UNIVERSITY OF CAPE COAST

CONSUMER AWARENESS AND FACTORS THAT INFLUENCE FRUITS AND VEGETABLES CONSUMPTION AMONG STUDENTS OF NORTHERN SCHOOL OF BUSINESS, TAMALE.

STEFFI NANA ABA BORDOH

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BY

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Thesis submitted to the Department of Vocational and Technical Education of the Faculty of Science and Technology Education, College of Education Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Philosophy degree in Home Economics Education

APRIL, 2025

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: ……...……..... Date: .....

Name: Steffi Nana Aba Bordoh

Supervisor's Declaration

I hereby declare that the preparation and presentation of this thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature: ……..……. Date: .....

Name: Prof. Christina Offei-Ansah

ABSTRACT

Dietary habits of students especially on the consumption of fruits and vegetables have several implications for their physical growth and health status. The study explored consumer awareness and factors that influence the consumption of fruits and vegetables among student of Northern School of Business, Tamale. Four research questions and three hypotheses were used. Descriptive research was used and stratified sampling and simple random sampling techniques were used to select 771 respondents for the study. The primary tool utilized to gather data was a 46-item questionnaire. The data was analysed and presented in frequencies, percentages, averages, and standard deviations. The study revealed that, respondents were knowledgeable on fruits and vegetables consumption and as a result, they were seen to have a positive attitude towards its consumption. This shows student's awareness on the intake of fruits and vegetables. The study showed that students were generally not consuming fruits and vegetables regularly especially the fruits. The study further revealed that availability was a main factor that influenced their consumption of fruits and vegetables consumption. The results revealed a statistically significant difference between males and females fruits and vegetables consumption pattern. There is a difference in the mean value for males (M=38.870) and females (M=36.70) hence the implication that males and females do not have the same fruits and vegetable consumption pattern. Stakeholders such as schools board and management should come up with a policy to encourage sale of fruits and vegetables and limit sale of unhealthy foods on school premises. There should be social structures concentrating on young people to improve their perspectives regarding eating out because students typically buy their own food.

KEYWORDS

Attitude

Awareness

Consumption

Consumer

Fruits

Knowledge

Vegetables

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DEDICATION

To my parents and siblings.

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LIST OF ABBREVIATIONS

WHO	World Health Organization
FVs	Fruits and Vegetables
NCDs	Non-Communicable Diseases
NRCIM	National Research Council and Institute of Medicine
MOH	Ministry of Health
USDA	United States Department of Agriculture
HHS	Health and Human Services
IARC	International Agency for Research on Cancer
WC	Waist Circumference
HBSC	Health Behaviour in School-aged Children
DHHS	Department of Health and Human Services
CDC	Centers for Disease Control
DGA	Dietary Guidelines for Americans
BMI	Body Mass Index
CDCP	Centers for Disease Control and Prevention
FVI	Fruit and Vegetable Intake
TPB	Theory of Planned Behaviour
PBC	Perceived Behavioral Control
ATT	Attitude
SCT	Social Cognitive Theory
HBM	Health Belief Model
HPM	Health Promotion Model
SPSS	Statistical Package for Social Sciences
SHS	Senior High School

CHAPTER ONE

INTRODUCTION

Background to the Study

With improved urbanization and socio-economic development, new lifestyles and practices have come up as well as changes in our eating patterns. These lifestyles have been attributed to the rise of various forms of diseases that are prevalent these days (World Health Organization, [WHO] 2008). As a result of our poor nutrition habits, especially the insufficient consumption of fruits and vegetables, diet related illnesses such as diabetes, hypertension and cardio vascular diseases are on the increase. Fruits and vegetables consumption are very important for the growth and development of individuals since the nutrients from them protect the body against diseases and boost our immune system as well. (Boeing, 2012).

Worldwide, inadequate consumption of fruits and vegetables (FVs) is responsible for 2.8% of deaths, mostly those caused by heart disease, stroke, and gastrointestinal cancer (Boeing, 2012). In view of the health advantages of FVs consumption, WHO suggests the consumption of not less than 400 grams (g) of FVs each day, and said that a further increment to 600 grams each day (g/d) could furthermore lessen the overall weight of infections (WHO, 2016). Non communicable diseases (NCDs) and their gamble factors including low FVs intake and weight have turned into a significant reason for morbidity and mortality (Tagoe & Dake, 2011).

In spite of the various advantages that fruits and vegetables deal to human wellbeing, the degree of consumer mindfulness and information on the sustenance and medical advantages of fruits and vegetables in Ghana is

exceptionally low (Nti, Hagan, Bagina, and Seglah, 2011). Thus, just couple of individuals with higher information on the wholesome and health benefits frequently consume them.

Pollard, Kirk, and Cade. (2002) reported in their study that, having adequate information on the health benefits of fruits and vegetables could upsurge. Increased FV consumption and the prevention of NCDs have been linked favorably in several studies (WHO, 2016; Oyebode, Gordon-Dseagu, Walker& Mindell, 2014; Boeing, 2012). This has since been converted into a variety of national health promotion efforts in various geographic areas with the aim of achieving and maintaining appropriate FVs intake globally for the prevention of NCDs (Agudo, 2014: Oyebode, Gordon-Dseagu, Walker& Mindell, 2014; Boeing, 2012) the consumption of FVs among individuals and families.

In general, studies done in Ghana show that Ghanaians do not consume enough FVs every day (Awiah, 2017: Kegey& Boateng, 2017). Currently, the average Ghanaian consumes only 1.5% of the recommended daily intake of fruits and 2.3% of the recommended daily serving of vegetables from the WHO (Kegey & Boateng, 2017). He suggests further research in order to pinpoint and fully understand the root causes of the inadequate consumption of FVs, particularly among Ghana's varied population segments.

Various variables impact the consumption of fruits and vegetables and this include financial and socio-social elements, food costs, taste, accommodation, capacity life, openness and accessibility (Li, Li, Mama, Liu, Hui-Ding, Wen, & Peng 2012). Wellbeing factors have additionally been related with low FVs utilization. This incorporate the degree of actual work,

not being overweight, smoking, alcohol intake, and binge drinking. (Satheannoppakao, Aekplakorn, & Pradipasen, 2009). Students at the Senior High School level are regularly at the pre-adulthood stage. This is a fundamental stage for development and improvement (Damasceno, Freitas, and Almeida, 2011). At this period, the body goes through different changes which impact a singular's grown-up life (National Research Council and Institute of Medecine,2009). According to Waugh and Grant (2014), teenagers usually acquire between 50 and 70 percent of their daily calories and essential nutrients from snacks, which are typically made up of fast food, baked goods, sweets, and fizzy beverages. The fundamental issue is that snacks and drive-thru eateries and shops that serve and sell these food varieties are not the serious issue but rather the unfortunate food selections of youths concerning type, amount and recurrence (Owusu, 2007). This present circumstance is entirely expected among Ghanaian Senior High School students. Sound ways of life and mentalities ought to be laid out among these youths since it goes far to influence their development and improvement. WHO (2016) estimates that, inadequate consumption of fruits and vegetables is the world's 6th significant g factor for mortality. Having information on the quantity of suggested segments for health benefits has been demonstrated to be a critical component in deciding FVs consumption. (WHO, 2016).

The wellbeing and way of life ways of behaving of understudies which incorporates their dietary patterns have been depicted as an ignored issue (Tanton, 2015). Notwithstanding, it is of extraordinary wellbeing concern in light of the fact that unfortunate propensities that is gotten up early ages for

the most part continue in more seasoned grown-up life and can have serious dependable ramifications on their wellbeing status later on.

National and populace-based reviews have observed that adolescents frequently neglect to meet dietary proposals for general nutritional status and for specific nutritional intake (Cavadini, Siega-Riz & Popkin 2000; Kann, Kinchen, &Shanklin, 2014).

Interventions to further develop wellbeing related ways of behaving ought to be customized to the main determinants or mediators of these behaviours. To date nutritional interventions have been moderately effective in working on an enduring utilization of satisfactory measures of fruits and vegetables. (Marie, Minot, & Lisa, 2004)

The recognizable proof factors that influence fruits and vegetables intake is indispensable to think of compelling mediations to decrease frequencies of Non-Communicable Diseases (NCDs) in the country especially among the growing population of adolescents.

Statement of the Problem

Transition period from Junior High School to the Senior High School level which is usually between the average ages of 14 to 18 has been described as being a challenging stage in human development (Siri, 2016). This is on the grounds that, most students wind up in another environment especially for those who use the boarding system (Siri, 2016). This progress period is typically connected with the need to change and adjust to another scholastic setting which is joined by additional assignments combined with pressure and an absence of time that could encroach on students' way of life decisions. Senior High School students' academic activities have been described as a

major factor in determining and supporting poor eating habits, especially in the adolescent population. (Wangeri, 2012).

It is assumed that, students at the Senior High School level most often purchase food items during snack breaks, lunch breaks as well as after close of school. This purchasing may lead to pursuing undesirable dietary routines like maximum usage of snack food sources (Conne 2017), high intake of fast food and insufficient consumption of fruits and vegetables (Alsunni, & Badar, 2015) and skipping of meals especially food served by the schools (Peltzer, & Pengpid, 2015). This transformative phase has additionally been related with a diminished intake of fruits and vegetables which may be as a result of lack of inadequate knowledge, certain practices as well as certain factors that may influence their consumption of fruits and vegetables which may result in developing certain health conditions and may affect them later in life (Tanton 2015, Wangeri, 2012).

With the exception of a MOH (2008) study, western countries were the focus of the great majority of the investigations. The study by the MOH. (2008) focused on student's consumption of fruits and vegetables and found out that, students were not consuming sufficient fruits and vegetables. However, there is limited information on the consumption of fruits and vegetables among Senior High School students in Ghana

Accordingly, the dietary patterns of students have been a significant worry as a significant deciding variable of their wellbeing status (White 2013), and the need to assess consumer awareness and factors that influence fruits and vegetables consumption of these Senior High School students to facilitate improvement of future interventions.

Purpose of the Study

When it comes to food choices, eating rituals, and calorie counting, adolescence is a time of growing independence, which could make adolescents more susceptible to developing dietary issues, if unfavorable eating habits are formed during this period. Dietary habits of students especially on the consumption of fruits and vegetables have numerous consequences for their physical growth, development and forthcoming health status.

The purpose of this study was to assist with filling this information gap and furthermore give proof to illuminate proposals on getting to the next level and encouraging the consumption of fruits and vegetables among students. This study therefore seeks to assess consumer awareness (knowledge and attitude) of Northern School of Business Senior High School students on fruits and vegetables consumption as well as identify the factors that may influence fruits and vegetables consumption among Senior High School students.

Research Questions

The study was guided by the following research questions:

1. What is the knowledge of students on fruits and vegetables?
2. What is the attitude of students towards fruits and vegetables consumption?
3. What is the fruits and vegetables consumption pattern among students?
4. What factors influence the choice and consumption of fruits and vegetables among students?

Research Hypothesis

H_0: There is no statistically significant difference between sex of students and fruits and vegetables consumption pattern.

H_0: There is no statistically significant relationship between knowledge of fruit and vegetable and attitude towards fruit and vegetable consumption.

H_0: There is no statistically significant difference between the ages of students and their knowledge of fruits and vegetables.

Significance of the Study

Conclusions drawn from the results of this study may help public health professionals create the best nutrition education programs for students to help lower the incidence of diet-related illnesses among the adolescent population. In order to fully address students' health needs, the study will expand research in the areas of fruit and vegetable consumption and dietary behaviors on college campuses.

In order to promote student health, the study may give schools the chance to improve their stores, environments, and selection of fruits and vegetables. The study will also be beneficial to academics because its findings will add to the body of literature already in existence on the knowledge, attitude and factors that influence the consumption of fruits and vegetables among Senior High School students. Hence it will be a stock of literature for researchers who intends to carry out comparable studies in Ghana and beyond.

Finally, the health education and promotion sections of the health sectors will also have a picture of the knowledge, attitudes, consumption

pattern, and preferences of fruit and vegetables of students so as to plan well to improve the health of the public.

Delimitation

The research was limited or restricted to the Northern School of Business, Tamale in the Northern Region of Ghana. The study concentrated on only Form 3 and 2 gold track students. Because of the current tracking of students, Form 1 green and gold track students as well as Form 2 green students were not in school during the data collection period. Hence, they were not engaged in the study. The study was delimited to fruits and vegetables that are available in the Northern part of the country.

Limitation

Every study conducted has its own drawbacks and this study was no exception. The major limitation for this study had to do with the instrument used. Questionnaire was the instrument used for data collection. It has certain drawbacks which include dishonesty on the part of the respondents. When this happened, it skewed the result which did not represent a true reflection of their fruits and vegetables consumption pattern. Some of the respondents felt reluctant in answering the questionnaire. Every dietary review technique depends on the respondent's memory which may result in additional errors Notwithstanding, concentrate on members were sharpened with respect to the need to give exact reactions. Also, the respondents were encouraged to and motivated before data collection, Consequently, the study's shortcomings had no impact on its findings.

Definition of Terms

Knowledge: experience-based knowledge of a situation or information, such as awareness or familiarity.

Attitude: a firmly held opinion or sentiment concerning something

Factor: A fact or influence that contributes to a result.

Influence: The capacity to have an effect on the character, development or behavior of someone or something.

Consumption: The action of eating or drinking something.

