

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

DIETARY PATTERNS OF SCHOOL CHILDREN AT NAVRONGO SENIOR HIGH



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**DIETARY PATTERNS OF SCHOOL CHILDREN AT NAVRONGO SENIOR HIGH
SCHOOL**



**A DISSERTATION IN THE DEPARTMENT OF CATERING AND HOSPITALITY
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DECLARATION

STUDENT'S DECLARATION

I, Paulina Adoriba, declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

SIGNATURE.....

DATE.....

SUPERVISOR'S DECLARATION

I hereby certify that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of Dissertation as laid down by the University of Education, Winneba.

NAME OF SUPERVISOR: DR. GILBERT OWIAH SAMPSON

SIGNATURE:.....

DATE:.....

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DEDICATION

This work is dedicated to my children; Jennifer Awini, Josephine Awini, Justine Awini and Joel Awini and to my husband; Mr. Michael Awini for their support and encouragement.



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ABSTRACT

The adolescent is considered especially vulnerable nutritionally because there is an increased demand for nutrients related to the dramatic increase in physical growth, psychosocial and cognitive development. What students eat is predetermined largely by peer influence, school environment including what is available to them in the school premises or what is provided by the school canteen. To this effect the study aimed at assessing the impact of dietary patterns on the nutritional status of school children at Navrongo Senior High School. The study employed quantitative research technique. A total of 95 respondents were selected randomly to prevent bias. In this study, data was collected using questionnaire. The data was analyzed using SPSS 20.0. The study found that 80.0% of the students frequently take breakfast, lunch, supper, meat and fish, while 62.1% rarely consume fast food with egg and 56.8% occasionally consume snacks, fruits, vegetables and legumes. Majority, 82.3% of the respondents indicated that health concern, food availability, environmental consideration, cost of food, individual energy and nutrients needs, and advertising and other point of sale information are the factors that influence food choice and habits of Navrongo Senior High School. The study further revealed that making healthful food more available and convenient, and limiting the availability of unhealthful food options help students eat more healthful diet as the mean score exceeded the mean score of 3.5. Based on this conclusion were made that SHS students frequently take breakfast, lunch, supper, meat and fish, while they rarely consume fast food with egg and they occasionally consume snacks, fruits, vegetables and legumes. The study recommended that stakeholders including parents, teachers and even the students should be educated on the need for good nutrition and also encouraged to vary their diets. Nutrition and health education programs should also be carried out periodically in the various schools and this should be incorporated into the educational curricula in the long run.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The school-aged child is likely to spend a greater part of the day at school. Therefore, increasing numbers of meals are eaten away from home, often at establishments where adherence to food safety is difficult and may affect good nutrition. The nutritional needs of the school-aged child are high because they participate in school group activities such as sports and recreational programs. The influence of peers and significant adults, like teachers or sports idols, is also increased while friendships and other social contacts become more important (Mahan & Escott-Stump, 2000). The adolescent is considered especially vulnerable nutritionally because there is an increased demand for nutrients related to the dramatic increase in physical growth, psychosocial and cognitive development. Moreover, the changes in their lifestyle and food habits affect both nutrient intakes and needs. There are also special nutrient needs with participation in sports, use of drugs, development of an eating disorder and excessive dieting which are associated with adolescence (Mahan & Escott-Stump, 2000). Williams & Schlenker (2003) asserted that both food and nutrition security promote optimum nutritional status and that both sexes of adolescents can be at risk of dietary excesses and deficiencies.

Most Senior High Schools students are in the teenage stage as well as their pubescence during which period rapid physical growth and psychological changes occur, climaxing in sexual maturity (Christie & Viner, 2005). The growth spurt is so drastic that factors like dieting is linked to the physical, psychosocial and cognitive development at this stage. According to the WHO (2011), about 50% of adult weight and skeletal mass and more than 20% of adult height are gained during this period. During this period,

lifestyles and food habits change, which affects both nutrient needs and intake. There is also a high susceptibility to nutrition deficiencies. This is partially due to the fact that the development of eating disorders is very prominent during this time. More importantly, at this stage, less attention is paid to what these young adults/adolescents eat because it is assumed that they can take care of themselves. The school children under study some of who are in their late adolescence or early adulthood both sexes and in all income and racial/ethnic groups can be at risk for dietary excesses and deficiencies. It is reported that many boys and girls in developing countries like Ghana enter adolescence undernourished, making them more vulnerable to disease and early death (MONUPA, 2011). On the other hand, dietary excesses of total fat, saturated fat, cholesterol, sodium and sugar occur leading to overweight and obesity i.e. another form of malnutrition with serious health consequences. This is increasing among young people in both low- and high-income countries.

Globally in 2010, the number of overweight children under the age of five is estimated to be over 42 million, of which 35 million of these are living in developing countries (WHO, 2011). During adolescence, lifestyles and food habits change, which affects both nutrient needs and intake. There is also a high susceptibility to nutrition deficiencies. This is partially due to the fact that the development of eating disorders is very prominent during this time. Overweight and obese children are likely to stay obese into adulthood and more likely to develop non communicable diseases like type 2 diabetes and cardiovascular disease. Adequate nutrition and healthy eating and physical exercise habits at this age are foundations for good health in later adulthood (WHO, 2011)

1.2 Problem Statement

The adolescent is considered especially vulnerable nutritionally because there is an increased demand for nutrients related to the dramatic increase in physical growth, psychosocial and cognitive development. Moreover, the changes in their lifestyle and food habits affect both nutrient intakes and needs.

Unlike pre-schoolers and lower primary school children, most parents of upper primary school children have lesser control over what their wards eat. This is because at this stage, less attention is paid to them as it assumed they can take care of themselves. Most parents do not provide packed lunches or snacks like the pre-schoolers. What students eat is predetermined largely by peer influence, school environment including what is available to them in the school premises or what is provided by the school canteen. Problem arises when the nutritional value of the food, the hygienic conditions under which it is prepared and the quantity of food served are compromised. Malnutrition is a known major contributor to the total global disease burden and the possibility of these school children becoming malnourished is very high. The nutritional status of this special population is crucial in their transitional period to young adulthood. Even though this has been a problem for ages, there has been little study conducted to find out the impact of dietary patterns on the nutritional status of school children.

1.3 Purpose of the Study

The purpose of this study is to investigate the dietary patterns of students of Navrongo Senior High School. It also seeks to study how the lifestyle and food habits affects their nutrients intake and needs.

1.4 Specific Objectives

1. To investigate factors influencing dietary patterns of students of Navrongo Senior High School.
2. To examine the factors that influence the food choice and habits of students
3. To propose three suggestions for helping students adopt to a healthy dietary pattern in school

1.5 Research Questions

The following research questions are formulated to guide the study

1. What factors influences dietary patterns of students in Navrongo SHS?
2. How do these factors affect the pattern of food choice among students?
3. What are the suggestions for helping students eat more healthful diet?

1.6 Significance of the Study

It is a known fact that children especially students are the greatest assets of a country. They are the future leaders. Providing optimum health in terms of physical, social, and intellectual development should thus be a priority concern of everybody. Malnutrition has been a problem worldwide which has been tackled in various ways but the problem still lives with us. In fact, it continues to kill millions of children daily. SHS students are no exception of this issue.

There is therefore the need for extra nutrients to support their rapid growth spurt in order to prevent complications later in life. Also the development of eating disorders is very prominent during this stage of life, which is carried into adulthood. Information on nutritional status for students within the 13-18 years is very scarce and the growth

references for this age group are inadequate. Thus when more information is gathered, it will add up to the existing information which could serve as a guide for research in this and/or related area.

The findings of the study would inform better contextual planning and management of dietary patterns generally, and that related to students in this age category in particular. It would provide the framework by which specific indicators could be used to assess the risk of malnutrition for them; thereby implementing the appropriate measures to curtail it. The indicators intended to be deduced from the characteristics of the school and its environment, would inform policy makers and health professionals generally, as to possible markers that can guide the design and implementation of intervention.

1.7 Limitation of the Study

The sample size, 95 participants, was too small. It will be difficult to find significant relationships from the data, as statistical tests normally require a larger sample size to ensure a representative distribution of the population and to be considered representative of groups of people to whom results will be generalized or transferred. In the questionnaire, the alternatives offered may have limited the students' responses.

The study had to rely on the students' self-reported information which may not be accurate. Some of the students may not have remembered what they ate or been unable to match what they did eat with items in the questionnaire. The time available to investigate a problem and to measure change was too short.

1.8 Scope of the Study

This study focuses mainly on the dietary pattern of Navrongo SHS students and how it affects their nutritional status.

1.9 Organisation of the Study

The study was organised in five chapters. Chapter one deals with the introduction. It gives the background to the study, statement of the problem, the purpose and objectives of the study and research questions. It also examined the scope of the study and the significance of the study.

Chapter two also review the related literature on the dietary pattern and nutritional status, and factors that influence food choice, dietary patterns and nutritional status of students and suggestions for helping students eat more healthful diet.

Chapter three discusses the methodology of the study. This is divided into research design, population, sample size and sampling techniques, data collection instrument and data analysis.

Chapter four is a detailed analysis, discussion and presentation of the data collected and the discussion on the results and findings. Finally, chapter five presents the summary of findings, conclusion, recommendations and areas for further research.

CHAPTER TWO

LITERATURE REVIEW

2.0 Nutrition and Health

Nutrition throughout life has a major effect on health. This is true for pregnant women as adequate maternal nutrition is one of the best ways to ensure maternal and fetal wellbeing in developed and developing countries. Maternal nutrition before and during pregnancy is an important determinant of birth weight. High rate of Low Birth Weight (LBW) in developing countries has been attributed to poor maternal nutrition (Ogunjuyigbe *et al.*, 2008). Pregnancy is a time of tremendous physiological change that demands healthy dietary lifestyle choices. Growing foetus draws a lot of energy and nutrients from the mother to enhance physical and psychological development (Ojo and Briggs, 2010).

