2015

The implication is that such pupils may benefit from the advantages of taking lunch at school. Some of the boarding students also indicated that they often skipped meals provided at the school's dining hall. The results for the reasons why the students skipped dining hall meals are provided on Table 4.4.As noted from Table 4.4 most students cited "I didn't feel like eating" and "I don't like the taste and aroma of the food served" as reasons for missing meals. In 1996, the CDC reported that meal skipping is common among adolescents, especially during their middle and late adolescence. Breakfast is the most skipped meal and is attributed to lack of time, desire to sleep longer in the morning, lack of appetite and dieting to lose weight. Skipping breakfast may affect concentration, learning and school performance. In light of this frantic nutritional effort is needed in second cycle institutions to elucidate the negative

consequences of meal skipping to students. This will probably enable them to better prepare adequately for adult life.

Table 4.4: Reasons for skipping Dining Hall Meals

Reasons	Frequency (n)	Percent
I didn't feel like eating	8	10
I don't have time	2	2.5
I don't like the taste and aroma of the food served	3	3.75
I want to manage my body image	38	47.5
Other	25	31.25
No response	4	5.00
Total	**80**	**100**

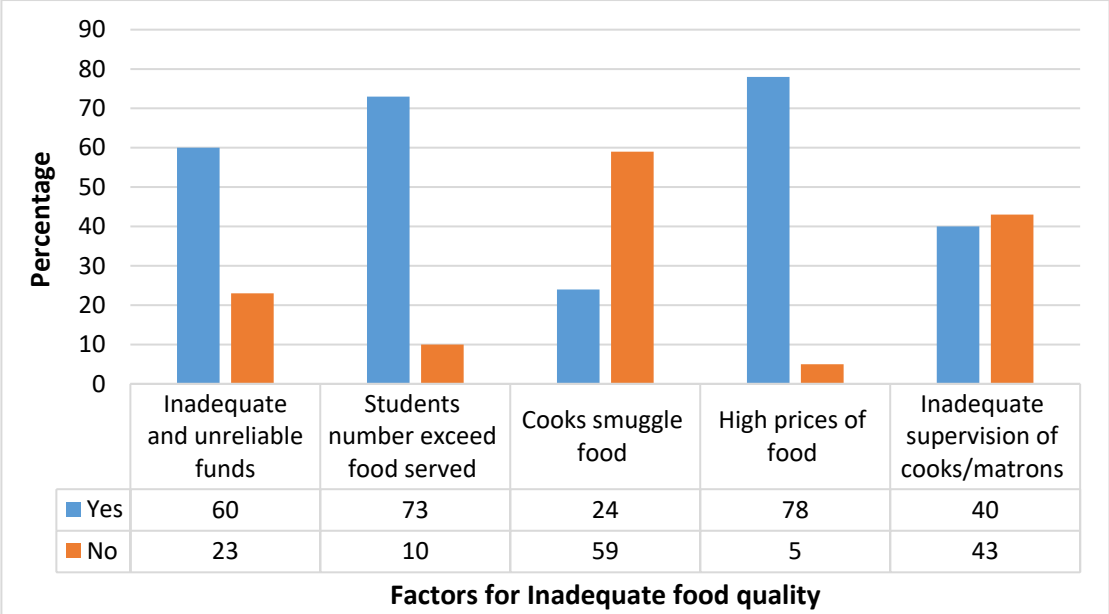
Source: Field Work, November 2015

Snacking among the students was common. More than half of the students reported snacking especially between breakfast and lunch. More boarders snack after supper compared to non-boarders (66.4 % versus 33.6 %) Chi-square (x^2) = 8.5, p = 0.003.

4.6.3 Factors Affecting the Provision of Adequate Diet

Various reasons were provided by the respondents to be responsible for the inadequate quality and quantity of food provided to the students at the dining hall. The result for these factors, are presented on Figure 4.5.

Table 4.5: Factors for the Inadequate Quantity of food for Students



Source: Field Work, November 2015

In the own opinion of most boarders 85.0 % (68/80), the quantity of food provided to them was described as inadequate. The factors attributed to the inadequate provision of food were from the view point of students (Figure 4.5).The most frequent factor cited by both students and staff for poor meals was high prices of food items (78%) inadequate and unreliable funds (60%). This knowledge of the students about the prices of food items and unreliable funding especially from the government is an indication that the student leaders were aware of these problems and might have educated their colleagues about these issues. This action has contributed to students' acceptance of

the dining hall food provided and absence of students' demonstrations on food at the school for a long time.