Awareness: Knowledge or perception of a situation or fact.

Consumer: an individual who makes personal purchases of products and services

Organization of the Study

Five chapters made up the study's whole structure. The background of the study, problem statement, purpose of the study, significance of the study, research objectives, research hypothesis, delimitations and limitations of the study are all included in the first chapter's introduction. The second chapter reviews literature on students in senior high school's knowledge, attitudes, and factors affecting their consumption of fruits and vegetables.

The research methods utilized to carry out the study were described in chapter three. A discussion of the study's results was in the fourth chapter. The overview of the full study, along with its findings and suggestions, was presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

This literature review aims to synthesize the existing research on the health benefits and nutritional value, knowledge, attitude and factors influencing the consumption of fruits and vegetables. By examining the current state of knowledge, this review seeks to identify patterns, gaps and future directions for research, ultimately informing strategies to promote increased fruit and vegetable consumption and improve public health outcomes.

Fruits and Vegetables

Fruits and vegetables are essential to human development and growth. Its consumption has been recognized as a healthy weight-management diet and a defense against becoming overweight or obese (Volken, Ruesch &Guggisberg,2012). They also contribute to reversing the typical deteriorating changes that come with growing older, such as a slow loss of cells, hair that is beginning to gray, and a decreased ability to breathe (Banwat, Lar, Daboer, Audu, & Lassa,2012). In Ghana, people cultivate and consume fruits and vegetables such oranges, pineapple, watermelon, banana, guava, pear, sweet apple, mangoes, and pawpaw. Vegetables include bra, okro, carrots, kontomire, garden eggs, lettuce, cabbage, alefu, and ayoyo among others.

According to scientific research, a fruit is a component of a flowering plant that is made up largely of at least one ovary and specific tissues of the bloom (Mauseth, 2013). Frequently, the botanical fruit is actually only a portion of the ordinary fruit. In contrast, the term "fruit" in the botanical sense also refers to a variety of other structures, such as bean pods, corn kernels, wheat grains, tomatoes, the part of a fungus that generates spores, and many more. In any

event, there are a few versions of the definition of fruit that emphasize distinct aspects of the enormous variety that is present among plant fruits (Schlegel and Rolf, 2003; Lewis & Robert, 2002). In other words, many plants disperse their seeds through their fruits. Fruit-bearing plants often co-developed with animals in an advantageous connection as a means of seed distribution and individual nutriment; in fact, many animals, including some humans, have grown to depend on fruits as a source of sustenance (Lewis, and Robert, 2002). Fruit is the name for the edible portion of a plant that is composed of seeds and supporting tissues. It is either a plant's fully developed ovary or a tasty, appealing part of a plant like a pineapple, orange, pawpaw, banana, or apple, among others. Fruits, according to (Mintah, Eliason, Nsiah, Baah, Hagan, and Ofosu, 2012), are the fleshy, edible seed-related structures of particular plants that may be tasty or unsweet in their raw form.

Vegetables on the other hand refer to the edible parts of plants, commonly collected and/or cultivated for their nutritional value for humans. According to this definition, fruits are a sub-set of vegetables, as fruits refer to the mature ovary of a plant which encloses the seed (International Agency for Research on Cancer, 2003). Vegetables are generally considered to be an edible plant or component of a plant, with the exception of most sweet fruits and seeds. This could be a plant's leaf, stem, or root. (Ver Ploeg, M., Nulph, D., & Williams, R. 2011). Mauseth (2013) also viewed vegetables as the sweet and meaty offspring of a tree or plant that includes seed and can be consumed as food; vegetables as the consumable parts of plants that can be eaten, such as leaves, stems, tubers, roots, and bulbs. They include cabbage, tomato, lettuce, carrot, cauliflower among others. They are also energy dense food sources

containing nutrients, minerals, fiber and other bioactive mixtures (Van Duyn, & Pivonka, 2010).

Health Benefits of Fruits and Vegetables

Fruits and vegetables are very significant in the proper functioning of the body, and various literatures prove to this fact.

The consumption of fruits and vegetables has been linked to a longer lifespan (Bellavia, Larsson, Bottai, Wolk, & Orsini, 2013), improved mental health, improved cardiovascular health (Oyebode, Gordon-Dseagu, Walker, & Mindell, 2014), and other advantages like weight control and a lower risk of certain cancers.

In particular, fruits contain satisfactory potassium, which assists with lessening the impact of bone misfortune and event of kidney stones. Fruits add to the legitimate working of the mind which invigorates the memory review and supplies the human body with fiber which helps in the digestive system (Ridgewell, 2008).

Fruits and vegetables intake have been linked to a longer lifespan (Bellavia, Larsson, Bottai, Wolk, & Orsini, 2013), improved mental health, improved cardiovascular health (Oyebode, Gordon-Dseagu, Walker, & Mindell, 2014), and other advantages like weight control and a lower risk of certain cancers. In spite of the various advantages that fruits and vegetables deal to human wellbeing, the degree of consumer mindfulness and information on the sustenance and medical advantages of fruits and vegetables in Ghana is exceptionally low (Nti, Hagan, Bagina, & Seglah, 2011). Thus, just couple of individuals with higher information on the wholesome and health benefits frequently consume them.

Vegetables are also essential because they support overall health, protect the body's important organs, aid in weight management, promote healthy skin and hair, and shield the body from infections. They also offer cell reinforcements that aid in removing illnesses from the body and aid in assimilation by preventing constipation, hemorrhoids, and diarrhea (Ridgewell, 2008). Fruits and vegetables are rich in dissolvable fiber that is, they dissolve in water to form a gel-like material. This can help to lower blood cholesterol and glucose levels. They also have a low glycemic value, there are few calories in a large amount of food and a high supplement density, all variables which add to bring down infection chance and weight the board to forestall and treat overweightness (Pereira et al., 2004; Bazzano, He, Ogden, Loria & Whelton, 2003; Ludwig, 2002).

Fruits and vegetables both contain a lot of fiber. Therefore, it makes sense that fiber helps to keep the digestive and intestinal systems in good shape. Foods high in fiber have been shown to be beneficial in reducing the risk of cardiovascular sickness through diet. They are also abundant in dietary supplements, such as potassium cancer-prevention agents and corrosive folic acid. Consuming fruits and vegetables ensure optimal health, provides the body with energy, and provides nutrients and minerals that are essential for bodily functions (Van Duyn & Pivonka,2010). These are necessary for the body to function properly in a variety of capacities. According to Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, and Pala (2007), ascorbic acid plays a vital function in maintaining the health of cells and tissues. The body need B vitamins to metabolize food-derived energy and avoid anemia, according to a 2013 study by Kahleova. Vitamin A is essential for bolstering the body's

defense mechanisms, claim Pellegrini, Salvatore, Valtuen'a, Bedogni, Porrini, and Pala (2007). Fruits and vegetables are a great source of ascorbic acid and vitamin D. Vitamin D helps to support healthy teeth and bones. A study by Hackam, Quinn, Ravani, Rabi, Dasgupta,& Daskalopoulou, (2013). found that diabetics with a diet high in fruits and vegetables have increased insulin sensitivity. Puberty-related development necessitates a significant amount of calories and supplements

The young adult's diet must include FVs to support bone health during these times of bone growth. Eating fruits and vegetables fundamentally predicted all-out-body bone mineral content in young men and had substantial associations with adolescent females' bone mineral thickness, according to a seven-year longitudinal study on bone mineral thickness (Vatanparast, Baxter-Jones, Faulkner, Bailey & Whiting, 2005).

Despite the fact that fruits and vegetables are frequently addressed as wholes, each hue of a fruit or vegetable lends itself to a particular nutrient that offers crucial nutrients for adolescent health. Dark green vegetables are a wonderful example because they are a strong source of calcium and vitamin K and have a reputation for enhancing bone health. Foods that are red or orange in color are high in beta carotene, an antioxidant that lowers the risk of cell damage during development's rapid cell expansion, which helps prevent cancer. The potassium in starchy meals is a helpful supply for regulating heart rate and muscle contractions. In order to maintain a healthy digestive tract and lower the risk of cardiovascular disease, legumes offer a lot of dietary fiber. Numerous vegetables and fruits are good sources of vitamin C and other

nutrients that support a strong immune system, energy, and development (Vatanparast, Baxter-Jones, Faulkner, Bailey & Whiting, 2005).

Fruits and vegetables with different colors have a number of benefits. The purple and blue varieties imply their capacity to prevent cancerous growth, strokes, and heart diseases as well as their capacity to strengthen cells. Beetroot and eggplant are a couple of examples. Similar to how tomatoes and watermelons benefit the heart, red color also lessens the likelihood of cancerous growth. Carotenoids, which support maintaining eye health, are found in orange or yellow-hued foods. Carrots and pineapple are a couple of examples. Banana, garlic, onion, and ginger are examples of brown and white soil products that include phytochemicals with antiviral and antibacterial activities as well as potassium. The green hues, including those of green apples, lettuce, cucumber, and green pepper, include compounds that have anticancer qualities (Hoejskov, 2014).

Theoritical Review

It is necessary to evaluate people's perceptions of and attitudes toward eating fruits and vegetables, as well as the factors that affect or influence their consumption, in order to develop a nutrition intervention for students (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012). A number of wellbeing conduct hypotheses have been applied to the study in order to better understand how mental developments (such as self-viability, stress, perceived control, and obstacles) and environmental factors (such as family income, family size, and accessibility) influence fruit and vegetable intake (FVI). Ajzen proposed the Theory of Planned Behavior (TPB), a wellbeing conduct hypothesis, in 1991. It predicts behavior from four psychosocial development

domains (i.e., mentalities, abstract standards, perceived social control, and expectation). These four conduct indicators, according to Ajzen (1991), should include any aspects that support a singular's presentation of acting or behaving in a particular way.

Theory of Planned Behavior

Identifying the psychological factors that influence conduct is the subject of the Theory of Planned Behavior, a theoretical approach. According to Fishbein and Ajzen's Theory of Reasoned Action (1975), an individual's support for a way of acting (BEH) could be predicted by his or her motivation to engage in that way of acting (i.e., aim), and INT could be predicted by an individual's assessment of how great the BEH is (i.e., mentalities, ATT), despite the individual's apparent prevailing difficulty to take an interest in the BEH. Reasoning Theory (subjective norm, SN).

Ajzen (1991) modified the Theory of Reasoned Action to incorporate perceived behavioral control in order to develop the TPB (PBC). PBC was presented as a measure of both INT and BEH and was defined as a person's apparent ease or difficulty in acting out their style of behaving. The TPB suggests that expectancy and perceived conduct control generally foresee conduct, attitude, emotional standards, and perceived social control, foresee purpose, and striking convictions generally predict disposition, abstract standards, and perceived conduct control.

Ajzen (1991) explained that an individual's behavior and activities are determined by their amazing convictions. Convictions of note can be categorized as behavior, standardizing, or control convictions. Convictions for conduct indicate ATT, those for standardizing indicate SN, and those for

controlling indicate PBC. Convictions must be compelling in order to be predictive. People's striking personalities vary, and they can also change according on the conditions present in a person's life. A person's attitude (ATT) is an evaluation of how good or detrimental they perceive the effects of acting in a certain way. Conduct convictions can be related to a style of acting being worthwhile, fantastic, entertaining, charming, wonderful, or any other notable outcome that might result from acting out a manner of acting. A person who considers the benefits and flavor of fruits and vegetables (FV) as the primary factors in selecting whether to consume FV, and who evaluates benefits as high and flavor as good (i.e., impartial), would have a modestly certain ATT toward FV. Ajzen, (1991) discussed studies that have distinguished between emotional and instrumental mindsets in light of the specific conduct conviction connected to the ATT.

It is assumed that the conviction corresponds to profound evaluations of a person's behavior that indicate emotional attitudes (e.g., charming, lovely). On the other hand, it is said that general judgments of behavior (such as excellent, ideal, or favorable) reflect instrumental mentalities.

The Social Cognitive Theory

The social cognitive theory (SCT), developed by Bandura in 1989, provides a thorough framework for examining behavior changes and sustenance-related methods of acting. According to the SCT, there are equal linkages between a person's personal circumstances, their immediate surroundings, and their behavior. As a result, interpersonal, environmental, and behavioral factors all interact. The mediators of the SCT consider their own feasibility, result hypotheses, self-direction, and observational learning

(Falbe, & Davison, 2014). The belief that one can perform to a given quality on their own is known as self-viability (Bandura, 1977).

Results assumptions are convictions and ideals about what might actually happen if a specific course of action is followed. Setting and maintaining goals, as well as being able to make the necessary adjustments or deal with issues as they emerge, are all examples of self-regulation (Falbe, & Davison, 2014). Last but not least, observational learning, also referred to as displaying, is the idea that by witnessing the actions and results of others, one can "learn from models" (Bandura, 1989).

The Health Promotion Model

It has been attempted to understand teenage nutrition behaviors using a variety of models. One of the most popular models for predicting teenage consumption of fruits and vegetables is the Health Belief Model. This theory is based on the idea that adolescents will take steps to improve their health, such as regularly consuming fruits and vegetables, if they believe that doing so will help them avoid a serious medical condition (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012; Becker, 1974).