Gopalan (2003) states that nutrition is an integral component of health and wellbeing of an individual. Good nutrition enables one to lead a socially and economically active life and it improves the quality of life as evidenced through enhanced nutritional status of the population groups, better work efficiency rate, reduced mortality and morbidity rate by raising the standard of living. Kathy (2008) calls attention to the fact that an individual's nutritional status reflects the degree to which physiologic needs for nutrients are being met. Thus, nutrient intake depends on actual food consumption which is influenced by factors such as economic situation, eating behaviour, emotional climate, cultural influences, effects of various diseases on appetite and the ability to consume and absorb adequate nutrients.

According to Kathleen and Sylvia (2008) when adequate nutrients are consumed to support the body's daily needs and any increased metabolic demands, the person moves into an optimal nutritional status. This status promotes growth and development,

maintains general health, protect them from or predispose them towards chronic disease. Good nutrition is the fundamental requirement for positive health, functional efficiency and productivity. Nutrition science, thus, provides abundant evidence on the importance of nutrition, not only in promoting proper physical growth and development but also ensures adequate immune competence, cognitive development and work capacity.

Sri (2009) states that the direct effects of under nutrition are occurrence of frank and subclinical nutritional deficiency diseases. The indirect effects are a high morbidity and mortality among young children, retarded physical and mental growth, lowered vitality leading to lowered productivity and reduced life expectancy. Under-nutrition predisposes to infection and infection predisposes to under-nutrition. The high rate of maternal mortality, still births and low birth weight are all associated with under-nutrition. Wahlqvist *et al.* (2003) underline the consequences of under nutrition which includes death, disability and stunted mental and physical growth. She further warns that poor nutrition often commences in utero and in many cases extends into adolescence and adult life. Females in particular are affected by lifelong poor nutrition. Evidence from epidemiological studies from both developing and industrialized countries suggests a casual relationship between foetal under nutrition and increased risks of impaired growth and various adult chronic diseases.

Adequate nutritional intake during pregnancy has been recognized as an important factor for healthy pregnancy and desired birth outcomes (Bawadia *et al.*, 2010). It was found that deficiency of nutrients during gestation may cause the fetus to receive suboptimal micro and macro nutrients, causing inadequate intrauterine growth and development, inherited malformations, preterm deliveries, and pregnancy complications (Redmer *et al.*, 2004). Thus, attention to appropriate dietary behavior and proper nutrient intake will

supply adequate nourishment to achieve optimum health for both mother and child (Wen *et al.*, 2010; Verbeke & De Bourdeaudhuij, 2007).

Studies show that nutritional knowledge affects the quality of food intake and also healthy choices of purchased food (O'Brien & Davies, 2007; Verbeke, 2008). Advancement of individual nutrition knowledge (NK) provides new information which may stimulate changing of attitude and subsequently result in enhancement of dietary practices (De Vriendt *et al.*, 2009). One study showed that health advice encouraged expectant mothers to improve their food intake (Anderson *et al.*, 1993); however another study indicated that higher knowledge of pregnant women was not an indicator to cause them to change their nutritional habits (Verbeke & De Bourdeaudhuij, 2007).

2.1 The Concept of Food Environment

Poor eating habit is a major public health concern among young adults who experience transition into university/college life during which they are exposed to stress and lack of inadequate time for food preparation. Rapid changes in physical growth and psychosocial development have placed these young adults a nutritionally vulnerable group with poor eating habits that fail to meet dietary requirements. Some common unhealthy eating patterns among young adults include meal skipping, eating away from home, snacking and fast food consumption.

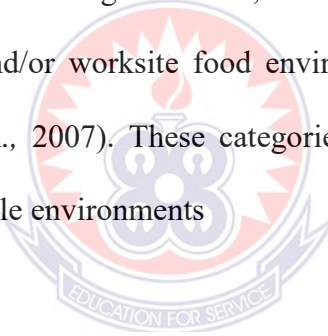
Environmental factors contribute greatly to the adoption of unhealthy eating habits among tertiary institution students. The mushrooming of shopping malls, convenience stores, vending machines and fast food outlets has created an alarming situation for young adults to practice unhealthy eating habits. University/college students tend to make their own food choices based on cost of food and availability of fast foods. Studies have shown that university/college students fail to meet recommended intake of fruits

and vegetables due to frequent snacking habits and higher frequency of fast food consumption (Larson *et al.*, 2009). When people are asked why they eat what they eat, the most common response is “I eat what tastes good to me”. One's sensory responses to the taste, smell, sight and texture of food are major influences on food preference and food choice. So the question is, what are we born with and what is learned? What and how people eat defines to a large extent their health. Obesity and other diet-related chronic diseases are recognized as major public health issues associated with risk for several of the leading causes of death and disability. There is strong interest in the determinant of food selection and the most effective ways to providing food guidance for individuals and population to improve their health and wellbeing.

Food environment is a collection of physical, biological and social factors that affect an individual or group of individuals' eating habit and patterns (Brownell & Frieden, 2009). Food environment is termed “toxic” to describe unparalleled exposure to high-calorie, high-fat, heavily marketed, inexpensive and readily accessible foods. “Toxic,” is a word often used to describe food environment in the United States and, increasingly, in many parts of the world. Even though food itself is usually safe to consume, the world in which most consumers live make choosing healthy food very hard and choosing unhealthy food very easy. It is truly a toxic environment that eats away at healthy lifestyles and promotes obesity. What makes up the food environment is vast and varied, ranging from social factors, physical factors and biological factors. The food environment often lurks silently in the background, going largely unnoticed, but it plays a major role in the food choices people make, even for the most independent-minded consumer. Food environment can be interpreted in many different ways. It is broadly defined to include home, community, and media/information environments (Sallies & Glanz, 2009).

Lytle (2009) also identified food environment to include food stores, restaurants, schools, and worksites. These four environments differ qualitatively from each other. Food stores and restaurants are often places to which one travels to purchase food and there may or may not be a great deal of choice regarding one's options. Worksites and time for other purposes, and that usually also happen to provide food (e.g. vending machines, cafeteria).

Employees and students may or may not be able to travel off-site for food or beverages. Food environment can also be categorized as the food store environment (e.g. grocery stores, supermarkets, specialty food stores, farmers' markets, and food pantries), restaurant food environment (e.g. fast food and full service restaurants), school food environment (e.g. cafeterias, vending machines, and snack shops in daycare settings, schools, and/or colleges), and/or worksite food environment (e.g. cafeterias, vending, snack shops) (Harrison et al., 2007). These categories are not mutually exclusive, as some articles included multiple environments



2.2 Dietary Pattern and Nutritional Status

According to [Rodriguez \(2009\)](#) eating habits refers to why and how people eat, which foods they eat, and with whom they eat, as well as the ways people obtain, store, use, and discard food. Everybody eats to survive. People eat according to learned behaviors regarding etiquette, meal and snack patterns, acceptable foods, food combinations, and portion sizes. Most researchers on eating habits concur on the components of a meal to vary across cultures, but generally include grains, such as rice; meat or a meat substitute, such as fish; or beans and accompaniments, such as vegetables. Various food guides provide suggestions on foods to eat, portion sizes, and daily intake. However, personal

preferences, habits, family customs, social setting, and other factors largely determine what a person consumes.

In many cases family dietary patterns can be partially attributed to genetic factors and hereditary cultural factors. Dietary patterns become established in children from about age 1-2 onwards and to a great extent persist throughout life. The diets of younger children tend to be more similar to that of their parents than the diets of older children (Latham, 1997). It is thus important to try to ensure that children's diets are as varied as possible from an early age.

A diet comprising many different nutrients as well as a many different flavours, textures, and colours will not only ensure adequate nutrition and development but will also encourage acquisition of the capacity to make appropriate choices between food items. Such "diet training" is particularly critical for children at the pre-school stage because this is the period during which the child learns to exercise control over his or her impulses and environment. In addition, during this period the child begins to take notice of the organoleptic qualities of food, to prefer some foods over others, to be fussy at mealtime, to not be hungry, to get bored by too much of the same, and to be "scared" of certain foods. And adequate family diet is good for the child's health and provides a solid foundation for the future, when the child will gradually come to spend more time away from home, at school and elsewhere. In such environments, the child will be increasingly exposed to the often unhealthy dietary habits of his or her peers (Kamau-Mbuthia & Elmadfa, 2007).

Dudek (2010) mentioned that breakfast consumption has been identified as a important factor in the nutritional well-being of children. Several studies have indicated that omission of breakfast or consumption of an inadequate breakfast is a factor contributing to poor school performance and to dietary inadequacies that are rarely compensated for

in other meals of the day. Differences have also been observed in the nutrient density of the breakfast meal, depending on whether it was consumed at school or at home. Also, previous studies have shown that the diets of obese people are less nutritionally sound than those of normal-weight people, and that they omit breakfast more frequently, as well as eating a less nutritional breakfast. Since both early eating habits and early obesity may persist into adulthood, the relationships between dietary habits and body weight during the school years may have a lifelong significance. Obese children, especially girls, omitted breakfast more frequently and ate smaller amounts of grain products at breakfast, in comparison to normal-weight children (Dudek, 2010). The energy supplied by breakfast, measured as a percentage of energy expenditure, was lower in the obese than in the normal-weight children, and their breakfasts were lower in carbohydrates, thiamine, niacin, vitamin B6, vitamin D, and iron. In Spain more than 20% of children go to school every morning without any breakfast or with an inadequate meal. Of course, children who skip breakfast at home often have money to buy a substitute; typically, however, such substitutes are of low nutritional quality (Dudek, 2010).

Chalapati *et al.* (2006) indicated that obese children have less satisfactory breakfast habits than normal-weight children do. To some extent, this may reflect the poorer overall quality of the diets of the overweight subjects. It is also possible however that an inadequate breakfast may contribute to the making of poorer food choices throughout the rest of the day, thereby promoting obesity. Since better breakfast habits have been associated with better overall diets, it is desirable to promote and facilitate the eating of adequate breakfast by schoolchildren, especially those who are overweight. Obese people tend to show a stronger preference for fatty foods, and especially sweet fatty foods, than thin people; even in people of normal weight, they tend to have a positive correlation between the degree of preference for fatty foods and the fat content of the

body. School-aged children and adolescents in particular tend to eat many snacks as a result of their greater independence from the family, their tendency to be away from home for much of the day, and their typically significant disposable wealth; children in these age groups often replace breakfast, and sometimes lunch, with snacks. Children who snack frequently tend to eat relatively small amounts of the higher quality foods typically present in main meals (Li *et al.*, 2004; Lopez, 2006).