4.7 Conclusion

The analysis so far in this chapter, has covered the meals provided for the students at the dining hall of Opoku Ware Senior High School located in Kumasi in the Ashanti Regional capital of Ghana. The sample size was 80 students who were all males as the school is a boys school. The analysis featured responses from the students interlaced with responses from the interviews. The analysis covered the types of meals provided at the dining hall, the nutritional value of the food items and students preferences for the meals provided. Also covered were analyses on food restrictions of students and the dietary diversity of the students based on the frequency of food consumption. The analysis further covered the snacking behaviour and foods usually eaten between meals. The nutrition knowledge of students and the quality and quantity of food provided, were also included in the analysis, with the chapter ending on factors that the respondents attributed to the inadequate nature of food provided for the students.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter represents the final chapter of the study. It first provides a summary of findings of the study. It also continues with a brief conclusion that was deduced from the study. Based on what came out, some recommendations have been made

The main objective of this study were to assess the nutritional status of meals provided to students in a second cycle institutions in the Kumasi Metropolis, assess the food habits of adolescents in second cycle institutions and identify factors that determine the provision of adequate meals in the boarding institutions. The population comprised adolescent boys between fifteen and nineteen years of age in the selected school. The sample was made up of eighty students selected from the three classes in the school

Instruments used for collecting the data included: questionnaires, interviews and observations. The questionnaires were administered to the students while the kitchen staffs were interviewed. Foods eaten in the dining halls were also examined. Descriptive analysis and cross-tabulations were used for the analysis. Meals served in the dining halls of all the schools was not enough to satisfy the energy requirements of the adolescent respondents and even when they supplemented the dining hall meals with extras from elsewhere, the calories obtained were still below the RNI especially for the sixteen to nineteen year old males. The nutrients in the meals assessed were

found to be adequate, though the students complained about the quality and quantity of meals provided at the dining hall for them. The quantitative analysis of the data were supplemented with the results of the interviews conducted with the kitchen staff.

5.2 Summary of Main Findings

The study revealed that meals provided at the dining hall for the students, contained all the important food groups, though the students were dissatisfied with the quality and quantity. The reasons students were also found to be skipping some of the meals because they either did not feel like eating or they did not like the taste and aroma of some of the food served"

The study also found out that inadequate and unreliable government subventions were major constraints in the provision of adequate diet in the boarding institution. The major constraint to eating balanced meals by students was high the cost of such food items and inadequate or late release of funds by the government that was identified in the food access model (Sharkey *et al.,* 2010), used for the study.

It was also revealed that the students purchased other foods such as *kenkey, banku*, rice and beans whilst in school to supplement the meals provided at the dining hall. It was also know from the study that snacking was common among students in the school with boarders significantly snacking after supper.

5.3 Conclusion

From the data collected and analysed, it can be concluded that adolescent students in Senior High Schools need good nutritious meals for their growth and development. Furthermore, to be able to concentrate in their studies and perform well in class, meals provided to boarding students should include balanced diets in which all the important food groups are represented. Finally, it can be concluded that all stakeholders in second cycle education, such as the government, school authorities and parents have important roles to play to ensure that adolescent students receive the best nutritious meals to enhance their studies.

5.4 Recommendations

From the findings obtained from the study, the following recommendations are made:

1. Health services providers should intensify nutrition/health education in second cycle institutions on the consequences of meal skipping, so that these adolescent students could improve their concentration in class, having been adequately fed.
2. Government or agencies responsible for the release of feeding subventions to second cycle institutions should ensure adequate and reliable release of such funds. Alternately, school farms and backyard gardening should be encourage and supported in second cycle institutions to augment subventions.
3. Nutrition surveillance should be established and intensified to monitor the dietary behaviours and nutritional status of adolescents in second cycle institutions.

4. Authorities in the second cycle schools should encourage healthy nutritious snacking by ensuring that these foods are made available in clean environments for these students.
5. Finally, Since students depend on food vendors around their campuses for some of their meals, the latter must be screened by the school authorities so that food brought to the schools for sale would be wholesome.