As a "guide for research of the complicated biopsychosocial process that drives individuals to participate in actions geared toward the betterment of health," Nola J. Pender's health promotion model (HPM), created in the 1980s, served as this (Pender, 2011). The model does not exclude fear or danger as a factor because it aims to explain and predict healthy ways of acting. The HPM analyzes the numerous ways people pursue wellbeing as they engage with their current environment and can be used throughout a person's life expectancy. The approach is adaptable to people from every single income

level and can include people of all ages, however it mostly focuses on teenagers and adults (Pender, 2011).

It is a psychological framework designed to explain and predict behaviors related to one's health. This is achieved by focusing on people's attitudes and beliefs. The premise of the health belief model is that people will behave in ways that are connected to their health:

- Believes that a bad situation can be prevented.
- Has the hope that by following a suggestion, a harmful health condition may be avoided.
- Has confidence in his or her ability to implement a suggested health measure.

Four constructs were used to express the perceived threat and net benefits in the HBM. It helps in specifying the Perceived Susceptibility to cardiovascular diseases, cancers and micronutrient deficiencies; Perceived Severity or seriousness to cardiovascular diseases and other non-communicable diseases; the Perceived Benefits that will be derived by consuming fruits and vegetables adequately; the Perceived Barriers which are the constraints or psychological costs the individual feels may be hindering him/her from consuming fruits and vegetables; the cues to action, which are the reminders that promote the strategies for change and Self-efficacy.

Conceptual Framewor

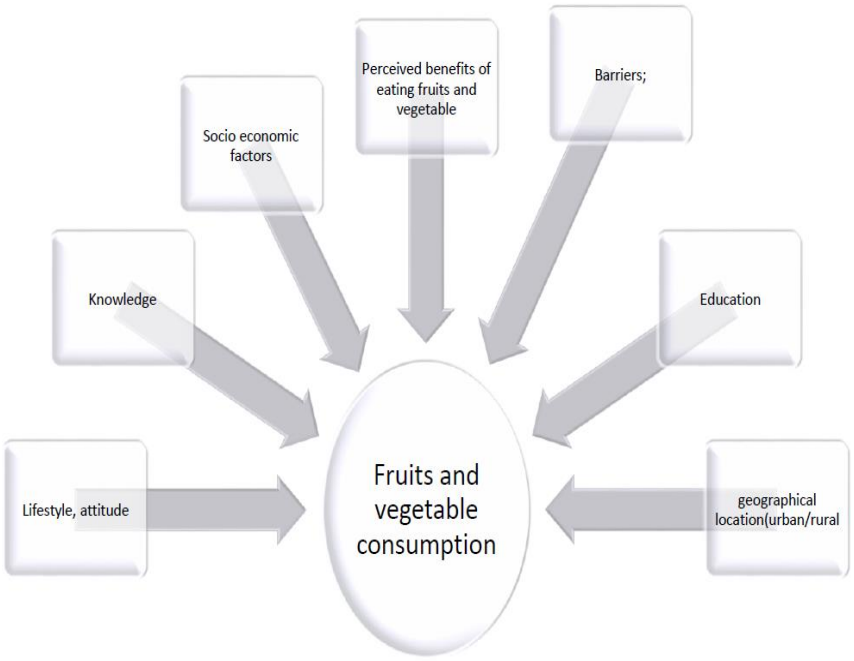

Figure1: The ASE model. A model for determining factors influencing fruits and vegetables consumption (adapted from Lechner, 2018).

Different models and theories have been used in trying to predict the consumption of fruits and vegetables among children and adolescents.

The model proposes that fruits and vegetables consumption primarily is a function of motivation and intentions. Some factors that influence the consumption of fruits and vegetables include: lifestyle, knowledge, socioeconomic factors, perceived benefits, education and geographical location.

A person's attitude towards fruits and vegetables consumption is as a result of the expected consequences from his or her bahaviour which has a relationship with knowledge. Social influence (socioeconomic factors, education and geographical location) is a result of subjective norms, examples

from others and direction to support and pressure related to fruits and vegetables consumption.

Self-efficacy (perceived benefits of consuming fruits and vegetables) is the result of a person subjective assessment of his or her abilities and capabilities related to fruits and vegetables intake.

Empirical Review

Fruits and Vegetables Consumption

The consumption of fruits and vegetables is an important part of a balanced diet and one of the risk factors for many chronic diseases. The amount of fruits and vegetables that is advised for consumption by the world's population is only modestly consumed (Litt et al., 2011). In general, studies done in Ghana show that Ghanaians do not consume enough FVs every day (Awiah, 2017: Kegey& Boateng, 2017). Currently, the average Ghanaian consumes only 1.5% of the recommended daily intake of fruits and 2.3% of the recommended daily serving of vegetables from the WHO (Kegey & Boateng, 2017). He suggests further research in order to pinpoint and fully understand the root causes of the inadequate consumption of FVs, particularly among Ghana's varied population segments. The WHO suggests 400g of fruits and vegetables per day as the minimum dietary allowance.

Consuming fruits and vegetables is thought to be a sign of a healthy diet and to help prevent non-communicable diseases (Dehghan, Akhtar-Danesh, & Merchant, 2011). Establishing a source of encouragement for young adults to eat more fruits and vegetables can serve as an example of how to prevent the emergence of chronic illnesses and issues with body weight (Kreausukon., Gellert, Lippke, & Schwarzer 2012). Some researchers have

connected eating few fruits and vegetables to being overweight or obese (Boeing, 2012; Bhagwat, Haytowitz, & Holden, 2014).

Fruits and vegetables can replace unhealthy foods in a number of ways, according to Whitehead, Ozakinci, Stephen, and Perrett (2012), many of which have positive effects on health. As a result, they can be utilized in substitute of unhealthy foods that some individuals might want to consume (Lucan & Sean, 2012). Some lifestyle factors, particularly in developing countries, are raising a population's susceptibility to chronic disease, indicating that the potential health benefits of consuming fruits and vegetables will be more and more significant in the future (Whitehead, Ozakinci, Stephen, & Perrett, 2012).

The risk of developing some cancerous growths has been shown to decrease with regular fruit and vegetable diet. Fruit and vegetables help to lower the risk of disorders of the digestive system. According to estimates, increasing the diet of fruits and vegetables can prevent 20–30% of gastrointestinal tract and 5-12% of all malignant growths worldwide. Global Agency for Research on Cancer (IARC, 2003)

Furthermore, according to an analysis, eating more fruits and vegetables as a teenager was associated with lower body mass indices (BMI), suggesting that fruits and vegetables can help prevent obesity and chronic illnesses even during puberty (Lin, Morrison, Phillips, & de Kretser, (2003). Middle periphery, a sign of stomach obesity, has been associated with eating fruits and vegetables together with other nutritional components. Teenage boys' intake of dairy, whole grains, fruits, and vegetables was significantly lower among those with waist circumferences (WC) over the 85th percentile

than among their counterparts with WCs below that mark (Bradlee, Signer, Qureshi & Moore, 2010).

Young people' consumption of fruits and vegetables is also inadvertently associated with obesity because to energy thickness (Befort et al., 2006; Altman, Obbagy,& Essery , 2012). The number of calories contained in one gram of food is referred to as "energy density." Eating foods with low energy density allows one to consume more for fewer calories when compared to foods with high energy density. Pre-adulthood is a very unique stage due to the erratic levels of growth and hormonal changes, though.

Drawing links between the consumption of fruits and vegetables and weight status in young adults and these progressions is difficult because they confuse the relationships that we know to be true for adults. Some studies have not shown a connection between teenagers' intake of fruits and vegetables and body mass index (Field, Gillman, Rosner, Rockett & Colditz, 2003; Ledoux, Hingle & Baranowski, 2011).

Ma, Betts, Horacek, Georgiou, and White. (2003) reported that, Dietary choices show how well a person can recognize and assess their own needs. As a result, there is a big discrepancy between recommended and actual fruit and vegetable consumption (Dehghan et al., 2011).

Consumption Pattern of fruits and Vegetables

Generally, regular intake of fruits and vegetables may prevent chronic diseases such hypertension, diabetes, and certain types of cancer and thus promoting good health (Hu, 2003). The health benefits of fruits and vegetables as reported in epidemiological studies are the major motivation for recommending high intake of fruits and vegetables per day (WHO, 2003).

At the adolescent stage a number of factors impact on chronic diseases and the adolescent children tend to develop their feature that stay throughout life (WHO, 2003). Therefore, high consumption of fruits and vegetables among adolescents is very essential and thus deserve public discussion (Rasmussen, Krolner, Klepp, Lytle, Brug, Bere, &Due, 2006). Despite the several benefits derived from fruits and vegetables consumption during the adolescent stage, large number of children and adolescents in most developing countries especially in African countries tend to consume less than the recommended daily intake of fruits and vegetables (Peltzer & Pengpid, 2010). The Health Behaviour in School-aged Children (HBSC) study conducted in 2001/2002 in 33 European and North American countries for adolescent students indicated that, less than 50% of all young adolescent reported consumed fruits and vegetables on a daily basis.

Unknown research has been done on the impact of teenage health and fruit and vegetable eating. Age, gender, socioeconomic status, family norms and parental encouragement, home accessibility, and parental intake are factors that shed light on teenagers' earlier research studies' consumption of fruits and vegetables (Rasmussen, et al, 2006). It has been suggested that a consumer's behavior, such as mental anguish (Cartwright et al., 2003), and economic level can have an impact on how much fruit and vegetable consumption they obtain.

According to this study, consumption of fruits and vegetables varies between countries. Thai schoolchildren consumed the most fruit and/or vegetables on a daily basis (3.7), followed by students from Indonesia (3.2), Sri Lanka (3.1), India (3.0), and Myanmar (2.9) in order of mean daily

servings. Fruits and vegetable availability, income, and the rate of urbanization are potential explanations for such variations. A correlation between consumption and availability for Thailand and Sri Lanka appears to be supported by the statistics on fruits and vegetables in the studied nations. Approximately 80% of female students, according to the study's findings, did not consume the required amount of fruits and vegetables each day.

Students in college might be thought of as being in a stage of life where it is easier to change their behavior. As a result, college campuses provide an important setting for removing real or imagined barriers to maintaining a healthy diet and exercising regularly and for putting in place successful interventions to disprove these notions (Wallace et al., 2000). It would be ideal if college students adopted healthy eating and exercise routines that would last throughout adulthood.

Only a small minority of college students, according to the data, consume the required daily servings of fruits and vegetables (Hiza & Gerrior, 2002). According to the current survey, less than once a day was ingested of vegetables or fruits by 58% and 64% of the participants, respectively. This was supported by the 51% of participants who gave their eating habits a low or fair rating. In a survey conducted by Hiza and Gerrior in 2002 of more than 2,600 college students, it was discovered that 55% had not consumed any green salad or vegetables, and 40% had not eaten any fruit in the previous 24 hours.

A minimum of five servings of fruits and vegetables should be consumed each day, according to the current Dietary Guidelines for Americans yet studies reveal that the majority of populations—including

adolescents—consistently fall short of this recommendation (Casagrande, Wang, Anderson, & Gary, 2007; Kimmons et al., 2009; CDC, 2010).

One of the most important aspects of preventing chronic diseases and maintaining health over the course of a person's life is eating a balanced diet (WHO, 2008). To meet the body's healthy demands, at least 5 servings of fruits and vegetables must be consumed each day, according to (Lutfiyya, Chang, & Lipsky, 2012). Fruits and vegetables provide essential food components that play crucial roles in the prevention of chronic diseases as well as key human nutrition sources. Increased consumption of fruits and vegetables is linked to a lower risk of heart illnesses, according to a study conducted by academics (Robinson & Tanya, 2008).

The results of a study on the consumption of fruits and vegetables by high school students in the United States showed that the median number of times per day that these students consumed fruits and vegetables was only 1.2 times for both fruits and vegetables and was no higher than 1.5 for any of the demographic subpopulations studied. Additionally, fruit and vegetables were also consumed once a day by 28.5% of pupils and 33.2% of children, respectively. Black and Hispanic students consumed the least vegetables overall. These findings indicate that the majority of students are probably not consuming enough fruit and vegetables each day to meet the recommendations for adolescents who engage in at least 30 minutes of physical activity each day: 1.5 cups of fruit and 2.5 cups of vegetables for females, and 2 cups of fruit and 3 cups of vegetables for males (CDC 2010).

Another study on consumption of fruits and vegetables amongst Fijian adolescents (Waqa 2010) showed that male adolescents show a higher

frequency of fruit consumption than do females. Almost half of the adolescents consumed one serving of vegetables or less each day. Females consumed less vegetable than males.

In a survey, Nti et al. (2011) found that orange, banana, and pineapple were the fruits that respondents ate the most frequently, at least daily or weekly. These are the fruits that consumers have the most access to, according to the research. Apple, mango, watermelon, pawpaw, avocado, and other seasonal fruits were also eaten. Onion, tomato, pepper, dark green leaves, garden eggs, and okro were the veggies that were most frequently consumed. The majority of the respondents include these vegetables in their main meals. The respondent occasionally ate the exotic vegetables cucumber, cabbage, carrot, and green pepper. The daily average for vegetable consumption was greater than the daily average for fruit consumption.