Review of recent literature on the dietary habits of school-aged Spanish children reveals similar tendencies (i.e., high intakes of total fats, and especially monounsaturated fats and cholesterol, free sugars and low intakes of carbohydrates). The woman of the family unit must know the key to a healthy and balanced diet to transmit the message correctly, and for that reason cardiologists have spread this message in small towns around Spain, with the hope of keeping traditional healthy nutritional habits in the countryside although they have already changed in the urban population (Li *et al.*, 2004).

The literature on food choice and habit as well as nutritional status indicated that under consumption and over consumption of calories tends to result in malnutrition. In other words, one must be both food and nutrition secured to be in a very good or optimum nutritional status. According to the WHO (2001), nutritional status depends on the interaction between food that is eaten, the overall state of health and the physical environment. Food preferences that are developed early in life influence adult food preference. Furthermore, it is during this period that they experiment and start developing dietary habits. Nutritional status is an indication of food, health and care as major requirements for nutritional well-being. The WHO notes that factors such as famine, starvation, fasting, economic instability and skipping meals are reasons why one would not have enough food or eat less which leads to bad nourishment or under

nutrition. On the other hand, overeating nutrient dense foods or physical inactivity levels may be factors leading to over nutrition.

Studies have been conducted in different parts of the world on food choice. In the US, Wang *et al.* (2010) conducted a study to determine the dietary intake pattern of 382 low income urban African American adolescents described their dietary patterns based on caloric intake, nutrients, food groups and diet quality. The study revealed that there was high energy intake among the participants with most of the participants consuming calorie dense foods as well as foods that are low in nutrient such as snacks, fried foods and sweetened beverage. They also found out that more than half of the participants consumed one or more servings of sweetened beverage and fried foods per day.

Another study conducted in Canada by Janssen *et al.* (2004) to present overweight and obesity prevalence rates for 11-16 year old Canadian youth and to examine associations between overweight and obesity with dietary habits and leisure-time physical activities revealed that the rate of overweight (pre obese) was greater in boys than in girls but did not vary according to age. Moreover, they also found out that physical inactivity levels and television viewing times recorded were higher in overweight and obese boys and girls than those who were normal. From the results it can be said that sedentary lifestyle as well as physical inactivity are more likely to have an influence on the obesity rate among Canadian adolescents.

A research conducted in Nordic countries (Denmark, Finland, Norway and Sweden) by Samuelson (2000) involving adolescents aged 13-18 years indicated that their meal patterns were irregular. They found out that, breakfast was the meal often skipped by the participants especially in females than males. Lunch was also sometimes skipped while most of them have dinner. Their results also revealed that snacking and light meals were very common. This discovery is similar to the finding of Wang *et al.* (2010) in the

United States were they also found out that snacking was very common. The study also showed many of the participants spent less time in doing physical activity but rather spent a lot of time in watching television as well as playing computer games. This can also be compared to the physical inactivity levels and sedentary lifestyles found among the Canadian adolescents by Janssen *et al.* (2004).

A study conducted in Xi'an City, China by Li *et al.* (2004) explored the association between dietary habits and overweight and obesity in adolescents. Results revealed that consumption of foods and beverages outside three main meals was more popular in boys than in girls, while girls consumed more fried food and soft drinks than boys. Snacking can therefore be said to be popular among Chinese adolescents. Moreover, it is important to note that the rate of snacking among these Chinese adolescents can be compared to the snacking rates of adolescents in Nordic countries as well as those in the United States. The report also stated that overweight and obesity were found among those who did not eat breakfast at home, but rather bought food from outside and also those who consume soft drinks. Consumption of soft drinks (carbonated and noncarbonated) is known to be a major contributor to the risk of overweight and obesity. Also Faruk *et al.* (2000) conducted another study in Bangladesh to investigate the dietary patterns and nutritional status of adolescent girls attending school in Dhaka City. Their studies revealed that a large number of the girls did not eat eggs, milk or dark green leafy vegetables but a larger proportion consumed meat and fish at least four times in a week. Conclusively, they reported that the diets of the girls were inadequate in both micronutrients and macronutrients. A study in Nepalese schoolchildren showed that fast foods (ready to eat snacks, chips etc) were preferred by more than two-third of adolescents (World Bank, 2003). In Nigeria, a study conducted by Olumaikaiye *et al.* (2010) on food consumption patterns of Nigerian adolescents and effects on body weight to determine the association

between nutritional status of adolescents and food consumption pattern showed that more than half of the participants ate three meals daily. They realized that the rate of underweight was higher among those who did not take snacks but ate three meals a day, but least among those who ate snacks twice a day in addition to their three main meals. They concluded that snacking was important in improving nutritional status. In the northern part of Ghana, Adamu *et al*, (2012) carried out a study to determine the effects of dietary patterns on the nutritional status of upper primary school children in the Tamale metropolis. Using 100 participants randomly selected from five basic schools, they used data collection tools and techniques including anthropometry, dietary assessment, interviews and observations. Food frequency questionnaires were administered to assess dietary intake over a period of two weeks. Results from the study revealed that, the prevalence of underweight was relatively low among participants as compared to other developing countries. While 7% were at a risk of becoming overweight, 4% were overweight. Foods consumed were basically from local staples. Variability was however lacking in the diet for most and consumption of animal protein was also low. More than 70% of participants did not consume eggs whereas fish and meat were consumed occasionally. Most meals were eaten at home and parents mostly determined what is eaten at each meal time. Again, 37% snack twice a day while 56% of the participants consumed both light and heavy meals as snacks. Snacking was frequent among the overweight and those at risk of becoming overweight than the underweight. General nutrition knowledge of respondents was poor. They also concluded that snacking is more likely to influence respondent's nutritional status. They also suggested that sedentary lifestyles may be implicated for the prevalence of overweight and risk of becoming overweight.

Malnutrition is often measured using anthropometric index. Dudek (2010) explain anthropometry as the science of measuring the size, weight and height of a human body. Height and weight measured usually vary according to the person's age and sex and these measurements are used to derive indices such as body mass index, weight-for-age, weight-for-height as well as height-for-age. This index can be used to determine underweight, wasting and stunting respectively.

Previous studies have also explored the health implication of food choice and habits. Indeed, health and nutrition are known to be closely related. Nutrition can have an effect on one's health either by improving it, or making it deteriorate, likewise health can also affect nutrition by either improving the individual's appetite or making it deteriorate. During teenage and early adulthood years, there is high incidence of nutrition deficiencies and poor eating habits which exposes them to many risk factors leading to the development of chronic diseases such as diabetes, osteoporosis, hypertension, heart diseases, chronic kidney failure, cancer and many others. Under nutrition is noted to be the single leading global cause of health loss (Lopez *et al.*, 2006). It was shown that even though the prevalence of underweight has decreased in most parts of the world in the past decade, it has increased in Sub Saharan Africa. In a study conducted in Sub Saharan Africa to determine the leading causes of death, Chalapati et al. (2006) also suggested that malaria, diarrheal diseases and malnutrition were the leading causes of death among school-age children.

2.3 Factors that Influence Food Choice

Poor nutrition and obesity are among the most important health issues facing society today, not only in terms of health, but also health care expenses (Goel, 2006; Rashad & Grossman, 2004). There are a variety of predictors of obesity including genetics,

physical activity, and food consumption (Goel, 2006). There are other outcomes of food choice and nutrition that also have an independent effect on health including some types of cancer, cardi-ovascular disease, and diabetes (Nicklas, *et al.*, 2001). For these reasons, food selection is an important consumer behavior with many long-term consequences to the individual in the form of health and longevity and to society in the form of health costs. Some research has shown that the most important factors predicting food selection among adults are: taste, cost, nutrition, convenience, pleasure, and weight control, in that order (Glanz, *et al.*, 1998). Many studies have shown that people often establish these tastes and habits while they are relatively young (Birch, 1999). Evidence suggests early establishment of habits and preferences occurs for a variety of behaviors including media use (Basil, 1990) and music listening (Holbrook & Schindler, 1994), as well as food choice (Birch, 1999). Therefore it is advisable to begin establishing good eating habits when people are as young as possible. Importantly, however, for the very young many food decisions are controlled by parents and preschools (Nicklas *et al.*, 2001). Therefore, food choice for the youngest age groups may be constrained by a number of factors. An especially important time of life for food choice is when people step out independently for the first time and begin to make all of their own food decisions. For many people, this is the transition to college life. The transition to college or university is a critical period for young adults, who are often facing their first opportunity to make their own food decisions (Baker, 1991; Marquis, 2005) and this could have a negative impact on students' eating behaviors (Marquis, 2005; Rappoport, 2003).

Previous literature has extensively discussed factors that influence eating behaviors among college students. However, application of a behavioral model such as the health belief model (HBM) has received less attention. Only three studies were found that applied HBM in the college eating context (Garcia & Mann, 2003; Wdowik, *et al.*, 2001).

These studies examined avoiding dieting, a combination of eating and exercise, and diabetic students, respectively. The present study provides valuable insights into how health beliefs impact eating behaviors for college students - a population at the crucial stage of transitioning into independent nutritional practices.

While three studies were found to apply the HBM to eating among college students, their findings were less useful to the current study because of differences in the nature of the sample or the dependent variables. One study (Wdowik *et al.*, 2001) applied HBM to understand how diabetic students manage their problem and did not address the general student population. The two student groups may differ from each other in their perceptions of healthy diet. For example, the diabetic student population may perceive benefits and barriers of healthy diet differently from general student population. A second study (Garcia & Mann, 2003) employed the model to understand how students resist dieting, not how they approach healthy eating. Finally, a third study (Von *et al.*, 2004) investigated the influence of HBM variables on physical activity and nutrition behavior among other behaviors. Unfortunately, they combined physical and nutrition behaviors as a single measure, although the two behaviors conceptually differ.