5.4 Directions for Further Research

Since this study investigated the food habits of adolescents in boarding schools, it is suggested that a further study be carried out using adolescents who are day students and those who are not in school to find out whether their eating habits are different and whether their nutrient intakes are adequate. Assessment methods like clinical observations and laboratory tests and skin fold measurements which were not used in this study should be employed, in combination with the diet survey to get a more accurate assessment of their nutritional status.

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APPENDIX A

UNIVERSITY OF EDUCATION, WINNEBA
COLLEGE OF TECHNOLOGY EDUCATION, KUMASI
DEPARTMENT OF HOSPITALITY AND TOURISM EDUCATION
QUESTIONNAIRE FOR STUDENTS

I am a postgraduate student of the University of Education, Winneba, Kumasi, conducting a research on "The Dietary Needs of Boarding School Students at Opoku Ware Senior High School in the Kumasi Metropolis".. The research is for academic purposes only. Your opinions on this topic would be beneficial in drawing a successful conclusion. The following are statements and their responses. Please read and tick (√) the appropriate responses in the columns provided. Brief comments where applicable are welcome. All information provided would be handled confidentially.

Section A: Demographic Characteristics of Respondents

1. Age in Years: a) 11-15 ( ) b) 16-20 ( ) c) 21-25 ( ) d) 26+ ( )
2. Gender: a) Male ( ) b) Female ( )
3. Class/level: a) SHS 1( ) b) SHS 2 ( ) c) SHS 3( )
4. Course of Study: a) Gen Arts ( ) b) Science ( ) c) Agric Science ( ) d) Technical ( )
5. Region: a) Ashanti ( ) b) Brong Ahafo ( ) c) Central ( ) d) Eastern ( ) e) Volta ( )
   f) Greater Accra ( ) g) Northern ( ) h) Upper East ( )i) Upper West (-) j) Western ( )

Section B: Patronage of Dining Hall Meals.

6. How many times are you given food at the dining hall? a) Once ( ) b) Twice ( ) c) Thrice
7. Do you enjoy the dining hall meals? a) Yes ( ) b) No ( )
8. Give reasons for your answer.....

   .....

9. Do you go to the dining hall to eat at all times?

   a) Yes ( ) b) No ( ) c) Not Always ( )

10. Give reasons for your answer.....

    .....

11. Which dining hall meal do you enjoy most?.....

12. Which dining hall meal don't you like?.....

Section C: Perceptions of Dining Hall Meals

13. Apart from energy, what time do you get from breakfast from the dining hall?

    .....

14. Are dining hall meals provided on time?

    a) Yes ( ) b) No ( ) c) Not Always ( )

15. What is the effect of your answer to Q14 on your studies? ……..

    .....

16. Are you given fruits with some of your meals? a) Yes ( ) b) No

17. Which type of proteins are you given in your dining hall meals?.....

18. Is the quantity of food provided to you enough? a) Yes ( ) b) No ( )

19. If No, what factors account for the inadequate quantity of the food provided?

    .....

20. What do you suggest should be done to improve the quantity of food served at the dining hall?.....

21. In your own opinion, is the quality of the food served to students the best?

    a) Yes ( ) b) No ( )

22. Apart from the listed factors that affects the quantity and quality of the food; list other factors if any in this space? .....
23. Do you get frequent colds, upper respiratory tract infections or urinary tract infections? a) Yes ( ) b) No ( )
24. Do you often experience a sore or heartburns after meals? a) Yes ( ) b) No ( )
25. Have you suffered with constipation, diarrhoea, bloating or abdominal pain after taking the dining hall meals? Yes ( ) No ( )
26. What do you suggest should be done to improve the quality of the food? .....

APPENDIX B

UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

DEPARTMENT OF HOSPITALITY AND TOURISM EDUCATION

INTERVIEW GUIDE FOR KITCHEN STAFF

All interviewees will be personnel in the area kitchen.

Date of interview.....

Time started.....

Time ended.....

Profession

2. Age
3. Duration of service
4. What policies and programmes have been put in place in your school concerning nutritional care of student boarders?
5. What factors determine the provision of meals in the boarding house?
6. Do the head of School tell you what to cook for the students?
7. What kind of food do your school provide for students?
8. Do you think the food is adequate for the students?
9. Where do you get your source of food for the students?
10. How often do your students complain about the food prepared?
11. Do you agree that the food the school provide determines/influence the student's feeding habits
12. What is the nutritional status of our students?
13. What are the food habits of students in this institution?
14. What factors determine the provision of adequate meals to boarders?

Thank you for your cooperation