In any case, American teenagers (aged 12 to 18) don't consume enough produce to fulfill the 2015 Dietary Guidelines for Americans' recommended intake of fruits and vegetables (You, 2015). Two and a half to two and a half to two and a half to three cups of veggies are advised for teens (13 to 18 years old) However, 12 to 19-year-olds typically consumed 0.97 to 1.26 cups equivalents of vegetables and 0.80 to 1.06 cups equivalents of fruits per day (for both men and women individually), according to 2011–2012 NHANES data (USDA ARS, 2014 Information Tables). About 25% to 33% of all consumed green items were potatoes and juice (Bowman et al., 2014; Lorson, Melgar-Quinonez, & Taylor,2009). Correlates of fruit and vegetable intakes in US children. Journal of the American Dietetic Association, 109(3), 474-478.2009). NHANES statistics from 2009 to 2010 show that young people

(ages 12 to 18) consumed 0.60 cups of vegetables and 0.46 cups of fruits for every 1,000 calories they consumed, respectively. (Kim et al.2014). In light of this, if a respectably active 13-year-old girl followed a diet based on 2000 calories and maintained a healthy weight, she would only be consuming 1.20 cups of vegetables and 0.92 cups of fruit each day (which is still much less than the recommended amounts based on her energy requirement as determined by the DGA-2015). Teenagers consume less fruit and vegetables than is recommended, which is more than one cup of fruit and at least one cup of vegetables per day.

Fries and sweetened, fruit-flavored beverages, particularly juice drinks, are occasional food choices that are less nutrient-dense versions of fruits and vegetables. According to Kim et al. (2014), french fries make up about 30% of the vegetables consumed by teenagers, and they estimates that Americans consume about 39% of their daily recommended intake of soda, caffeinated beverages, sports drinks, and drinks with sugar added to organic products .Solid fats and added sugar should be ingested in moderation as they are high in calories and low in nutritious value which can make them a bad replacement for foods like fruits and vegetables that are high in nutrients and low in calories (Kim et al.2014).

Knowledge on Fruits and Vegetables

According to David, Kimiywe, Waudo, and Orodho,(2008), nutrition education is the interaction through which people acquire the knowledge, mindset, and skills necessary for developing healthy eating habits. Students spend 33% of their day at school, therefore it is essential to provide them with practical advice about making healthy eating choices. (Encourage, Sherman,

Borradaile, Grundy, Vander Veur, Nachmani, Karpyn, Kumanyika, & Shults, 2008).).

According to Perez-Rodrigo and Aranceta (2001), schools may be able to connect with kids when their eating patterns are still developing and set them up for lifelong healthy behaviors and eating habits. According to research by Neira and De-Onis (2006), schools have a big impact on most kids' attendance and provide lots of opportunity for kids to observe productive work and healthy eating habits. Children who are now at danger owing to issues with their diet and health arrive at school worn out, hungry, and unable to cope with the demands of learning or gain anything from the lessons.

According to Steyn (2010), educational plan-based nutrition programs would essentially further enhance children's nutritional understanding and dietary way of behaving; as a result, schools should support school wellness arrangements and limit entrance to unhealthier food.

Since nutrition and actual development are inevitably linked, achieving optimal nutrition is crucial for realizing maximum development potential. Good eating habits are crucial for young people's physical and mental growth, psychosocial development, and mental performance, as well as for preventing diet-related chronic diseases (Quatromoni, Copenhafer, D'Agostino, & Millen, 2002).

An individual's growth, progress, and susceptibility to illness over the course of their lifetime are all directly correlated with their dietary choices during adolescence. (Oldewage-Theron, & Egal, 2010). Adolescent dietary patterns are influenced by a variety of physical and psychosocial variables. Teenagers generally consume less supplements despite the strict requirements, which is

likely due to poverty and inadequate nutritional knowledge. Information has a big impact on how much produce people eat. (Salehi, Eftekhar, Tavafian, Montazeri, &Jazayer,2010).

A review has also revealed that increasing access to knowledge has a substantial impact on how young people establish their sustenance behaviors. (Ghaffari, Tavassoli, Esmaillzadeh, & Hassanzadeh, 2012).

According to some studies, adopting healthy eating habits is one of the most crucial things you can do to help your teenager meet their nutritional needs. Studies also show that when you learn good eating habits early in life, you're more likely to keep them up as an adult, which lowers your risk of developing serious chronic diseases (Chin, Mohd-Nasir, & Mohd-Nasir, 2009; McNaughton, Ball, Mishra, & Crawford, 2008). Adolescents' eating habits are typically greatly influenced by the physical and psychological changes that occur during this time (Dapi, Hornell, Janlert, Sherlund, & Larsson, 2010). Fruit and vegetable consumption was shown to be positively associated with knowledge in a comprehensive study looking at the association between food consumption and dietary knowledge. (Shaikh et al., 2008).

Attitudes towards fruits and vegetables consumption

An individual's views about eating fruits and vegetables are influenced by personal elements such as knowledge, attitudes, and abilities as well as social and behavioral effects as well as ecologically friendly factors such as availability, affordability, quality, and supply. The attitude toward consuming nourishing foods in one's life may differ depending on one's knowledge and abilities (Bandura, 1991).

Growing independence, including the choice of when and what to eat, characterizes adolescence. However, being affected by a number of factors (biological, social, physical, economic, psychological, psychosocial, attitudes, beliefs, and knowledge about food) and altering their lifestyle may have an impact on their dietary choices and eating behaviors, causing them to fail to adhere to healthy eating practices like eating enough fruits and vegetables (Taylor,Evers, & McKenna, 2005). In a cross-sectional study of adolescents' eating habits in secondary schools, Onyiriuka, Ibeawuchi, and Onyiriuka (2013) found that meal skipping, combining fast food with soft drinks, and low consumption of fruits and vegetables were the primary eating habits emphasized. Additionally, his research showed that breakfast was the meal that was most commonly skipped, while supper was the meal that was skipped the least. It was shown that consuming fruits and vegetables and attitude had a strong association.

Students in the tenth grade had a significantly higher intention to consume fruit than students in the fifth or eighth grades, however (CDC, 2006). Mintah et al. (2012) observed that the opinions of the respondents were noticeably positive because the majority of them were in favor of consuming fruit in their study on fruit consumption among university students.

Fruits and Vegetables Preferences

The most often consumed fruits by the respondents, at least on a daily or weekly basis, were orange, banana, and pineapple, according to Nti et al (2011) study on awareness of nutrition and health benefits and frequency of intake of fruits and vegetables among Ghanaian homemakers. The discovery suggests that these are the fruits that consumers may generally find. Apple,

mango, watermelon, pawpaw, avocado, and other seasonal fruits were also enjoyed. Apples, oranges, and pineapples were the most favored fruits, although consumption of apples did not match the preference that was expressed.

Fruits that people ate the most were oranges and watermelons. This is similar with other surveys from higher campuses in Ghana and Oyo state, where the most popular fruits were orange, banana, and watermelon. Onion, tomato, pepper, dark green leaves, garden eggs, and okro were the veggies that were most frequently consumed. The majority of the respondents include these vegetables in their main meals. Exotic foods including cucumber, cabbage, carrots, and green pepper were occasionally consumed among respondents.

Factors Influencing the Consumption of Fruits and Vegetables

Several studies have linked factors including accessibility, style of life, financial situation, and demographic disparities as having an impact on how much produce is consumed. It has been noted that some factors, such as income, marital status, and gender, are associated to the socioeconomic determinants of consumption of fruits and vegetables (Dehghan et al., 2011). According to Dehghan et al. (2011), women consume more fruits and vegetables than men do. Additionally, greater income levels, higher levels of education, and being single or never married have all been strongly linked to higher rates of FV intake. The consumption of fruits, vegetables, and other healthy food options is reportedly influenced by education, income, and financial factors, according to Lallukka, Rahkonen, Roos, Laaksonen, and Lahelma (2010). In addition, the price of nutritious food probably affects people from all income levels (Lallukka et al., 2010). Individual taste, societal

legacy and values, social financial implications, and basic impacts, according to Lucan et al. (2010), might affect dietary decisions. The main obstacles to eating fruits and vegetables are accessibility, taste, cost, and individual preferences. Schedule/time constraints and a lack of freshness are further significant obstacles (Lucan et al., 2010). Additionally, it was shown that some people may have the best of intentions to eat the prescribed amounts of fruits and vegetables but lack understanding of appropriate portion proportions (Ma et al., 2003).

Demographic differences

Teenagers' intake of fruits and vegetables is impacted by a variety of demographic characteristics. (Schroeter, House, & Lorence, 2007). Age, gender, and BMI are some of these variables. According to a 1995 study by the Centers for Disease Control and Prevention, different age groups have different habits when it comes to eating fruits and vegetables. Different nutritional analyses revealed that men and women had different eating habits. In certain studies, it was discovered that women ingested more fruits and vegetables than men (Wardle, Haase, Steptoe, M, Jonwuites, and Bellisle, 2004; Zansky, Norton, Crim, and Henao, 2012).

However, the review focused specifically on students' overall dietary habits. In contrast to other studies, a study from North Carolina found that men consume more fruits and vegetables than women. (Ward, 2012). Men and women consume different amounts of fruits and vegetables, which may be due to cultural variations. According to some cultures, foods high in energy indicate strength and masculinity, hence they are referred to as being for men, whereas

foods high in nutrition, such as fruits and vegetables, are regarded as being for women (Ward, 2012).

Socioeconomic Status

Health and nutritional status are well known to be greatly influenced by socioeconomic class. Food availability, both in terms of quantity and quality, is influenced by a household's socioeconomic situation, eating habits, and cultural customs (WHO, 2006). Families, neighborhoods, and schools are the key contexts that have an impact on how children and adolescents develop. The likelihood that these teenagers will develop into healthy adults is significantly impacted by the quality of these surroundings.

The ability to buy a desired good or service, such as the kind, caliber, and quantity of food that will be consumed, is known as a person's purchasing power is determined by their income level or economic standing (Adigbo, & Maddah, 2011). Thus, the most crucial element in determining the character of these conditions as well as the welfare and wholesome status of children and teens is family wealth. Low-income households frequently reduce food intake or purchase more modest, less nutrient-dense food items as a means to adjust to the situation. The dietary requirements of the weak, such as adolescents, are impacted by this exercise, when supplementation is important to support their physical and mental development.

Financial factors are accepted to influence people's eating habits and food choices. Better options and financial flexibility are provided for purchasing high-quality food (Lallukka, Pitka-niemi, Rahkonen, Roos, Laaksonen, & Lahelma, 2010). According to a study conducted in Finland (Lallukka, Pitka-niemi, Rahkonen, Roos, Laaksonen, and Lahelma, 2010),

independent of educational attainment, FV intake increased when income was higher. According to another study, those with lower socioeconomic statuses tend to consume more foods that are high in calories and low in nutrients. Quality food options are typically more expensive than food sources that are high in energy. This suggests that folks with greater incomes may afford to buy wholesome food sources. (Kamphuis, Giskes, Bruijn, Wendel-Vos, Brug, & Van, 2006; Piha, Laaksonen, Martikainen, Rahkonen, & Lahelma, 2010).

Lifestyle Factors

One of the elements influencing the consumption of fruits and vegetables is lifestyle. According to an Australian study, those who smoke are more likely to have a low fruit and vegetable intake pattern (Wang and Worsley, 2014). The review acknowledged that poor intake may be caused by smokers' bad eating habits. A research in Florida and Arkansas found that students' consumption of fruits and vegetables was negatively impacted by eating out (Schroeter, House, & Lorence, 2007).

Availability

One of the main elements influencing the consumption of fruits and vegetables is availability (Othman, Karim, Karim, Adzhan, Halim, & Osman, 2012). Teenagers' consumption of fruits, vegetables, and other healthful foods may rise if they have access to shops and vendors that sell them (Centers for Disease Control and Prevention, 2013) When quick access to nutritious food options is available, consumers eat more of them (Kathleen, Connie, Leslie, and Plain, 2009). According to a study by Perera (2012), students' perceived significant barrier to consuming the recommended daily amount of fruits and vegetables is the inaccessibility of those foods in their immediate vicinity. In a

study by Neumark-Sztainer, Story, Resnick, and Blum (2006), it was discovered that home accessibility had a substantial impact on these students' consumption of fruits and vegetables.

At school, students expend a significant amount of their energy. The availability of FVs at school has an impact on kids' intake of them. Young people who had access to fruits and vegetables during the school day reported eating more, according to California research 2013 study by Keihner, Sugerman, Linares, Rider, Egelski, & Mitchell.

The study also discovered that children with gardens who cultivate their own fruits and vegetables consume more of them than those without gardens. According to Chung and Hoerr (2015), kids' consumption of fruits and vegetables is hampered by the lack of or limited availability of these foods on school campuses.

Chapter Summary

This chapter examined previous research on the knowledge, attitudes, behaviors, consumption patterns, and factors influencing students' eating of fruits and vegetables. Various authors had offered their opinions on the matter.

CHAPTER THREE

RESEARCH METHODS

The research method is the systematic way of obtaining information from a population as well as describing the method and techniques used in data collection and analysis. Therefore, this chapter includes the research design, population, sampling procedure, data collection instrument, data collection procedure and data processing and analysis.