Studies on factors that influence choice of food have been revealing. At this stage in their lives, students in this age group begin to gain some amount of control in decisions concerning their lives especially in their choice of friends and the kind of foods they eat outside their homes. Though they have the right to choose what they want to eat, there are other factors that influence their choices, many of which can improve their choices or adversely affect them. Some of these factors that influence their choices of food include socio-economic status of parents (specifically income and educational level of parents)- (Kamau-Mbuthia, 2007), peer pressure-International Food Information Foundation

Council, (2009); Neill *et al.* (1997), cultural practices (Latham, 1997; Robert, 2007) and advertisement (WHO, 2006).

2.3.1 Socio-economic Factors

Socio economic status is known to be a great determinant of health and nutritional status. This is buttressed by WHO (2006), as cited in Chen (1979), in his explanation of the factors that account for adequate nutrition. According to him, the first factor is the adequate availability of food in terms of quantity as well as quality, which depends on socio-economic status, food practices, cultural traditions and allocation of the food in the household. He stated the second factor to be physiologically related in terms of digestion, absorption and utilization of the food. The main settings that influences the way children and adolescents grow up include families, neighbourhoods and schools. The quality of these settings and whether they are supportive and nurturing or dangerous and destructive has a profound influence on adolescents' chances for leading successful adult lives. Family income is perhaps the single most important factor in determining the quality of these settings (National Research Council, 1995; cited in Adamu *et al.*, 2012) and the nutritional and health status of both children and adolescents.

This assertion is further emphasized by Videon and Manning (2003), on studying the determinants of fruits, vegetables, and dairy products consumption among adolescents in the United States. They concluded that the presence of parents during evening meals associated positively with increased consumption of fruits, vegetables, and dairy products. Nevertheless, [Wood-Wright \(2009\)](#) in an examination of dietary intakes and patterns among U.S. families found that the resemblance between children and their parents' eating habits is weak and that factors other than family and parental eating behaviors may play an important role in affecting children's dietary intakes. What is

eaten by the family is solely dependent on the income of the parents. Low income families tend to either purchase less nutritious cheap food items as a means to cope with the situation or reduce intake of food. The less nutritious cheap food items will certainly not meet the nutritional requirement of the household particularly the vulnerable groups of which adolescents are included. Nutritional requirement increases during adolescent where females require 2200 calories per day and males 2500-3000 calories and all the other nutrients needed for the growth and development.

Therefore, adolescents from low income families are more likely to have nutritional deficiencies than their peers. Moreover, adolescents from poor and low income families are more likely to have emotional problems, face both financial and non-financial barriers to adequate food, medical care and have limited care from their parent since much of their time is focused on earning income for the family. Therefore, socio-economic status of parent specifically income, have an adverse effect on adolescent's health. This is a supported study in the United States on the association between socioeconomic status (income) on health care and health status of adolescents (Newacheck *et al.*, 2003) which is in consistence with the findings of a study conducted by (Montgomery, 1996; Bearman & Moody, 1999). These studies were especially conducted on early childhood periods since it is a crucial stage of development, where a deficiency or any health problem that occurs is carried on to adulthood. Children from low income families suffer from worse health with different nutritional deficiencies and metabolic dys functions than children from high income families. Case, Lubotsky and Paxson, (2002) findings on the relationship between family income and health status among toddlers in the U.S showed a positive association. Poverty is considered the prime factor determining food consumption; however, some researchers suggest that cultural factors play a stronger role than socioeconomic conditions in determining allocation of

food and nutritional adequacy (WHO, 2006; as cited in Sendrowitz, 1995) especially in countries where gender discrimination plays an important role in intra household food allocation. Parental educational level, in particular the mothers, showed the highest impact on the adolescents' health-related dietary habits since they cook family meal. Mostly, educated mothers are cautious of what the family eats than uneducated mothers.

2.3.2 Advertisement

Advertising products by manufacturers is the best medium to get their product to the population. The most commonly used mediums are television, radio and magazines. Television is the favourite medium most widely used by food manufacturers because it can reach large audiences and instil brand name recognition. Much television advertising is also aimed toward people who do not read newspapers, such as children and adolescent. Mostly, this advertisement focuses on highly processed and highly packaged foods which do not meet the nutritional requirement for both children and adolescent. According to WHO (2006) as cited in Phyu Phyu Aung (2002), advertising, probably TV and magazines, influenced preferences in 80% of Nepalese adolescents. Also, another food study he conducted in Myanmar also showed that about half of the participants consume snacks that are advertised.

2.3.3 Cultural and Religious Factors

Culture is known to have both positive and negative influences on the kinds of food people consume. The nutritional advantages of traditional foods cannot be repudiated. Latham (1997) buttresses this point in his statement that ~~the~~ traditional use of certain green leaves by rural people is a beneficial practice that should be encouraged". Another example of how culture positively affects food consumption is again cited by Latham

(1997). According to him, many societies in Indonesia and parts of Africa partly ferment foods before consumption. Scientifically, fermentation is known to improve nutritional quality of food as well as reduce bacterial contamination (Marquis, 2005). Conversely, certain taboos have negative influences on the foods people consume.

According to Latham (1997), many taboos concern the consumption of protein rich foods often by those groups of the community most in need of protein. A common taboo in Africa is against the consumption of eggs. Certain religions also forbid their members from consuming certain foods. Jewish and Moslems are forbidden from taking pork. Meanwhile, these are known to have some nutritional value.

2.3.4 Peer Pressure

Parents have lesser control on what adolescents eat especially when they go to school. However what their friends eat in the school and what is available to them in the school environment may have an impact on their food preference. This point is reinforced by the International Food Information Foundation Council (2009). According to the council, social pressure has a major influence on teenagers' food choices because that is the time they want to gain peer acceptance or insist on independence from parental authority. Also according to Neill *et al*, (1997), what children eat at school is dependent on many factors, including the cafeteria environment, peer pressure, administrative support, teacher participation, cafeteria staff and the quality of food choices offered. Peer pressure can thus be an important determinant in one's choice of food.

In Ghana, there is paucity of documented information on the nutritional status of SHS students especially those in boarding schools and such studies could help in the development of relevant nutrition intervention by stakeholders to address issues of

malnutrition among them. It is against this background that this study is being conducted to assess the nutritional status of SHS students in Navrongo.

2.3.5 Interpersonal Factors

Interpersonal factors have strong influence over a person's ability to eat healthy foods. Interpersonal determinants of healthy eating include income, interactions with family members, friends and support from others.

2.3.6 Income

Low income is a social factor, which is commonly associated with unhealthy eating (Finch, 2003). The limited financial resources of an individual may prevent them from providing healthy nutritional diet for children (Berkowitz & Papiernik, 1993). Studies show that low-income people often consume less fruits and vegetables and have a lower intake of lean sources of protein and whole grains—all comparatively high-cost foods (Rogers *et al*, 1998; Wynn *et al*, 1994). This eating behavior can lead to lower intakes of macronutrients, vitamins, and minerals (Rogers *et al*, 1998), and can lead to low infant birth weight (Wynn *et al*, 1994).

Parents need to use their food budget carefully and buy food that can provide more calories and can be easily stored; therefore many of their choices include inexpensive, high on fat and carbohydrates foods (Stevens, 2010). Depending on whether these young women receive assistance from the government or not, they have different personal experience with providing food for their families (Stevens, 2010). In several studies, parents reported that they were perceptive of public health messages and understood the need to maintain nutritional diet, such as to increase the consumption of fresh fruits and vegetables and whole grain products (Collins *et al*, 2000). The reasons given for poor

nutrition and obesity in their lives included the high cost of fresh foods, cravings for unhealthy products during some periods, lack of available supermarkets in the area they live, and the need to rely on non-perishable high-density foods during times of food insecurity each month (Center on Hunger and Poverty, 2002).

Furthermore, several studies also have shown that low income can lead to perceived stress and depression among people, which are allied with riskier health and nutrition behaviors in pregnant women and new mothers (Walker., 1989; Walker *et al.*, 1999). Conversely, social support and family care is associated with more positive health behaviors (Walker *et al.*, 1999). Low income might be a big problem for mothers living in countries from Eastern Europe. They might face food insecurity or other difficulties to provide healthy and nutritional diet for the baby and themselves. Still despite economic limitations and the negative influence of stress, women might find different strategies to provide adequate dietary intake for them and their children. Influenced by different factors they might find resources to eat the required healthy foods and enact different health behaviors.

2.3.7 Parents-Children Relationship

A life course perspective incorporates multiple concepts with importance for understanding food choices. –These concepts include trajectories, transitions, turning points, lives in place and time, and timing of events in lives” (Devine, 2005). Becoming a parent is an event that might affect both parents and children dietary behavior. A healthy dietary intake of pregnant women is important not just for the mother but it also has an influence on maternal and baby health, and thus may exert an influence over the health of younger and older generations (van Teijlingen *et al*, 1998).

Adults make food choices for the whole family. –Parental attitudes must certainly affect their children indirectly through the foods purchased for and served in the household, thereby also influencing the children’s exposure and, hence, perhaps their habits and preferences” (Wardle, 1995). Hence there is an opportunity for healthy eating habits to be established in early age. That is why it is vital parents to be well informed about appropriate diets and targeted with healthy choices of food both for them and their children.

–The conditions in which foods are chosen, the lives of the parents making the choices, and the foods available to be chosen are constantly changing” (Devine, 2005).

Significant social and economic trends, which affect the food choices include changes in the conditions related with maternal employment and parental hours of employment (Presser, 1999; Bureau of Labor Statistics., 2005) and time spent preparing and eating meals at home (Blisard *et al.*, 2002; Devine *et al.*, 2003). Because of the busy daily routine, mothers might adopt unhealthy eating habits, which they unconsciously might transfer over the child. According to Nielsen (2002), an increasing proportion of food that parents and children eat is prepared and consumed away from home. The eating culture is drastically changing and this is related to changes in food consumption, changes in nutrient intake, such as increases in calorie consumption (Chanmugam *et al.*, 2003); –and a disproportionately high level of dietary fat, saturated fat, cholesterol, sodium, and calories and a low level of fruits and vegetables, dietary fiber, calcium, and iron, associated with meals eaten away from home” (Guthrie *et al.*, 2002).