Research Design

According to Amedahe and Gyimah (2003), a research design is a plan outlining how data pertaining to a certain subject will be obtained and organized. The research design also reveals what an expert is writing about, including the hypotheses and their application to subsequent informational investigations (Akubia, 2011). The research used a quantitative approach. It entails the creation of quantitative information. The study was conducted using a descriptive research design. Data collection for testing hypotheses or determining the answers to research questions on the current state of the subject matter is related to descriptive research design (Gay, 1992; referred to in Amedahe, 2006). As a result, the descriptive design is employed to accomplish a number of study goals. Both the features of particular groups and the percentage of persons who exhibit a particular behavior are described using it. Additionally, it is utilized to identify correlations between variables and create precise predictions. According to Asare (2010), a descriptive research design is ideal when a researcher wants to describe something as it is, in its natural state, or wants to characterize some elements of a population by choosing unbiased samples of participants to fill out an instrument. In this

study, participant characteristics and the variables used to measure them were described exactly as they were, without any manipulation or variable control. Since the objective of the study was to describe and record the knowledge, attitude, and other factors that affected the consumption of fruits and vegetables by Senior High School students, this methodology was used. The following are some benefits of using the descriptive research design, according to (Frankel, & Wallen, 2003): it provides more objective results in that the researcher only describes the situation as it is without any form of manipulation, it is an easy way to collect data, and it is very suitable for larger populations. Utilizing this research strategy was appropriate because the sample size for this study was large. There are several drawbacks to descriptive research design as well. It doesn't give the study's results in depth. When respondents give erroneous answers, it can produce misleading results, which can undermine the study's findings. Therefore, the researcher contemplated utilizing the descriptive study design on the basis of the aforementioned grounds.

Mugo (2008) highlights that, despite the fact that there are essentially three different kinds of descriptive research designs, a cross-sectional survey study design was employed for the purposes of this evaluation. It is helpful for giving a sneak glimpse of the current attitudes, beliefs, and actions of a population (Mugo, 2008). Given that the study's goal was to learn more about the targeted demographic by choosing a representative sample of survey respondents, this was appropriate for the review. The cross-sectional survey approach has a number of benefits, including the delivery of multiple replies from a diverse group of respondents; it offers a major picture of the event and

aims to explain people's thoughts and behavior based on information acquired at a certain moment. Despite its benefits, there are also disadvantages, such as the potential for hasty and arbitrary responses from respondents. The challenge is ensuring that the questions to be answered or the arguments to be offered in the descriptive design are accurate and not misleading. The researcher was careful to exclude these barriers from the item structures of the questionnaire.

Study Area

The study was conducted at the Northern School of Business Senior High School, which is situated in Tamale's Sagnarigu Municipal Assembly in Ghana's Northern Region. Over 4000 students attend this mixed-gender public school, which also offers boarding. Few students come from the south, with the majority of students hailing from the north of the country.

Population

Population, according to Hayes (2011), is the entire group of people or things that share a certain set of traits. The population is the totality of the components within which a study is conducted. In other words, the population is the larger group from which the sample that represents the entire study is drawn. This is a group whose members share traits that make them recognizably a part of the group.

A population is described by Mugo (2008) as a collection of people, things, or things from whom samples are taken for measurement. A study population, according to Degu and Yigzaw (2006), is the group from which a sample is taken and conclusions are drawn. Therefore, Form 2 gold track students and Form 3 students made up the population for this study. These groups were taken into account because they were the ones present at school

when data was being collected. According to records kept by the school administration, there are 1,240 Form 3 and Form 2 gold track students overall, 507 of whom are female and 733 of whom are male. Table 1 lists the student population according to programme of study.

Table 1: Population Distribution Table of the Respondents

Form	Programmes of Study	Total number of students
Form 3	General Science	50
	General Arts	200
	Business	250
	Home Economics	210
Form 2	General Arts	330
	Business	200
Total		1240

Source: Field Data (2020)

Sample and Sampling Procedure

A sample is a subset of a population that has been chosen to take part in a study. (Hayes, 2011). It is also a group of people picked from a population who are thought to represent that demographic.

A sample, according to Saunders, Lewis, and Thornhill (2007), is a sub-grouping of a larger population that is examined to acquire quantifiable information about the population. A sample was also viewed by Borden and Abbott (2002) as a part of a larger group. According to Ross (2005), sampling is typically done to enable the itemized analysis of a subset rather than the full population. It entails selecting different review units from a defined focus population (Degu, & Yigzaw, 2006). The data obtained from the succeeding

sample is mostly utilized to fuel insightful hypotheses about the population. The sample size for the investigation was determined using the sample size determination table developed by Krejcie and Morgan in 1970. The sample size for each structure was chosen using a multi-stage sampling procedure.

The sample size for each form was calculated using the multi-stage sampling method. Thus, stratified sampling and random sampling are used.

The population had to be divided into strata in order to use the stratified sampling approach. As a result, the population was divided into strata according to the several study programs (General Science, Business, General Arts, and Home Economics).

The respondent was then chosen using a straightforward random selection process, more precisely the lottery method, from each of the strata, namely General Science, Business, General Arts, and Home Economics. Paper pieces with numbers on them were coiled up in a basket. A composition was selected by each pupil. Every paper that was selected was noted, and then it was placed back into the container. This was done to ensure that every student is given the same opportunity to participate in the review. This was carried out up till the allotted sample size for each program for Form 2 students. The Form 3s underwent the same process to choose respondents for the study. Referring to Krejcie and Morgan's (1970) estimate of sample size table, the sample size for the study was 771 students. The breakdown for the samples selected from each programme is indicated in table 2.

Table 2: Sample Size Distribution

Form	Programme of Study	Sample Size
Form 3	General Science	44
	General Arts	132
	Business	152
	Home Economics	136
Form 2	General Arts	175
	Business	132
	Total	771

Source: Field Data (2020)

Data Collection Instrument

Data was defined by Frankel and Wallen (2003) as the meticulously gathered information or empirical evidence that follows rules or procedures. However, in order to address research issues, researchers must collect data. The method by which data will be gathered is the research instrument. There are many different sorts of instruments used in data gathering, however the type of research design will determine which ones are used.

The questionnaire was the method chosen to obtain data due to the utilization of a sizable sample and the participants' overall preference for obscurity in the conduct of a review. According to Frankel and Wallen (2003), a questionnaire is a method for gathering data that asks respondents to respond verbally or in writing to a pre-written set of questions. By asking respondents questions as opposed to observing how they behave, questionnaires allow researchers to learn more about participants. According to Miles (2001), a questionnaire often involves asking individuals questions to learn what they

know or believe about a subject. This was used since it is an efficient and practical method for gathering data. Additionally, the respondents could read and write because they were literate, so the researcher thought they were suitable for this study.

The instrument had five (5) sections lettered A-E with a total of forty-six (46) items. Section (A) sought to assess the knowledge of students on fruits and vegetables. In this section, respondents were required to answer by ticking either True or False to the items numbering eight. (8). Section (B) was to determine the attitude of students towards the consumption of fruits and vegetables. Respondents were required to respond to statements using a 5-point Likert scale thus whether they strongly agree, agree, neutral, disagree and strongly disagree. That section had nine (9) items. Section(C) elicited responses on the consumption pattern of fruits and vegetables among students. Respondents were asked to indicate their frequency by responding to eleven (11) items by ticking, ranging from very frequently, frequently, occasionally, rarely, very rarely and never consumed. Section (D) sought to identify factors that influence the consumption of fruits and vegetables. Respondents were requested to respond to the statement provided by ticking either Yes or No with thirteen (13) items. Age, gender, religion, program of study, and form were the five (5) questions in Section E that solicited replies to the respondents' demographical characteristics.

Test for Validity and Reliability

A copy of the instrument was given to my supervisor in order to validate it, and she checked the content and construct validity. Students from Tamale Senior High School were used for the questionnaire's pilot testing

since they shared many of the same traits as the study's respondents. 77 participants, or 10% of the total sample for the study, were used for the pilot testing. According to Taylor and Baker (1994), a sample size of 10–20% of the sample size for the real study is a reasonable number of participants to take part in a pilot testing. The instrument's dependability was calculated using the Cronbach's alpha reliability coefficient. A reliability coefficient of.7 or higher, according to Frankel and Wallen (2003), is considered satisfactory. Such a dependability coefficient, according to Abington-Cooper (2005), is beneficial and can be used to gather evidence to support.

Ethical Consideration

The researcher received ethical approval from the University of Cape Coast's Institutional Review Board. The researcher also got an introduction letter from the Department of Vocational and Technical Education in order to request authorization from them to collect data from my respondents. The study's goals and methods were thoroughly explained to the participants. Consent form was given to the students to sign to show their readiness to participate in the study. Confidentiality, anonymity and privacy was adhered to.

Data Collection Procedure

The researcher visited the respondents in their various classrooms and gave them the questionnaire in person. One benefit of administering in person is that the researcher has the opportunity to thoroughly explain the instruments to respondents so they are aware of the need of providing accurate answers. Respondents were resolutely promised of secrecy and anonymity by the researcher in other for the respondents to feel relaxed and respond to the items.

With the researcher present, respondents who had challenges were assisted. Larger part of the respondents had the option to complete the instrument within a period of 20 minutes afterwards it was collected. However, few respondents could not complete within this period hence an additional 10 minutes was given. The researcher used a period of three days to administer the questionnaire. In all 700 questionnaires were collected which gives a return percentage of 91%.

Data Processing and Analysis

In order to respond to the research questions that guided the review, the information which was gotten from the respondents were altered to eliminate insignificant reactions, and coded afterwards. The data was analyzed using Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics was used in the data analysis. Demographic characteristics of the respondents was presented using frequencies and percentages. Frequencies and percentages were also used to present results on fruits and vegetables consumption pattern among students.

Results on the factors influencing consumption of fruits and vegetables as well as that of the knowledge and attitudes of students on fruits and vegetables consumption was analyzed using the mean and standard deviation. A t- test was used to analyze the research hypotheses 1, 2 and 3. Research hypothesis 1 examines the differences between gender and consumption pattern of fruits and vegetables among students. Hypothesis 2 is between knowledge of students on fruits and vegetables and attitude of students towards fruits and vegetables consumption and hypothesis 3 is the differences between age and knowledge students on fruits and vegetables.

Chapter Summary

The research design, sample size, sampling method, data collection tool, data collection method, and data processing and analysis were the main topics of this chapter.

CHAPTER FOUR

RESULTS AND DISCUSSION

In this chapter, the study's findings are presented and are provided along with a commentary. There are two sections to the chapter.; the first portion offers the findings regarding the respondents' demographic traits and then discusses them. The examination of the primary data in order to respond to the research questions is the second major theme of the chapter. The study was conducted in the Northern School of Business Senior High School.

Demographic Characteristics

The study's preliminary data, which consists of the respondents' demographic details, are presented and examined in this section. These include the respondents' form or class, gender, age, and religious and educational backgrounds. The category of students who participated in the study is revealed by these demographic details. The results of the demographic characteristics of the respondents are presented in Table 3.

Table 3: Demographic Characteristics of Respondents

Scale	Sub-scale	F	%
Gender	Male	260	37.2
	Female	439	62.8
Age	14 years and below	16	2.3
	15-17 years	212	30.3
	18 years and above	471	67.4
Religion	Christian	251	35.9
	Muslim	397	56.8
	Traditionalist	27	3.9
Programme of study	General Arts	289	41.3
	Home Economics	143	20.5
	General Science	28	4.0
	Business	239	34.2
Form/Class	Three	456	65.2
	Two	243	34.8

Source: Field Data 2021

As indicated in Table 3, 260 (37.2%) of the respondents were males and the remainder (n=439; 62.8%) were females. The study's programs of study may have contributed to the study's predominantly female population. This is because usually General Art and Home Economics programmes are characterized with female dominance and in this study, most (n=289; 41.3%) of the respondents were General art students followed by Home Economics students (n=143; 20.5%). The programmes of study that are usually characterized with male dominance in most of the SHS in Ghana are General

Science and Business. In this study, it is evident in table 3, that the sum of respondents studying these programmes is relatively small as compared to the other programme that is dominated by females.

In terms of the age range of the respondents, majority (n=471' 67.4%) of the respondents were 18 years and above, followed by those between 15-17 years (n=212; 30.3%). Only sixteen (n=16; 2.3%) of the respondents were 14 years and below. The majority (n=471' 67.4%) of the respondents being 18 years and above could be explained against the background that majority (n=456; 65.2%) of the respondents were in form three followed while about half (n=243) of the respondents were formed, two students.

Main Results

In regard to the research questions and hypotheses that were proposed to guide the study under several research-related themes, the major findings are discussed in this part. The results of each research question and hypothesis are presented in a table followed by relevant discussions.

Students' Knowledge of Fruits and Vegetables

Research Question One: *What is the knowledge of students on fruits and vegetables?*

The main goal of this inquiry was to gauge pupils' familiarity with fruits and vegetables. Respondents were asked to select the appropriate response to a variety of elements in order to answer this research question. The results on respondents' knowledge of fruits and vegetables are presented in Table 4.

Table 4: Appropriate Options as Indicated by Respondents on Knowledge of Fruit and Vegetable Consumption

Variables	Correct answer	Frequency (f)	Percentage (%)
Fruits and vegetables contain fats and proteins.	False	664	95.0
Frequent consumption of fruits and vegetables reduce the chances of developing chronic diseases like cancer, diabetes or hypertension.	True	675	96.9
Consumption of fruits and vegetables improves health as well as promotes growth and development.	True	677	96.9
Dietary fiber in fruits and vegetables help in the digestion of food.	True	659	94.3
Adequate consumption of fruits and vegetables help in strengthening the immune system.	True	540	77.3
Fruits and vegetables are not important for healthy living.	False	590	84.4
Vitamins are found only in fruits and not in vegetables.	False	537	76.7
Adolescents such as students need to consume enough fruits and vegetables	True	604	86.3

Source: Field data, 2020

The results in Table 4 depict that majority (n=664; 95%) of the respondents know that fruits and vegetables do not contain fats and proteins. Majority (96.9%) of the respondents answered correctly that regular fruit and vegetable consumption lowers the risk of chronic diseases like cancer, diabetes, or hypertension. Similarly, a majority of 96.3% of the respondents responded correctly that dietary fiber in fruits and vegetables help in the

digestion of food. Also, 77.3% of the respondents were able to identify that the correct response to the statement "*Adequate consumption of fruits and vegetables help in strengthening the immune system*" was true. In addition, majority (*n*=537, 76.7%) of the respondent knew that vitamins are not found in only fruits. The majority of the respondents (86.3%) respondent correctly to the statement "*Adolescents such as students need to consume enough fruits and vegetables"* The findings show that participants have knowledge of fruits and vegetables.

Attitude of Students Towards Fruits and Vegetable Consumption

Research Question Two: *What is the attitude of students towards fruits and vegetable consumption?*

Finding out students' attitudes on eating fruits and vegetables was the goal of this research inquiry. Respondents were asked to answer a series of questions in order to answer this study topic. The results on respondents to these items are presented in table 5.

Table 5: The Attitude of Students Towards Fruits and Vegetables Consumption

Statements	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree			
	F	%	F	%	F	%	F	%	F	%	Mean	SD
I skip meals made up of fruits and vegetables	9	1.3	29	4.1	13	1.9	348	49.8	300	42.9	4.29	0.80
I eat fruits and vegetables because they taste good	362	51.8	159	22.7	20	2.9	80	11.4	78	11.2	2.07	1.41
I do not like the taste of most fruits and vegetables	66	9.4	317	45.4	99	14.2	48	6.9	168	24.0	3.04	3.74
I buy fruits and vegetables with my pocket money	382	54.6	278	39.8	24	3.4	7	1.0	7	1.0	1.58	1.38
I eat more fruits and vegetables when they are in season	344	49.2	325	46.5	20	2.9	7	1.0	3	0.4	1.57	0.64
I encourage my friends to always consume fruits and vegetables	325	46.5	287	41.1	42	6.0	22	3.1	23	3.3	1.76	0.94
I do not enjoy eating fruits and vegetables every day	149	21.3	71	10.2	140	20.0	199	28.5	140	20.0	3.16	1.42
I consume fruits and vegetables because they help to stay healthy.	522	74.7	101	14.4	37	5.3	16	2.3	23	3.3	1.45	0.94
I would like to eat a fruit or vegetable I have never tried before.	338	48.4	249	35.6	96	13.7	13	1.9	3	0.4	1.70	0.80

Source: Field Data, 2021

The results in Table 5 show that most (n=348; 49.8%) of the respondents disagreed with the statement "I skip meals made up of fruits and vegetables" while a little below those who disagreed (n= 300; 42.9%) also strongly disagreed to the same statement. The result also portrays that most of the respondents (n=317; 45.4%) of the respondents agreed that they do not like the taste of most fruits and vegetables. However, only 168 of the respondents representing 24% strangely disagreed that they do not like the taste of most fruits and vegetables. The results again show that the majority (n=382; 54.6%) of the respondents strongly agreed that they purchase fruits and vegetables with their pocket money. The results also show that 278 (38.8%) of the respondents agreed that they would purchase fruits and vegetables with their pocket money while only 7 of the students representing 1% strongly disagreed that they purchase fruits and vegetables with their pocket money. From Table 5, it is observed that most (*n*=344; 49.2%) of the participants agreed that they eat more fruits and vegetables when they are in season. 325(46.5%) of the respondents agreed that they consume more fruits and vegetables when they are in season. This result could be due to the fact that fruits and vegetables are cheaper when they are in season. Table 5, again shows that 325 (46%) of the respondents agreed strongly that they encourage their friends to consume fruits and vegetables and 287 (41%) of the respondents also agree that they encourage their friends to consume fruits and vegetables. This finding could be because the respondents have knowledge of fruits and vegetables. It could be observed from Table 5 that 10.2% and 21.3% of the respondents agreed and agreed strongly that they do not enjoy eating fruits and vegetables every day. Concerning, the statement "*I would like to eat a fruit or vegetable, I have*

never tried before" it is evident from table 3 that 48.4% (n=338) strongly agreed and 35.6% (n=249) agree to the statement. Only a few (n=13 and n=3) disagreed and strongly disagreed to the statement "*I would like to eat a fruit or vegetable I have never tried before*". The findings on participants' attitude towards the consumption of fruits and vegetables could be attributed to participants' knowledge about fruits and vegetables. Also, participants' understanding of the fact the consumption of fruits and vegetable reduces the chances of developing chronic diseases like cancer, diabetes or hypertension could have influenced their attitude towards its consumption.

Fruits and Vegetables Consumption Pattern Among Students

Research Question 3: *What are the fruits and vegetables consumption pattern among students?*

Students were asked to answer to numerous issues relevant to this study question in order to address how they describe their fruits and vegetable consumption pattern. The results are summarized in Tables 6, 7 and 8.

Table 6: Fruits Consumption Pattern

Scale	Sub-Scale	Frequency (f)	Percentage (%)
How often do you eat fruits?	Always	47	6.7
	Very often	180	25.8
	Sometimes	415	59.4
	Rarely	55	7.9
	Never	2	0.3
Have you eaten any fruits in the past one week?	Yes	580	83.0
	No	119	17.0
If Yes, how many times within the week?	Once per week	132	18.9
	2-4 days in the week	351	50.2
	5-6 days in the week	150	21.5
	Everyday	36	5.2
Have you eaten any fruits in the last 24 hours?	Yes	285	40.8
	No	413	59.1

Source: Field Data, 2021

The results in Table 6, indicate that majority of the participants (n=415; 59.4%) sometimes consume fruits and 47 (6.7%) of the respondents indicated that they always consume fruits. The results again show that majority of the study participants (n=580; 83.0%) had consumed fruit(s) in the past one week as of the time of data collection while 119 (17%) of the participants indicated that they had not consumed any fruit in the past one week prior to data collection. Participants were to indicate the number of times they have consumed fruit within the past one week prior to the time data was collected for this study. Table 6 shows that half 50% of the participants indicated that they consumed fruits 2-4 times in the week. Also, 150 (21.5%) of the participants indicated that they have consumed fruits 5-6 times within the week. Table 6 depicts that majority of the respondents (59.1%) responded that they have not consumed a fruit or fruits in the last 24 hours while a little below half (40.8) of the participants responded in affirmative that they had consumed fruit(s) in the last 24 hours.

Table 7 presents the summary of results on participants' responses concerning their vegetable consumption pattern. This data was collected to find out participants' vegetable consumption patterns.

Table 7: Vegetable Consumption Pattern

Scale	Sub-Scale	Frequency (f)	Percentage (%)
How often do you eat vegetables	Always	135	19.3
	Very often	516	73.8
	Sometimes	44	6.3
	Rarely	2	0.3
	Never	1	0.1
Have you eaten any vegetables in the past one week?	Yes	658	94.1
	No	41	5.9
If Yes, how many times within the week?	Once per week	58	8.3
	2-4 days in the week	98	14.0
	5-6 days in the week	452	64.7
	Everyday	90	12.9
Have you eaten any vegetable in the last 24 hours?	Yes	543	77.7
	No	155	22.2

Source: Field Data, 2021

As presented in table 7, the majority of the participants (n=516; 73.8%) indicated that they consume vegetables very often. 135 (19.3%) of the participants also indicated that they always consume vegetables. With respect

to whether participants had consumed any vegetables in the past one week before the data collection, Table 7 shows that majority (94.1%) of the participants responded in the affirmative while only 5.9% of the participants responded in the opposite. The results again show that majority of the participants (64.7%) consumed vegetables 5-7 times within the past one week and 12.9% of the participants of the indicated that they consumed vegetables every day of the week. Majority (77%) of the participants indicated that they had eaten vegetables or some vegetable in the last 24 hours, prior to the data collection for this study. Table 8, present the summary of the results on the specific fruits and vegetable participants consume. In order to respond to a variety of questions, participants had to mark how frequently they consume various fruits and vegetables on a scale. In order to respond to a variety of questions, participants had to mark how frequently they consume various fruits and vegetables on a scale.

Table 8: Fruits Consumed by Participants

FRUITS	Very Frequently		Frequently		Occasionally		Rarely		Very Rarely		Never	
	f	%	F	%	F	%	F	%	F	%	f	%
Orange	78	11.2	239	34.2	325	46.5	50	7.2	4	0.6	3	0.4
Pineapple	69	6.9	207	29.6	354	50.6	61	8.7	4	0.6	2	0.3
Pawpaw	37	5.3	76	10.9	387	55.4	177	25.3	19	2.7	2	0.3
Coconut	28	4.0	44	6.3	339	48.5	248	35.5	37	5.3	2	.3
Tangerine	28	4.0	50	7.2	248	35.5	299	42.8	65	9.3	8	1.1
Apple	40	5.7	55	7.9	190	27.2	286	40.9	99	14.2	29	4.1
Banana	57	8.2	70	10.0	182	26.0	248	35.5	110	15.7	32	4.6
Grapes	47	6.7	76	10.9	151	21.6	236	33.8	145	20.7	43	6.2
Dates	55	7.9	131	18.7	138	19.7	194	27.8	126	18.0	55	7.9
Mango*	92	13.2	340	48.6	164	23.5	72	10.3	23	3.3	8	1.1
Watermelon*	89	12.7	317	45.4	132	18.9	96	13.7	48	6.9	17	2.4
Pear*	102	14.6	219	31.3	261	37.3	88	12.6	18	2.6	11	1.6

Source: Field Data, 2021 Seasonal fruits marked (∗)

According to Table 8's findings, the majority of participants (n=354; 50.6%) said they occasionally consume pineapple while 55.4% of the participant response shows that they occasionally consume pawpaw. It could be observed from Table 6 that 299 (42.8%) of the participants answered that they rarely consume tangerine. Similarly, 286 (40.9%) of the participants' responses showed that they rarely consume apple. The result again depicts that 248 (35.5%) and 110 (15%) of the respondents answered that they rarely and very rarely consume banana respectively. Concerning grapes and dates, the responses show that 236 (33.8%) and 194 (27.8%) of the participants indicated that they rarely consume these fruits respectively. The results in table 8, indicate that 340 (48.6%) of the participants consume mangoes and 317 (45.5%) of the participants consume watermelon when they are in season.

Table 9 presents the findings on the vegetables consumed by participants involved in the study. This data was collected in order to find out which vegetables are mostly consumed by the study participants.

Table 9: Vegetables Consumed by Participants

FRUITS	Very Frequently		Frequently		Occasionally		Rarely		Very Rarely		Never	
	F	%	F	%	F	%	f	%	f	%	f	%
Cucumber	192	27.5	349	49.9	108	15.5	23	3.3	10	1.4	17	2.4
Cabbage	371	53.1	281	40.2	31	4.4	9	1.3	4	0.6	3	0.4
Carrots	336	48.1	294	42.1	51	7.3	14	2.0	2	0.3	2	0.3
Okro	463	66.2	190	27.2	28	4.0	12	1.7	5	0.7	1	0.1
Garden eggs	336	48.1	294	42.1	51	7.3	14	2.0	2	0.3	2	0.3
Tomatoes	289	41.3	374	53.5	19	2.7	12	1.7	4	0.6	1	0.1
Green leafy vegetables such as kontomire, ayoyo, bra leaves etc	512	73.1	151	21.6	14	2.0	13	1.9	4	0.6	1	0.1

Source: Field Data, 2021

It could be observed from table 9, that just a little below half (49.9%) of the study participants frequently consume cucumber while majority (53.1%) of the participants consume cabbage very frequently. The responses as presented in table 9, shows that okra is very frequently consumed by the majority (66.2%) of the participants. Only 5 of the participants indicated that they consume okra very rarely. Carrot was found to be consumed very frequently by 336 (48.1%) of the participants and frequently by 294 (42.1%) of the participants while only two of the participants indicated that they have never consumed carrots. Also, with respect to garden eggs, 336 (48.1%) of the participants said they consume it very frequently and 294 (42.1%) of the participant indicated that they consume the garden eggs frequently. Green leafy vegetables such as kontomire, ayoyo and bra leaves were consumed very frequently (n=512; 73.1%). Also, the green leafy vegetables were frequently consumed by 151 (21.6%) of the participants.

Factors that Influence the Choice and Consumption of Fruits and Vegetables

Research Question 4: *What factors influence the choice and consumption of fruits and vegetables among students?*

Research question four investigated the variables that affect participants' consumption of fruits and vegetables. Hence, the participants were to indicate by answering yes or no to a number of items. The results on the factors that influence participants' consumption are presented in table 10.