Recently studies prove that marketing campaigns significantly influence parents’ choices for food. Pregnant mothers might be especially vulnerable as they might tend to eat according to cravings and personal taste. As the baby absorbs some components from

the food that the mother consumes, unhealthy eating might have a negative effect over the child's nutrition and growth.

Parents are a major mediator of children's access to food and determine their eating habits after the birth (Gier *et al*, 2007). Parents influence children's dietary behavior by the types of foods they buy or allow their children to buy (Gier *et al*, 2007). Sometimes parents might adopt unhealthy eating habits and influence negatively to their children by increasing the consumption of fat and sugar during the day. Fast food is a type of food that is marketed directly both to adults and their children and often preferred when the family is out. Studies show that the consumption of such food is steadily increasing despite the fact that adults' frequency of dining in fast-food restaurants is associated with increased body weight and obesity (French *et al*, 2000; Pereira *et al.*, 2003). Factors influencing the decision of heaving such unhealthy meals might be cravings and preferences. The busy daily routine of the parents might also be a factor for the increasing consumption of that kind of food. Mothers, who have been at work the whole day, might not have the time to prepare hot and healthy dish afterwards. This might predetermine bad eating habits and unhealthy diet for the whole family.

As parents interact with children daily, they have the opportunity to improve their food choices (Birch & Fisher, 1998). –Family members can influence the food preferences of their children by providing healthy food choices, offering multiple opportunities to prepare and eat new foods, and serving as positive role models through their own food choices” (Kalich *et al*, 2009). Children might also affect parents eating behavior through the foods they request. By requesting food products they determine the choice for the whole family as, food products, which are most often requested by children, are most often bought on request (Ward and Wackman, 1972). Research suggests that fast-food marketing influences children's food preferences and what they repeatedly ask their

parents to buy for them (Hasting *et al.* 2003). If parents buy fast food for their children and constantly go to such restaurants, they might not be able to resist the temptation and increase their consumption of this type of food. The same can be said for any product requested by the child. Thus, children might also affect parents' dietary choices and predetermine both healthy and unhealthy eating.

2.5 Eating Behavior of College Students

Numerous studies have shown that college students often have poor eating habits. Students tend to eat fewer fruits and vegetables on a daily basis and report high intake of high-fat, high-calorie foods (Brevard & Ricketts, 1996; Driskell, *et al.*, 2005; Racette *et al.*, 2005). According to the American College Health Association (2006), a 2004 study revealed that only 7.3 % of students ate five or more servings of fruits and vegetables daily. The transition to college life often worsens dietary habits among students (Grace, 1997) which could contribute to weight problems especially during the first year of college or university (Anderson *et al.*, 2003) and continue during later years of life (Racette *et al.*, 2005).

2.5.1 Determinants of Eating Behavior

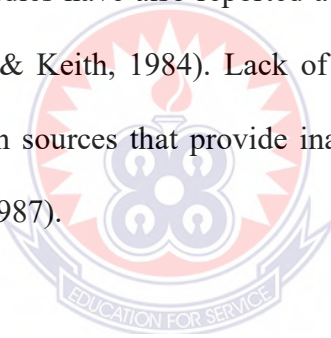
Previous studies have shown a link between demographic and psychographic characteristics with dietary behavior of college students. Driskell *et al.* (2005) revealed few differences among lower and upper level students in terms of their dietary habits, suggesting that habits established in the first year or two likely carry forward into later college years. However, where a student lives seems to affect his or her dietary habits and diet-related health (Brevard & Ricketts, 1996). Students living off-campus reported a higher percentage of energy from protein. Similarly, serum triglyceride level and the

ratio of total cholesterol to high-density lipoprotein were also higher among students living off-campus. The authors conclude that students living off campus are choosing different foods than those living on campus.

Gender differences also exist (Racette *et al.*, 2005). Female college students tend to eat more fatty foods than male students, although their fruit and vegetable consumption tends to remain similar. As discussed earlier, according to Brevard & Ricketts (1996), residence on or off campus made a difference, but it also interacted with gender. Higher energy from protein was more prevalent among men living off campus than on campus. For women, higher serum triglyceride and ratio of total cholesterol to high-density lipoprotein was found among those who lived off campus. Horacek & Betts (1998) clustered male and female college students by dietary intake differences. Four clusters were found: students influenced by internal (hunger and taste) and external cues (friends and media), by budget, by health, and neither of the factors. Males tended to be equally represented in all the four clusters with a somewhat higher percentage in the cues group, while female students tended to cluster in the cues group (55%) followed by health factors (28%). In a study by Mooney & Walbourn (2001), females avoided certain foods for their concern for weight, health and ethical reasons (especially when avoiding meat) more significantly than males. Marquis (2005) similarly reported that females were more significantly motivated by convenience, pleasure, price, and weight concerns than male students. We can thus conclude that the dietary intake of male and female college students is influenced by different factors.

Motives influencing eating behaviors among college students have been studied as well. House and Levy-Milne (2006) investigated what benefits college students believed result from a healthy diet. In this study, students at a Canadian university reported healthy eating to be helpful in providing a healthy appearance (in terms of weight, skin,

physique, and so forth), providing positive feelings, and preventing disease. Although the results in this study were based on a focus group finding with 15 students (9 students were studying to be dieticians) there are nonetheless similarities with studies conducted among general adults (Steptoe *et al*, 1995). Horacek & Betts (1998) found that taste, time sufficiency, convenience, and budget influenced students' eating habits in that order. These seem to act more as barriers to healthy eating as revealed from the focus group (House and Levy-Milne, 2006). One could assume that these barriers may be more influential than benefits given the prevalence of eating habits among college students. Other factors associated with poor eating habits among college students include a higher perception of stress (Cartwright *et al*, 2003), and low self-esteem (Huntsinger & Luecken, 2004). Previous studies have also reported a low level of nutrition knowledge (Barr, 1984; Van den Reek & Keith, 1984). Lack of indepth nutrition knowledge has been attributed to reliance on sources that provide inadequate information on nutrition (Thomsen, Terry, & Amos, 1987).



2.6 Role of the Environment in Healthy Eating

There is growing interest in the role of the environment in promoting or hindering healthy eating. It has been suggested that individual change is more likely to be facilitated and sustained if the environment within which choices are made support healthy food options. Brownell. & Frieden (2009) emphasized that as with other major public health issues such as smoking reduction, injury prevention and infectious diseases prevention, success at the population level for reducing obesity and diet-related chronic diseases are not likely to be achieved until environmental influences are identified and modified. Diet-related environment and policy interventions are also being advocated at a population level because individual behavioural change strategies are expensive and

cannot reach large numbers of people on a cost effective basis. Environmental changes may also have more lasting effect on behavioural change maybe because they are incorporated into structures, systems, policies and socio-cultural norms. The overall goal of public health is to give people the best chance to enjoy many years of healthy and active-life.

Public health encompasses a population focused and organized effort to help individuals, groups and communities reduce health risks and maintain or improve healthy living as regards to food choices. Improving dietary and lifestyle patterns and reducing obesity will require addressing not only individual behaviour but the environmental context as well as conditions in which people live and make access to healthy foods in low income and disadvantaged communities (Huntsinger & Luecken, 2004).

Many factors contribute to an individual's body weight and overall dietary health. These include individual factors, such as demographic characteristics, socioeconomic status, education, and preferences for food and so on. Environmental factors also influence body weight and dietary health. Such factors can include access to stores and restaurants, parks and recreation facilities, sidewalks, and the availability of public transportation, and social environmental factors like crime, neighbourhood cohesion, and the social and cultural norms around food (Brownell & Frieden, 2009).

Individual factors can explain some differences in who becomes obese or who acquires diabetes, but alone, they cannot account for all the differences in rates of these diseases. The food environment and food store access may help explain differences in diet and health outcomes (Diez-Roux, 2009). Measurement of food environment and its effect on dietary behaviour is a relatively new field of inquiry, and pioneering researchers have been innovative in their development and use of tools to assess these environmental effects. A working group of researchers' expert in measuring food environment was

formed by the National Cancer Institute in 2006. This group, consisting of internal National Cancer Institute (NCI) and extramural scientists, identified the need to create a consolidated list of the measures of the food environment. The working group noted that no systematic compilation of measures of the food environment has been completed and that such a compilation would benefit researchers and community groups interested in reviewing or using existing measures. This paper is an initial attempt to identify measures of the food environment used in research and serves as the basis of the discussion of food environmental measures (Harrison, 2007).

2.7 Strategies to Enhance Healthy Eating Habits

Eating patterns are frequently irregular in an adolescent which is a common factor of nutritional risk irrespective of the area. As per Shubhangna et al. (2009) in India, poor nutrition, early child bearing and reproductive health complications compound the difficulties of adolescent physical development. Most girls are not adequately aware of their increased nutritional need for growth resulting in girls that are underweight and of short stature. Adolescent girls face more problems than boys, largely due to socio-cultural factors. Even in developing countries some of the dietary patterns like meal skipping, snacking, irregular meals, wide use of fast food, appear quite common among adolescents. According to WHO (2005) adolescence represents a window of opportunity to prepare for healthy adulthood. Healthy eating and lifestyle behaviour should be promoted and practiced, thereby preventing or postponing the onset of nutrition-related chronic diseases in adulthood. Under nourished adolescents would require further nutrition interventions, besides proper According to WHO (2005), the strategy for nutrition intervention in adolescence suggests components of promotion, prevention and treatment. Thus, promoting adequate nutrition with adolescents means enhancing control

of adolescents over their food and food resources and improving their access to appropriate nutrition services in addition to strengthening food-related skills and encouraging healthy eating and lifestyle. Prevention focuses on a specific condition like malnutrition and specific micronutrient deficiencies. Treatment includes health care services to deal with nutritional aspects of diseases in adolescents in an appropriate manner. As per Bhatia (2001) school-based nutrition interventions also provide the most effective and efficient way. Schools provide a setting to introduce nutrition information, technologies to the community and also interventions such as nutritional screening, providing micronutrient supplements, ensuring consumption and nutrition behaviour development and school feeding programmes. He further suggests that in populations where many adolescents are not in school, school outreach programme have been found effective. Vocational schools and other community-based institutions such as youth groups can also be involved in addition to using the media. Adolescents may also be reached through work-site programmes in certain case.

Social affective context is the positive or negative experiences encountered socially while eating a particular food. This can lead to the like or dislike of such food but adolescents should be encouraged to avoid developing food preference as a result of negative previous experience with a particular food, because such food might be beneficial to health. Biologically, human beings appear to be born with unlearned predisposition towards liking things that taste sweet and rejecting things that taste sour or bitter but a study by Harrison *et al.* (2007) reported that high sugary food intake could make students forgetful. Therefore, adolescents should be advised to reduce their sugary food intake which is more beneficial to the brain activities. Parents and caregivers as a matter of fact play central roles in shaping the dietary habit of household members.

Adolescents should emulate healthful food choice offered to them at home and make the same food choice whenever they are away from home. As a result of ubiquity of fast food and junk food outlets, adolescents are advised to lower the intake of fast food and junk food as both are high in calories, sugar, salt and fat and embrace the consumption of balanced and varied diet as well as fruits and vegetables in quest of food choice to be mentally sound. In addition, adolescents should avoid subscribing to friends and peer pressure as a result of social norms and expectations. For example, some students feel pressured to eat less-nutritious fast food rather than making a wise food choice (Schroder & Eachern, 2005).

WHO (2005) reports that nutrition promotion and education helps to encourage healthy eating and physical activity, strengthen self-esteem as a means of resisting adverse environmental influences on eating and dieting practices, contribute to preventing obesity and disordered eating through these attitudes and behaviour. Behaviour change through communication is a multi-level tool for promoting and sustaining the desired behaviour in individuals and communities by providing important information about food and by promoting a particular brand.

CHAPTER THREE

METHODOLOGY

3.0 Research Design

The study employed quantitative techniques of data collection and analysis. This involves questionnaire administration using cross sectional survey to assess the nutritional status of the students of Navrongo SHS.

3.1 Population of the Study

Study population comprised students of Navrongo Senior High School. The study included form 1, 2 and 3 students. In all, one hundred and fifty (150) students were target for the study.

3.2 Sampling and Sampling Technique

Probability proportional to number of students in each class was used to select the sample size of ninety five (95) students. A proportion of the total sample size was allocated to each of the classes based on the total population of students in the school. This was done using simple ratio and proportion. Simple random sampling technique was then to select the required number from each class to prevent bias.

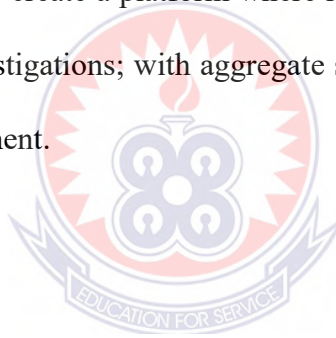
3.3 Data Collection Instrument

A structured questionnaire was formulated to collect information from the subjects. Questionnaires were made of closed ended question. The questionnaire sought information on socio-demographic characteristics, factors that influence the food choice and habits of students, dietary patterns of students and suggestions for helping students

eat more healthful diet. All respondents were able to answer the questionnaires with ease with little or no guidance.

3.4 Data Collection Procedure

The researcher obtained official permission from the Headmaster of Navrongo Senior High School before administering the questionnaire to the students. The questionnaire was personally administered by the researcher to the ninety five (95) students. The questions were explained to respondents to further establish better rapport. All the twenty four (24) questions or statements were ticked (✓) within the appropriate columns, with columns structured in likert scale based on research questions raised in the study. The rationale for likert scale is to create a platform where respondent's attitude, opinions and interests was subject to investigations; with aggregate scores identified in the strength of the agreement and disagreement.



3.6 Data Analysis

Data entry and analysis were completed using SPSS version 20.0. Mean and standard deviation for continuous variables and frequency of categorical variables were obtained through descriptive analysis. The data obtained during the field was coded, counted, categorized into tables.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the results and discussions of the study obtained from questionnaires. The chapter specifically looks at the factors determine the food choice of students, dietary patterns and nutritional status of students and suggestions for helping students eat more healthful diet.

4.1 Demographic Characteristics of Respondents

In the current study, demographic characteristics of respondents comprising of age, gender and living status of the respondents were investigated. According to Van-Bussel *et al.*, (2011) balanced and healthy diet will vary depending on individual needs (e.g. age, gender, lifestyle, degree of physical activity), cultural context, locally available foods and dietary customs. With this, demographic characteristics of the students were needed to make a fair conclusion on the study. Table 4.1 shows the age category of the respondents.

Table 4.1: Age category of Respondents

Age range	Frequency	Percentage (%)
Under 15years	8	8.4
16-20years	60	63.2
21 - 24years	25	26.3
25years and above	2	2.1
Total	95	100.0

Age distribution is the proportionate number of persons in successive age categories in a given population (Arnot *et al.*, 1999). The study sought to investigate the respondent's categorization of their age bracket as they responded to the questionnaires. From Table 4.1, majority (n=60) of the respondents representing 63.2% had their ages ranging between 16-20years. This was followed by ages between 21-24years constituting 26.3%. The range under 15years had 8.4% and the age group of 25years and above also had 2(2.1%) representing the minority of the respondents. This result can be attributed to the fact that form 1, 2 and 3 classes were inclusive in the study. It can therefore be suggested, based on the available information that most of the respondents are in their youthful age. Table 4.2 shows gender of the respondents.

Table 4.2: Gender of Respondents

Gender	Frequency	Percentage (%)
Male	39	41.1
Female	56	58.9
Total	95	100.0

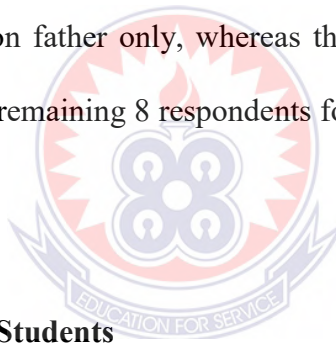
According to Arnot *et al.*, (1999) gender can be either of the two categories (male and female) into which humans and most living things are divided on the basis of their reproductive functions. Gender has become necessary in behavioural studies across the world because they have different conclusion on a subject of study. According to Table 4.2, more than half of the respondents were females constituting 58.9%, while 41.1% of the respondents were males. It can therefore be deduced that more females were captured in this study.

The study also investigated the living conditions of the respondents. Table 4.3 illustrates the living status of the respondents.

Table 4.3: Living status of Respondents

Living status	Frequency	Percentage (%)
Mother only	18	18.9
Father only	6	6.3
Both parents	63	66.3
Other relatives	8	8.4
Total	95	100.0

From the study, most of the respondents depend on both parents (i.e. mother and parents) for their source of revenue; while few of them source of revenue from other relatives which can be their sister, brother, aunt, nephew, cousin, and others. Eighteen (18) respondents representing 18.9% rely on their mother only, 6 respondents constituting 6.3% depends on father only, whereas the 63 of them representing 66.3% rely on both parents and the remaining 8 respondents forming 8.4% rely on other relative for their source of revenue.



4.2 Dietary Patterns of Students

People eat according to learned behaviors regarding etiquette, meal and snack patterns, acceptable foods, food combinations, and portion sizes. Most researchers on eating habits concur on the components of a meal to vary across cultures, but generally include grains, such as rice; meat or a meat substitute, such as fish; or beans and accompaniments, such as vegetables. Various food guides provide suggestions on foods to eat, portion sizes, and daily intake. However, personal preferences, habits, family customs, social setting, and other factors largely determine what a person consumes. With this Table 4.4 shows the frequency of dietary pattern of Navrongo SHS students.

Table 4.4: Frequency of dietary pattern of students

	Responses				Mean	Std. Dev.
	1	2	3	4		
I often take my meals at the right time	75(78.9%)	14(14.7%)	6(6.3%)	--	1.27	.573
I usually take meat/fish during meals	70(73.7%)	13(13.7%)	12(12.6%)	--	1.39	.704
I do take lunch at stipulated time during the week	75(78.9%)	13(13.7%)	7(7.4%)	--	1.28	.595
I often take snacks	30(31.6%)	51(53.7%)	6(6.3%)	8(8.4%)	1.92	.846
I take supper throughout the week	80(84.2%)	12(12.6%)	3(3.2%)	--	1.19	.468
I usually consume vegetables and legumes during meals	39(41.1%)	44(46.3%)	12(12.6%)	--	1.72	.679
I consume fruits at all times	24(25.3%)	54(56.8%)	17(17.9%)	--	1.93	.656
I don't consume fast foods	6(6.3%)	26(27.4%)	59(62.1%)	4(4.2%)	2.29	.650

Key: 1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree

Table 4.4 displayed the dietary pattern of Navrongo Senior High School students. Out of 95 respondents studied, 75(78.9%) of them frequently take breakfast in a week, while 6(6.3%) rarely take breakfast in a week. However, 70 (73.75%) of the respondent frequently take meat and fish, whereas 12(12.6%) of the respondents rarely take meat and fish. According a study conducted by Wang *et al.* (2010) food frequency questionnaires were administered to assess dietary intake over a period of two weeks. Results from the study revealed that, the dietary pattern was relatively low among participants as compared to other developing countries. Whiles 7% were at a risk of becoming overweight, 4% were overweight. Foods consumed were basically from local

staples. Variability was however lacking in the diet for most and consumption of animal protein was also low. More than 70% of participants did not consume eggs whereas fish and meat were consumed occasionally.

Concerning on how often the respondents take lunch in a week, 75(78.9%) of the respondents opined that they frequently take lunch in a week, while 7(7.4%) of the respondents mentioned that they rarely take lunch in a week. Moreover, regarding on how often the respondents take snacks, it was revealed that 30(31.6%) of the students frequently take snacks, while 8(8.4%) of the respondents asserted that they rarely take snacks. Majority (n=51) of the respondents constituting 53.7% attested that they occasionally take snacks. According to [Rodriguez \(2009\)](#) eating habits refers to why and how people eat, which foods they eat, and with whom they eat, as well as the ways people obtain, store, use, and discard food. Everybody eats to survive. People eat according to learned behaviors regarding etiquette, meal and snack patterns, acceptable foods, food combinations, and portion sizes. Studies have been conducted in different parts of the world on food choice. In the US, Wang *et al.* (2010) conducted a study to determine the dietary intake pattern of 382 low income urban African American adolescents described their dietary patterns based on caloric intake, nutrients, food groups and diet quality. The study revealed that there was high energy intake among the participants with most of the participants consuming calorie dense foods as well as foods that are low in nutrient such as snacks, fried foods and sweetened beverage. They also found out that more than half of the participants consumed one or more servings of sweetened beverage and fried foods per day.

As described in Table 4.4, regarding to how often the respondents take supper in a week, 80(84.2%) of the respondents affirmed that they frequently take supper in a

week, 3(3.2%) of the respondents mentioned that they rarely take supper in a week. Regarding the issue of vegetables and legumes are consumed usually, 39(41.1%) of the respondents said that they frequently consume vegetables and legumes, whereas 12.6% rarely consume vegetables and legumes. In addition, how often fruits is consumed, 24(25.3%) of the respondents frequently consume fruits, while 17(17.9%) of the respondents consume fruits. The majority (n=54) of the respondents representing 56.8% occasionally consume fruits.

Concerning on whether fast food is consumed with egg by the respondents usually, 6(6.3%) of the respondents said they frequently consume fast food with eggs, while 59(62.1%) of the respondents rarely consume fast food with egg. A research conducted in Nordic countries (Denmark, Finland, Norway and Sweden) by Samuelson (2000) involving adolescents aged 13-18 years indicated that their meal patterns were irregular. They found out that, breakfast was the meal often skipped by the participants especially in females than males. Lunch was also sometimes skipped while most of them have dinner. Their results also revealed that snacking and light meals were very common. This discovery is similar to the finding of Wang *et al.* (2010) in the United States, where they also found that snacking was very common.

Also Faruk *et al.* (2000) conducted another study in Bangladesh to investigate the dietary patterns and nutritional status of adolescent girls attending school in Dhaka City. Their studies revealed that a large number of the girls did not eat eggs, milk or dark green leafy vegetables but a larger proportion consumed meat and fish at least four times in a week. Conclusively, they reported that the diets of the girls were inadequate in both micronutrients and macronutrients. A study in Nepalese schoolchildren showed that fast foods (ready to eat snacks, chips etc) were preferred by more than two-third of adolescents (World Bank, 2003).

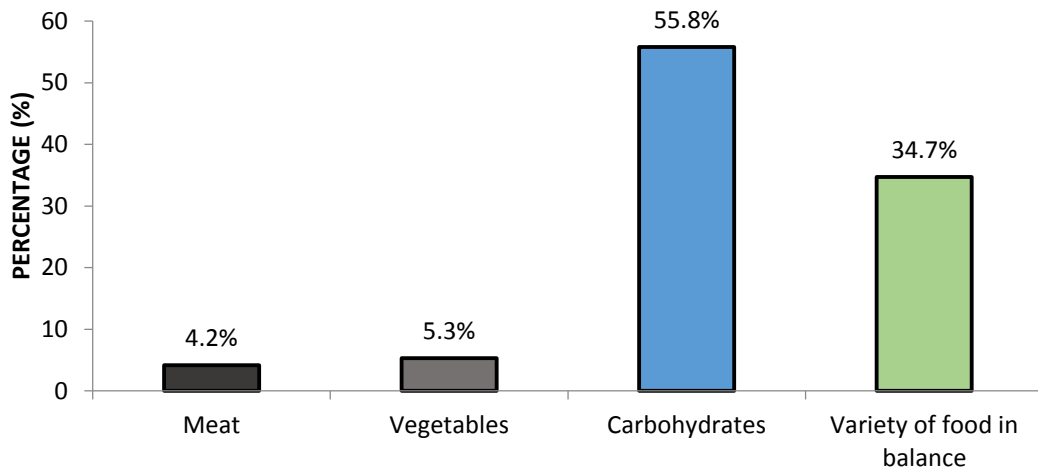


Figure 4.1: Type of food consume by students

Figure 4.1 displayed the type of food consumed by the respondents. Four (4) respondents representing 4.2% indicated that they mainly eat meat, 5 of them constituting revealed that they mainly eat vegetables. However, the majority (n=53) of respondents representing 53.8% mentioned that they mainly eat carbohydrates (rice, bread etc) as meal. The remaining 33 respondents representing 34.7% opined that variety of food in balanced is consumed. The results indicate that the students of Navrongo Senior High School normally consume carbohydrate foods (i.e. rice, bread etc) as their meal. According to Adamu *et al.*, (2012), a diet comprising many different nutrients as well as a many different flavours, textures, and colours will not only ensure adequate nutrition and development but will also encourage acquisition of the capacity to make appropriate choices between food items. Such “diet training” is particularly critical for children at the pre-school stage because this is the period during which the child learns to exercise control over his or her impulses and environment.

4.3 Factors that influence the Food Choice and Habits among Students

There are numerous factors that influence food choices, many of which can improve their choices or adversely affect them. Some of these factors that influence their choices of food include socio-economic status of parents (specifically income and educational level of parents)-(Kamau- Mbutia and Elmadfa, 2007), peer pressure- International Food Information Foundation Council, (2009); Neill *et al.* (1997), cultural practices (Latham, 1997; Robert, 2007) and advertisement- WHO (2006). In order to examine the factors that influence food choice and habit of Navrongo SHS students, respondents were required to indicate the extent to which they agree to the statement. Table 4.5 is a summary of the findings. From the table, it is interesting to note that the food that is available is what



Table 4.5: Frequency of factors that influence food choice and habits

	Responses					Mea n	Ran k
	1=SD	2=D	3=U	4=A	5=SA		
Health concern	1(1.1%)	7(7.4%)	6(6.3%)	56(58.9%)	25(26.3%)	4.42	1
Food availability	--	8(8.4%)	3(3.2%)	34(35.8%)	50(52.6%)	4.33	2
Environmental consideration	--	1(1.1%)	--	63(66.3%)	31(32.6%)	4.31	3
Cost of food	--	4(4.2%)	4(4.2%)	46(48.4%)	41(43.2%)	4.31	4
Individual energy and nutrients needs	--	7(7.4%)	--	57(60.0%)	31(32.6%)	4.18	5
Advertising and other point of sale information	3(3.2%)	9(9.5%)	6(6.3%)	41(43.2%)	36(37.9%)	4.03	6
Parental influences on eating behaviours (including the culture or religion of the family)	17(17.9%)	21(22.1%)	11(11.6%)	37(38.9%)	9(9.5%)	3.00	8
Influence from friends	16(16.8%)	29(30.5%)	12(12.6%)	18(18.9%)	20(21.1%)	2.97	9
Valid N (listwise)	95						

Key: SD = Strongly Disagree , D = Disagree, U=Undecided , A = Agree, SA = Strongly

Agree

$\bar{x} \geq 3.5 = agreed$

Eating the right balance of a wide range of foods provides most people with the energy and nutrients that they need to stay healthy. A balanced diet, together with regular physical activity, can help people to maintain a healthy weight and may reduce student's chance of developing diet related illness, such as obesity. There are numerous factors that influence food choices, many of which can improve their choices or adversely affect

them. The response from the importance index ranking (Table 4.5) indicated that the highest ranked factors that influence food choice and habits of Navrongo Senior High School is health concern with a mean score of 4.42. This implies that diets which exclude many foods due to a person's health concerns or for medical reasons need to be planned carefully. According to Shills (2006) people who are lactose intolerant cannot eat some dairy products and so must make sure that they eat other foods which are good sources of calcium, e.g. soft edible bones in fish such as tinned salmon or sardines. However, they can consume hard cheese, as it is low in lactose, and also yogurt in moderate amounts, because the bacteria in yogurt help digest the lactose.

Also food availability has the second highest mean score of 4.33. This indicates that some foods are grown in a particular season of the year and they are called 'seasonal foods'. Buying foods when they are in season will often ensure the food price is lower, followed by environmental consideration with a mean score of 4.31. The view of the respondents confirms with Mahan and Escott-Stump (2000) that scientific intervention in the food chain also causes concerns for some people.

In addition, cost of food as a factor that influence dietary choice have 3.31 mean score. This means that cost of food is a particularly important factor for people with low incomes. Food prepared food at home is often cheaper than eating out or buying take-always. Also, various studies have shown that children of wealthier families tend to consume more protein, meat, fish, milk, and green vegetables, whereas children of poorer families tend to have a higher caloric intake and to consume more processed fast food, fats, and sugar.

Moreover, individual energy and nutrients needs had the least mean score of 4.18. This means that the amount of energy, carbohydrate, fat, protein, vitamins and minerals needed differs between different age groups and between males and females. In an

instance, women of child-bearing age should consume extra amounts of folate and foods with added folic acid during early pregnancy to decrease the risk of fetal neural tube defects, e.g. spina bifida. Energy needs also depend on activity levels. Athletes will have much higher energy requirements due to their high level of physical activity.

Also, advertising and other point of sale information had mean score of 4.03. This implies that advertisements encourage people to choose certain foods which often appear on the television, internet, radio, posters, magazines and newspapers. Point of purchase information and product placement are strategies often used to provide information to consumers. This can assist people in making healthier choices. According to WHO (2006) as cited in Phyu (2002), “advertising probably TV and magazines, influenced preferences in 80% of Nepalese adolescents”. Also another food study he conducted in Myanmar also showed that about half of the participants consume snacks that are advertised. Moreover, parental influences on eating behaviours (including the culture or religion of the family) have the mean score of 3.00. This indicates that ethical and religious practices, such as avoiding meat, may limit the range of foods people eat. Example; Strict Vegan will not consume any meat products. They should choose non-meat food sources which are high in protein, iron and vitamin B₁₂. The Influence from peers as a factor had the least mean score of 2.97. According to Neill et al. (1997) what children eat at school is dependent on many factors, including the cafeteria environment, peer pressure, administrative support, teacher participation, cafeteria staff and the upper primary school children and it thus cover pupils in quality of food choices offered. Peer pressure can thus be an important determinant in one’s choice of food

The results indicates that health concern, food availability, environmental consideration, cost of food, individual energy and nutrients needs, and advertising and other point of sale information are the factors that influence food choice and habits of

Navrongo Senior High School as their mean exceeds the cut-off point of 3.5 ($\bar{x} \geq 3.5$).

4.4 Suggestion for Helping Students Eat More Healthful Diet

Consuming a healthy diet throughout the life course helps prevent malnutrition in all its forms as well as a range of non-communicable diseases and conditions. But the increased production of processed food, rapid urbanization and changing lifestyles led to a shift in dietary patterns. People consume more foods high in energy, fats, free sugars or salt/sodium, and many do not eat enough fruit, vegetables and dietary fibre such as whole grains. Table 4.6 shows the suggested ways of helping students eat more healthful diet.

Table 4.6: Frequency of helping students eat more healthful diet.

Statement	Responses					Mea n	Std. Dev.
	1	2	3	4	5		
Making healthful food taste and look better	--	3(3.2%)	3(3.2%)	42(44.2%)	47(49.5%)	4.40	.706
Making healthful food more available and convenient	2(2.1%)	4(4.2%)	4(4.2%)	35(36.8%)	50(52.6%)	4.34	.906
Limiting the availability of unhealthful food options	2(2.1%)	6(6.3%)	3(3.2%)	36(37.9%)	48(50.5%)	4.28	.953
Changing social norms to make it "cool" to eat healthy food	--	6(6.3%)	2(2.1%)	47(49.5%)	40(42.1%)	4.27	.791
Teaching children good eating habits at an early age	2(2.1%)	5(5.3%)	2(2.1%)	44(46.3%)	42(44.2%)	4.25	.899

Key: 1 = Strongly Disagree, 2 = Disagree, 3=Undecided, 4 = Agree, 5= Strongly Agree

$\bar{x} \geq 3.5 = \text{agreed}$

As part of the third objective, suggestion which can help students eat more healthful diet was assessed. According to Ventura & Birch (2008) adolescents should be encouraged to avoid developing food preference as a result of negative previous experience with a particular food, because such food might be beneficial to health. According to respondents of the study making healthful food taste and look better ($x=4.40$, $Sd=.706$), making healthful food more available and convenient ($x=4.34$, $Sd=.906$), limiting the availability of unhealthful food options ($x= 4.28$, $Sd=.953$), changing social norms to make it “cool” to eat healthy food ($x= 4.27$, $Sd=.791$) and teaching children good eating habits at an early age ($x=4.25$, $Sd=.899$) can help students eat more healthful diet. Research shows students learn better when they’re well nourished. Healthy eating has been linked to higher grades, better memory, more alertness, faster information processing and improved health leading to better school attendance. Conversely, unhealthy eating habits can negatively affect learning. Researchers have studied a number of areas related to eating and learning (Anigo *et al.*, 2014).

Biologically, human beings appear to be born with unlearned predisposition towards liking things that taste sweet and rejecting things that taste sour or bitter but a study by (Lytle, 2009), reported that high sugary food intake could make students forgetful. Therefore, adolescents should be advised to reduce their sugary food intake which is more beneficial to the brain activities. Parents and caregivers as a matter of fact play central roles in shaping the dietary habit of household members. According to Gallo (1998), adolescents should emulate healthful food choice offered to them at home and make the same food choice whenever they are away from home. As a result of ubiquity of fast food and junk food outlets, adolescents are advised to lower the intake of fast food and junk food as both are high in calories, sugar, salt and fat and embrace the

consumption of balanced and varied diet as well as fruits and vegetables in quest of food choice to be mentally sound. In addition, adolescents should avoid subscribing to friends and peer pressure as a result of social norms and expectations. For example, some students feel pressured to eat less-nutritious fast food rather than making a wise food choice (Schroder & Mc Eachern, 2005).



CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter sums up the findings from the study, draws conclusion arising from the study and makes relevant recommendations based on the findings.

5.1 Summary of Findings

The study was carried out to assess the impact of dietary patterns on the nutritional status of school children at Navrongo Senior High School. Much emphasis was laid on factors that influence the food choice and habits of students, dietary patterns and nutritional status of students and suggestions for helping students eat more healthful diet. They are summarized as below;

It appears from the study that Navrongo SHS students frequently take breakfast, lunch, supper, meat and fish, while they rarely consume fast food with egg and they occasionally consume snacks, fruits, vegetables and legumes.

It was observed that health concern, food availability, environmental consideration, cost of food, individual energy and nutrients needs, and advertising and other point of sale information are the factors that influence food choice and habits of Navrongo Senior High School as their mean exceeds the cut-off point of 3.5 ($\bar{x} \geq 3.5$).

The study revealed that making healthful food taste and look better, making healthful food more available and convenient, limiting the availability of unhealthful food options, changing social norms to make it "cool" to eat healthy food and teaching children good eating habits at an early age can help students eat more healthful diet as the mean score exceed the mean score of 3.5.

5.2 Conclusions

Based on the findings of the study, conclusions were made that Navrongo SHS students frequently take breakfast, lunch, supper, meat and fish, while they rarely consume fast food with egg and they occasionally consume snacks, fruits, vegetables and legumes.

Health concern, food availability, environmental consideration, cost of food, individual energy and nutrients needs, and advertising and other point of sale information are the factors that influence food choice and habits of Navrongo Senior High School.

Making healthful food taste and look better, more available and convenient, limiting the availability of unhealthful food options, changing social norms to make it "cool" to eat healthy food and teaching children good eating habits at an early age are suggested to help students eat more healthful diet.

5.3 Recommendations

Based on the findings of the study, the researcher recommends that:

1. Based on the need of the children of a particular school intervention programmes should be developed and implemented to enhance the dietary behaviour of students.
2. Consumption of animal protein must be encouraged since it contributes enormously to nutritional status of students.
3. Existing foods at the various Senior High Schools should be made healthful and look better by authorities and other benevolent Non-Governmental Organizations to supplement food intake.
4. Nutrition and health education programs should also be carried out periodically in the various schools and this should be incorporated into the educational curricula in the long run.
5. Stakeholders including parents, teachers and even the students should be educated on the need for good nutrition and also encouraged to vary their diets.

6. Students should be encouraged on the importance of consuming nutritious food.

5.4 Suggestion for Further Research

Further research should be conducted on the nutrient/energy values and bacterial loads of food sold in the premises of schools as well as the school kitchen. Further research is also needed to uncover the underlying factors that contribute to nutritional status of students apart from their eating or food habits.

The study is suggestive that there may be other internal and again external factors that may result in the outcome of the study. Internal factors such as intelligence, self-concept, gender, age, and personality of the individual could be researched upon to determine their level of influence regarding adolescents' food habits and nutritional status. In addition, external factors such as time spent in school, advertising, cultural values pertaining to food, socioeconomic status, family, and availability of food could be worked upon to enable researchers know the real predictors of the food habits of the students. It is recommended that future research should include these to obtain a better understanding on the subject matter.

Also, an extensive work can be done using qualitative tools such as, interviews, focus group discussions or panel discussions to collate views from students regarding what could account for the other influences on their dietary habits as well as nutritional status.

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Preamble: The questionnaire is designed to collect data on the topic “**Impact of dietary patterns on the nutritional status of school children at Navrongo Senior High School.** Please read the statement carefully and tick (✓) the option(s) which you think are applicable or provide your opinion which best answers the question. All responses will be confidential and will not be connected in any way to you or your organization.

SECTION A: PARTICULARS AND GENERAL INFORMATION ABOUT RESPONDENTS

1.0 What is the age category you belong? *(Please tick).*

Under 15 years	<input type="checkbox"/>	16 – 20 years	<input type="checkbox"/>
21 – 24 years	<input type="checkbox"/>	25years and above	<input type="checkbox"/>

2.0 Please indicate your gender. *(Please tick)*

Male	<input type="checkbox"/>
Female	<input type="checkbox"/>

3.0 What is your living status? *(Please tick).*

Mother only	<input type="checkbox"/>	Father only	<input type="checkbox"/>
Both parents	<input type="checkbox"/>	Other relative	<input type="checkbox"/>

SECTION B: DIETARY PATTERNS AND NUTRITIONAL STATUS OF STUDENTS

4.0 To what extent do you agree with the following statement. Please rate using a scale

of 1-4 Please tick [√] the appropriate box.

1= Agree, 2 = Strongly Agree, 3= Disagree 4= Strongly Disagree

S/N	Statement	1	2	3	4
1	I often take my meals at the right time				
2	I take my breakfast daily throughout the week				
3	I usually take meat/fish during meals				
4	I do take lunch at stipulated time during the week				
5	I often take snacks				
6	I take supper throughout the week				
7	I usually consume vegetables and legumes during meals				
8	I consume fruits at all times				
9.	I don't consume fast foods				

5.0 What type of food do you consume? (*Please tick*).

Mainly meat	<input type="checkbox"/>	Mainly vegetables	
Carbohydrates (rice, bread etc)		Variety of food in balance	

SECTION C: FACTORS THAT INFLUENCE FOOD CHOICE AND HABITS OF STUDENTS

6.0 Please indicate the extent to which you agree on the following statements about factors that influence the food choice and habits of students. Please rate using a scale of 1 to 5 where 1 represents strongly disagree, 2 represents disagree, 3 uncertain, 4 represents agree and 5 represents strongly agree. *Please tick [√] the appropriate box below.*

Factors	Rating				
	1	2	3	4	5
Individual energy and nutrients needs					
Health concern					
Cost of food					
Food availability					
Environmental consideration					
Advertising and other point of sale information					
Hunger and food carvings					
Parental influences on eating behaviours (including the culture or religion of the family)					
Influence from friends					

SECTION D: SUGGESTION FOR HELPING STUDENTS EAT MORE HEALTHFUL DIET

7.0 Please indicate the extent to which you agree on the following statements about the suggestion for helping students eat a more healthful diet. Please rate using a scale of 1 to 5 where 1 represents strongly disagree, 2 represents disagree, 3 uncertain, 4 represents agree and 5 represents strongly agree. *Please tick [√] the appropriate box below.*

Statement	Rating				
	1	2	3	4	5
Making healthful food taste and look better					
Limiting the availability of unhealthful food options					
Making healthful food more available and convenient					
Teaching children good eating habits at an early age					
Changing social norms to make it "cool" to eat healthy food					