Table 10: Factors Influencing Fruits and Vegetables Consumption

Factors	Yes		No	
	F	%	F	%
Fruits and vegetables are very affordable	606	86.7	93	13.3
Fruits and vegetables are readily available at school.	640	91.4	59	8.4
I do not consume them because they are not easy to obtain.	271	38.8	428	61.2
Fruits and Vegetables are available at home.	552	79.0	147	21.0
I consume fruits and vegetables based on the season.	312	44.6	387	55.4
My religion and belief do not allow me to eat certain fruits and vegetables.	173	24.7	526	75.3
I react to certain fruits and vegetables when I consume them.	286	40.9	413	59.1
I eat fruits and vegetables to be healthy.	563	80.5	136	19.5
I eat them when I am sick to make me well and prevent sickness.	600	85.8	99	14.2
They are very tasty and attractive.	581	83.1	118	16.9
They are easy to store and preserve.	516	73.8	183	26.2
I do not get satisfied when I consume them.	460	65.8	239	34.2
Due to certain past experiences, I enjoy consuming fruits and vegetables.	521	74.5	178	25.5

Source: Field Data, 2021

The results as presented in table 8 depicts that majority (86.7%) of the respondents answered in affirmative to the statement "*fruits and vegetable are very affordable*". The respondents indicated that fruits and vegetable are readily available at school and at home as majority (91.4% and 79.0%) of the respondents answered yes to that statement respectively. Majority of the participants (61.2%) objected to the statement that "*I do not consume them because they are not easy to obtain*". Majority of students (55.4%) revealed that the fruits and vegetable they consume are not influenced by season. Similarly, majority of the participants (75.3%) objected to the statement "*My religion and belief do not allow me to eat certain fruits and vegetables*". The findings also show that majority of the participants (*n*=521, 74.5%) consume fruits and vegetables to be healthy and 74.5% of the participants indicated that they enjoy fruits and vegetables due to certain past experiences.

Hypothesis One: *There is no statistically significant difference between the gender of students and fruits and vegetables consumption pattern.*

In terms of their consumption of fruits and vegetables, male and female students' means were compared in the research hypothesis to see if there were any differences. The result of the t-test statistics is presented in Table 11.

Table 11: Difference Between Gender of Students and Fruits and Vegetables Consumption Pattern

Gender	M	SD	*T*	df	Sig (2-tailed)
Male	38.87	9.43	3.084	697	.002
Female	36.70	8.70			

Source: Field Data, 2021

From Table 11 The findings demonstrate that males' patterns of fruit and vegetable eating differ statistically significantly from those of females., (M=38.87, SD=9.43) and females (M=36.70, SD=8.70); t (697) = 3.084, p<.05, (2-tailed). This means that there is a difference in the mean value of male students' fruits and vegetable consumption patterns (M=38.87) and female students' fruits and vegetable consumption patterns (M=36.70). This finding implies that fruit and vegetable consumption patterns for male students and female students are not the same.

Hypothesis Two: *There is no statistically significant relationship between knowledge of fruit and vegetable and attitude towards fruit and vegetable consumption.*

Hypothesis two was formulated to determine if there is a connection between students' knowledge of and attitudes about fruits and vegetables, as well as their consumption patterns. In order to test this hypothesis, correlation analysis was conducted. The result is presented in Table 12.

Table 12: Relationship Between Knowledge of Fruit and Vegetable and Attitude Towards Fruit and Vegetable Consumption

Variables		**Attitude toward fruits and vegetables**
Knowledge of fruits and vegetables	Pearson Correlation	.123**
	Sig. (2-tailed)	.001
	N	699

**Correlation is significant at the 0.01 level (2-tailed)

The correlation analysis in Table 10 indicates that there was a statistically significant positive correlation between students' knowledge of fruits and vegetables and students' attitude toward fruits and vegetable

consumption (r=123; p<.001). The null hypothesis was therefore failed to be rejected.

Hypothesis Three: *There is no statistically significant difference between the ages of students and their knowledge of fruits and vegetables.*

Hypothesis three was formulated to find out whether there is a difference between students in terms of age and their knowledge of fruits and vegetables Whether or not a statistically significant difference exists must be determined, a number of statistical tests need to be conducted. The results of these statistical tests are presented in Tables 13- 15.

Table 13: Descriptive Results of Age Category

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
14 years and below	16	11.0625	.57373	.14343	10.7568	11.3682	10.00	12.00
15 years -17 years	212	11.0991	.66361	.04558	11.0092	11.1889	9.00	16.00
18 years and above	471	11.0255	.81174	.03740	10.9520	11.0990	8.00	16.00
Total	699	11.0486	.76487	.02893	10.9918	11.1054	8.00	16.00

Source: Field Data, 2021

Table 13, presents the descriptive statistic for the three age groups. As depicted in Table 11, respondents within the age range of 18 years and above (M=11.0255, SD =0. 81174) had the lowest mean as compared to participants with the age range 15 years -17 years (M=11.0991, SD=.03740) and participants within 14 years and below (M=11.0625, SD= .57373). There appears to be a difference in the means. Hence, to determine whether the diffidence is statistically significant or not the research needed to run other tests. First, the test of homogeneity of Variances was taken into account. In Table 14, the outcomes are displayed.

Table 14: Test of Homogeneity of Variances

Levene Statistic	**df1**	**df2**	**Sig.**
.671	2	696	.511

Source: Field Data, 2021

As indicated in Table 14, Levene's test of Homogeneity results shows that p>.05. This implies that the assumption concerning equality of variance has been met. Hence, the researcher followed with ANOVA. The results for the one-way ANOVA are presented in Table 15.

Table 15: ANOVA for Age Categories

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.795	2	.397	.679	.508
Within Groups	407.552	696	.586		
Total	408.346	698			

Source: Field Data, 2021

Table 15 indicate that there was no statistically significant difference between age groups' means with respect to their knowledge of fruits and vegetables as determined by one-way ANOVA (F (2, 696) =.679, p=.508). This suggests that there is no statistically significant variation in the respondent's knowledge of fruits and vegetables across the different age groups. The null hypothesis was therefore failed to be rejected.

Discussion

This study was conducted to investigate the knowledge, attitudes, and factors that influence the consumption of fruits and vegetables among senior high school students in the Northern School of Business Senior High School,Tamale. The findings that were discovered after the data was analyzed are discussed in this section. The headers for the conversations reflect the research questions they are addressing.

Students' knowledge on fruits and vegetables

The results of the study on students' awareness of fruits and vegetables showed that students were aware of these foods. Students were aware that eating fruits and vegetables lowers one's risk of contracting chronic illnesses like cancer, diabetes, or hypertension. The pupils also understood the value of fruits and vegetables. The findings revealed that students knew that consumption of fruits and vegetables improves health and promotes the growth and development of individuals. This suggests that students may have a positive attitude towards the consumption of fruits and vegetables. The possible explanation for these findings could be the study of integrated science as a core subject at the SHS level. The

integrated science course introduces students to basic science concepts such as nutrients and their sources, digestion, balance diet and the importance of fruits and vegetables. It could be said that the students understood these concepts in their integrated science lessons. The result of the present investigation is consistent with the result of Olawale (2015) whose study focused on knowledge and attitude towards consumption of fruits and vegetables among secondary school students in Ibadan North East Local Government Area, Oyo State. Olawale's findings showed that most of the participants (79%) had good knowledge of the health benefits of consuming fruits and vegetables. This discovery is in line with the research's conclusions. A study that investigated homemakers' knowledge of nutrition and health benefits of consumption of fruits and vegetables revealed that the participant had a fair knowledge of the benefits of fruits and vegetables (Nti et al., 2011). This finding is similar to the findings of this study. The results of this recent investigation are consistent with those of Asampana (2015) who found out that in some selected Senior High Schools in the Northern Region, majority of the students (96.0%) had knowledge of vegetables however only 3.82% had knowledge of use fruits.

Students' attitude towards the consumption of fruits and vegetables

The study revealed that the students have a positive attitude towards fruits and vegetable consumption as depicted in Table 5. This result might be explained by the fact that students had knowledge of the benefits of fruits and vegetables. It could also be due to students' understanding of the importance and the health benefits of fruits and vegetables. This finding suggests that students would

consume more fruits and vegetable if all other things being equal. A study conducted by Webb and Lewis (2013) in Trinidad and Tobago revealed that majority of the students (84.3%) had a positive attitude toward fruit consumption because students were of the view that they like fruits and the consumption of fruits make them feel healthy and 68.6% also expressed that fruits are good snacks. Similarly, Olawale (2015) found that more than half 69.8% of secondary school students involved in his study had a positive attitude towards the consumption of fruits and vegetables. The findings of these studies (Webb & Lewis, 2013; Olawale, 2015) are consistent with the results of our recent investigation.

Fruits and vegetables consumption pattern among students

The findings revealed that majority of the students (59.4%) sometimes eat fruits while 73.8% of the students eat vegetables very often. The results also showed that the majority of responders (83.0%) consumed a fruit(s) in the past week before data was collected. This finding differs from that of Hiza and Gerrior, (2002) found out that only a small percentage of college students consumed fruit and vegetables. The 24-hour recall for this study showed that a little above half (59.1%) of the respondents had not consumed any fruits. This finding is similar to the finding of Hiza and Gerrior, (2002) whose finding indicated that 40% of the respondents in their study had not consumed any fruit in the last 24 hours before data was collected. A study conducted by Hall, Moore, Harper and Lynch (2009 indicated that the incidence of low fruit and vegetable consumption among men varied from 36.6% in Ghana to 99.2% in Pakistan, and

among women from 38.0% in Ghana to 99.3% in Pakistan). Their study concluded that there was low consumption of fruits and vegetables in the countries involved. The results of the present investigation do not support this finding. This is due to the study's finding that fruit and vegetable consumption was high, as evidenced by Tables 6 and 7. Also, the results of this study do not agree with the results of Vea, (2007) who found out that the consumption of fruit and vegetables was low among the children, both amount and frequency of intake. Although this current study did not look at the number of fruits and vegetables consumed by participants, the study should that participants consumed fruits and vegetables frequently.

On the other hand, the findings revealed majority of the respondents (94.1%) had consumed fruit(s) and 64.7% of the respondents indicated that they had consumed vegetables for 5-6 days in the week before data collection. The 24-hour recall revealed that respondents 77.7% had consumed some vegetables. This finding is inconsistent with the findings of Hiza and Gerrior, (2002). This is because the authors found that majority of their respondents (55%) had not eaten any vegetables in the last 24 hours before data was collected for the study. The findings of this current study show that respondents consume fruits and vegetables regularly. This could be attributed to their knowledge of fruits and vegetables as well as respondents' positive attitude toward fruits and vegetable consumption.

Also, the findings as indicated in Table 8, participants infrequently consume fruits that available all year round (such as pineapple, pawpaw, tangerine and apple) as well as seasonal fruits such as mangoes, watermelons and pear. A possible explanation for this finding could be that these fruits are not readily available in the locality of the respondents. Also, it could be that these fruits are expensive as they would be in the case of apples since they are imported and are relatively expensive in all parts of the country. This finding does not align with those of Nti et al. (2011). The is because the authors found that the frequently consumed fruits and vegetables were orange, banana and pineapple while in this study these fruits were infrequently consumed by respondents. The study subjects might be to blame for the disparity in the results. This is due to the fact that while the study by Nti et al(2011) included homemakers, the current study was centered on students.

The findings again indicated that green leafy vegetables such as *kontomire, ayoyo* and *bra* leaves as well as Okro were consumed very frequently by the respondents as compared to vegetables such as cucumber, cabbage and carrots. This finding could be that *kontomire, ayoyo*, bra leaves are readily available and are comparatively inexpensive like carrots and cabbage. Comparably, this finding is similar to that of Nti et al. (2011) because the authors found that okro and green leafy vegetables were the most consumed by homemakers. However, Nti et al. (2011) study failed to mention the specific green leafy vegetables that were mostly consumed by homemakers. Nonetheless, the similarity of these findings could be attributed to the fact that this study and that

of Nti et al. (2011) were both carried out in the Northern Region of Ghana. The findings of this study differ from the findings of Layade and Adeoye (2014) who found out that in Oyo State, tertiary students frequently consumed banana (34%) and infrequently consumed cashew (1%). In this study, it evident in Table 6, that Mango (48.6) is the most frequently consumed fruit as compared to banana (10%). The differences could be due to the differences in the geographical locals as well as the study participants. This because the geographical location of an individual tends to influence the individual's food habits and preferences as well as the prices of food and its availability which may in turn influence the choice and consumption (Ramtekkar, Reiersen, Todorov,&Todd,2010;Yaktine & Caswell, 2013). Also, there is the possibility that the taste and preference of tertiary students may differ from that of high school students. A study by Asampana Agongo, (2015) found that Mango (97.3%) and Ayoyo (76.2%) were among the fruits and vegetables mostly consumed by SHS students in the Northern Region of Ghana. The findings of Asampana (2015) are similar to the findings of this current study. According to Asampana Agongo's hypothesis, the results can be linked to the fact that practically every household in Ghana's Northern Region has a mango tree or trees there (2015).

Factors that influence the choice and consumption of fruits and vegetables

According to Table 10's findings, respondents' decisions about which fruits and vegetables to eat and how readily available they are at home and ast school were influenced. This finding implies that respondents would choose fruits and vegetables that are available and those that are inexpensive. This could be

because respondents may not have enough money to spend on fruits and vegetables. Also, the finding revealed that the choice and consumption of fruits and vegetables are not influenced by their religion. This finding could be attributed to respondents' understanding of the importance of fruits and vegetables. The findings of this study differ from that of Layade and Adeoye (2014) because with the exception of availability of fruits, they found that students' income, sex, and parents' income of fruit were the factors that influence their consumption of fruits and vegetables. A study conducted by Mintah, et. al, (2012) revealed that the price of fruits influenced students' choice and consumption. Again, the authors found that university students were not influenced by religion did not influence their choice and consumption of fruits. These findings are in line with the findings of this current study as it is evident that the affordability of fruits influenced their choice and consumption but religion does not.

Difference between gender of respondents and fruits and vegetable consumption pattern

The results revealed a statistically significant difference between men and women's patterns of fruit and vegetable consumption. According to the research, men respondents eat more fruits and vegetables than female respondents. The researcher did not succeed in disproving the null hypothesis. This finding is in line with the findings of Vea (2007) who found out that there was a difference between girls' and boys' fruits and vegetable consumption. However, Vea's study found out that girls had a more frequent consumption of both fruit and vegetables compared with boys. A study conducted by Stea et al, (2020) revealed that

females showed increased consumption of fruits and vegetables compared to males. Although this finding of Stea et al, (2020) is consistent with the findings of this current study that there is a difference between fruits and vegetable consumption in terms of gender, the findings of Stea et al, (2020) are not consistent with the findings of this study. This is because Stea's study revealed that females consume more fruits and vegetables compared to males whiles the finding of this study is the opposite. A review conducted by Rasmussen, et al. (2006) revealed that 27 of the 49 studies found that girls consume more fruits and vegetables as compared to boys. (cited in Darfour-Oduro, 2018). Likewise, Esteghamati, et al. (2012) also reported that fruit and vegetable consumption did not differ significantly between males and females (p=0.415). The findings of these studies (Rasmussen, et al. 2006; Esteghamati, et al. 2012) contradict the finding of this study.

Relationship Between Knowledge of Fruits and Vegetables and Attitude Towards Fruit and Vegetable Consumption

The findings showed that there was a positive significant relationship between students' knowledge of vegetable consumption and students' attitude toward vegetable consumption. This finding suggests that knowledge of fruit and vegetable has a relation with students' attitude toward the consumption of fruits and vegetables. However, the finding of this study contradicts the findings of Nti et al. (2011) who did not find any relationship between participants knowledge of fruits and vegetables and attitude towards fruits and vegetable consumption.

Difference between the age of students and knowledge of fruits and vegetables

The results demonstrated that there is no discernible age difference amongst students in terms of their knowledge of fruits and vegetables. This means that the students with the age range of 14 years and below, 15 -17 years and 18 years and above did not differ in terms of their knowledge of fruits and vegetables. The possible expiation could be that the students involved in the study may have covered or completed their integrated science subject that introduces them to basic food and nutrition including fruits and vegetables. The finding of this study is in line with the findings of Olawale (2015) revealed that there was no significant difference between the age of respondent and their knowledge of fruits and vegetables ($p>0.05$). Regression analysis showed that student income, sex, parent's income and Availability of fruit were statistically significant and determined fruit consumption among student ($p<0.10$).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The research looked at the consumer awareness (knowledge, attitudes), and factors that influence the consumption of fruits and vegetables among Northern School of Business Senior High School students. The study was descriptive in nature and primarily focused on (a) evaluating students' knowledge of fruits and vegetables. (b) gauging pupils' attitudes toward eating fruits and vegetables. (c) determining the fruits and vegetable consumption patterns among students. and (d) identifying the factors that affect student choices and consumption of fruits and vegetables.

The study was conducted in the Northern School of Business Senior High School, Tamale in the Northern Region. The study used stratified sampling technique to divide the population into strata based on the programmes of study of the students and further used simple random sampling to select the respondents from the stratas. The primary tool utilized to gather data was a 46-item questionnaire. The frequency, percentages, means, and standard deviations were the key metrics used to examine the data.

Summary

The major conclusions from the data analysis are as follows:

According to the study's findings about students' awareness of fruits and vegetables, students were informed about these foods. Again, it was determined that students were aware of the value of eating fruits and vegetables, including how doing so might improve health and foster personal growth. The fact that

pupils realized that eating fruits and vegetables lowers one's risk of getting chronic diseases was another evidence of their knowledge. The results of the study on students' attitudes toward eating fruits and vegetables showed that students have a favorable attitude toward doing so because they indicated that they would consume more of them if all other factors were the same. The majority of students ingested vegetables more frequently than fruits in terms of fruits and vegetables, respectively. Once more, the survey showed that people regularly ate green leafy vegetables such ayoyo, bra leaves, kontomire, and okro. Fruits were generally eaten, though not regularly. The key determinants of fruit and vegetable consumption among students were availability and affordability. The study confirmed once more that religion had little impact on people's consumption of fruits and vegetables. The results of the test for hypothesis 1 showed that male respondents eat more fruits and vegetables than female respondents. Finding from research hypothesis 2 reveals a connection between students' attitudes toward eating fruits and vegetables and their understanding of such foods. With regard to their knowledge of fruits and vegetables, students in research hypothesis 3 who were between the ages of 14 and under, 15 and 17, and 18 and above did not differ from one another.

Conclusions

The results of the investigation show, Senior High School students are aware of the advantages of eating fruits and vegetables and how to consume them. It may be said that they have a general understanding of fruits and vegetables. Students were seen to have a good attitude about eating fruits and vegetables as a

result of their knowledge of such foods. Once more, it can be said that students generally ate fruits and vegetables, though not regularly. They ate more okro and green leafy vegetables than the other groups. This was caused by a number of elements, including its accessibility and cost both at home and at school. The results revealed a statistically significant difference between men and women's patterns of fruit and vegetable consumption. Additionally, there was a strong correlation between students' attitudes about vegetable consumption and their understanding of vegetable consumption. Finally, the results demonstrated that pupils' knowledge of fruits and vegetables did not significantly vary by age among them.

Recommendations

Taking into account the above research findings and conclusions, the following recommendations are made.

Stakeholders such as school board and management should come up with a policy to encourage sale of fruits and vegetables and limit sale of unhealthy foods on school premises. There should be social structures concentrating on young people to improve their perspectives regarding eating out because students typically buy their own food. The trend of eating out is growing as a result of increased urbanization, socioeconomic conditions, and geological structure.

School authorities should ensure behavioural change in food habits of students through campaigns on effects of inadequate fruits and vegetables consumption. Campaigns for mindfulness that highlight the negative effects of

inadequate fruit and vegetable consumption also help young people change their behavior.

Nutrition Officers should encourage the development and promotion of fruits and vegetables-based snacks for sale in schools. Convenient fruit and vegetable snacks should be offered by the food business.

Food Processing Industries should promote the application of appropriate preservation methods for fruits and vegetables to ensure long-term storage. Additionally, promote healthy eating habits in schools through nutrition education. Increasing knowledge about nutrition is essential for encouraging young adults, especially students, to eat more healthfully.

Agricultural officers should help to expand the variety and accessibility of fruits and vegetables. Traditional fruits and vegetables consumption should be promoted in metropolitan areas. The majority can afford traditional fruits and vegetables since they are less expensive.

Suggestions for Further Research

The following topics are suggested for additional study:

1. A study on students' consumption of fruits and vegetables in junior high schools has to be done more thoroughly.
2. More research on the availability of fruits and vegetables has to be done.

There should be more research to look into the factors affecting the availability of fruits and vegetables because this study indicated that availability has a significant impact on intake.

3. A research to understand the relationships between students' knowledge and consumption patterns for fruits and vegetables.

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APPENDIX A

UNIVERSITY OF CAPE COAST

COLLEGE OF EDUCATION STUDIES

FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION

DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION

This questionnaire is prepared with the aim of collecting data pertaining to my Master of Philosophy in Home Economics thesis with the topic "Consumer Awareness and Factors that Influence Fruits and Vegetables Consumption among Students of Northern School of Business, Tamale". Any information you provide will be kept strictly confidential and used purely for academic work. Respondents are kindly requested to provide candid responses to the set of questions for this study. Thank you for your cooperation.

SECTION A – Knowledge on Fruits and Vegetables

Please answer the following questions by ticking (√) either True "T" or False "F".

S/N	**KNOWLEDGE**	T	F
1.	Fruits and vegetables contains fats and proteins.		
2.	Frequent consumption of fruits and vegetables reduce the chances of developing chronic diseases like cancer, diabetes or hypertension.		
3.	Consumption of fruits and vegetables improves health as well as promotes growth and development.		
4.	Dietary fiber in fruits and vegetables help in the digestion of food.		
5.	Adequate consumption of fruits and vegetables help in strengthening the immune system.		
6.	Fruits and vegetables are not important for healthy living.		
7.	Vitamins are found only in fruits and not in vegetables.		
8.	Adolescents such as students' needs to consume enough fruits and vegetables		

SECTION B. Attitude towards Consumption of Fruits and Vegetables

Tick as appropriate whether you agree, neutral or disagree your attitude on the following:

S/N	ATTITUDE	STRONGLY AGREE	AGREE	NEUTRAL	DISAGREE	STRONGLY DISAGREE
9.	I skip meals made up of fruits and vegetables.					
10.	I eat fruits and vegetables because they taste good.					
11.	I do not like the taste of some fruits and vegetables.					
12.	I will buy fruits and vegetables with my pocket money.					
13.	I will consider eating more fruits and vegetables if they are readily available.					
14.	I will encourage my friends to always consume fruits and vegetables.					
15.	I do not enjoy eating fruits and vegetables every day.					
16.	I consume fruits and vegetables because they help to stay healthy.					
17.	I would like to eat a fruits or vegetables I have never tried before.					

SECTION C – Fruits and Vegetables Consumption Pattern

Please indicate your consumption pattern by ticking (√) in the boxes and writing your answer in the spaces provided WERE.

18. How often do you eat fruits?

Always [ ]

Very often [ ]

Sometimes [ ]

Rarely [ ]

Never [ ]

19. How often do you eat vegetables?

Always [ ]

Very often [ ]

Sometimes [ ]

Rarely [ ]

Never [ ]

20. Have you eaten any fruits in the past one week?

Yes [ ] No [ ]

21. If Yes, how many times within the week?

Once per week [ ]

2-4 days in the week [ ]

5-6 days in the week [ ]

Everyday [ ]

22. Have you eaten any vegetables in the past one week?

Yes [ ] No [ ]

23. If Yes, how many times within the week?

Once per week [ ]

2-4 days in the week [ ]

5-6 days in the week [ ]

Everyday [ ]

24. Have you eaten any fruits in the last 24 hours?

Yes [ ] No [ ]

25. If Yes, to the above, which fruit did you eat?.....

26. Have you eaten any vegetable in the last 24 hours?

Yes [ ] No [ ]

27. If Yes to the above, which vegetables did you eat?.....

Below is a list of fruits and vegetables. Tick your appropriate consumption pattern.

28.

	FRUITS	Very Frequently	Frequently	Occasionally	Rarely	Very Rarely	Never
A.	Orange						
B.	Pineapple						
C.	Pawpaw						
D.	Coconut						
E.	Tangerine						
F.	Apple						
G.	Banana						
H.	Grapes						
I.	Dates						
	For seasonal fruits marked*, please estimate your average consumption when it is in season.						
J.	Watermelon*						
K.	Mango*						
L.	Pear*						

M.	OTHERS						

	VEGETABLES	Very Frequently	Frequently	Occasionally	Rarely	Very Rarely	Never
N.	Cucumber						
O.	Cabbage						
P.	Carrots						
Q.	Okro						
R.	Gardern eggs						
S	Tomatoes						
T.	Green leafy vegetables such as kontomire, ayoyo, bra leaves etc.						
U.	OTHERS						

SECTION C –Factors Affecting Fruits and Vegetables Consumption

Answer "YES(Y) or "NO" (N) to the following factors that influence your fruits and vegetables consumption by ticking (√) your response.

S/N	FACTORS	Y	N
29	Fruits and vegetables are very affordable		
30.	Fruits and vegetables are readily available at school.		
31.	I do not consume them because they are not easy to obtain.		
32.	Fruits and Vegetables are available at home.		
33.	I consume of fruits and vegetables based on the season.		
34.	My religion and belief does not allow me to eat certain fruits and vegetables.		
35.	I react to certain fruits and vegetables when I consume them.		
36.	I eat fruits and vegetables to be healthy.		
37.	I eat them when I am sick to make me well and prevent sickness.		
38.	They are very tasty and attractive.		
39.	They are easy to store and preserve.		
40.	I do not get satisfied when I consume them.		
41.	Due to certain past experiences, I enjoy consuming fruits and vegetables.		

SECTION D - Demographic Characteristics

Please tick (√) the appropriate response

42. Age category

14 years and below [ ]

15 years -17 years [ ]

18 years and above [ ]

43. Gender

Male [ ] Female [ ]

44. Religion

Christian [ ]

Muslim [ ]

Traditionalist [ ]

Others (specify) [ ] ……

45. Programme of Study

General Arts [ ]

Home Economics [ ]

General Science [ ]

Business [ ]

46. Form

Form Three [ ] Form Two [ ]

APPENDIX B

UNIVERSITY OF CAPE COAST
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IORG #: IORG0009096

2ND FEBRUARY, 2021

Ms. Steffi Nana Aba Bordoh
Department of Vocational and Technical Education
University of Cape Coast

Dear Ms. Bordoh,

ETHICAL CLEARANCE – ID (UCCIRB/CES/2020/70)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted **Provisional Approval** for the implementation of your research titled **Knowledge, Attitude and Factors that Influence the Consumption of Fruits and Vegetables among Senior High School Students.** This approval is valid from 2nd February, 2021 to 1st February, 2022. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST