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COLLEGE OF HEALTH SCIENCES
UNIVERSITY OF GHANA, LEGON**



**DRIVERS OF FOOD CHOICE AMONG ADOLESCENT GIRLS IN THE LOWER
MANYA KROBO DISTRICT-EASTERN REGION OF GHANA**

BY

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DECLARATON

I, GLORIA OSEI OWUSU, thereby declare that apart from other researchers' work that have been duly acknowledged, this dissertation is my original work and it has not been presented elsewhere for another degree either in whole or in part.

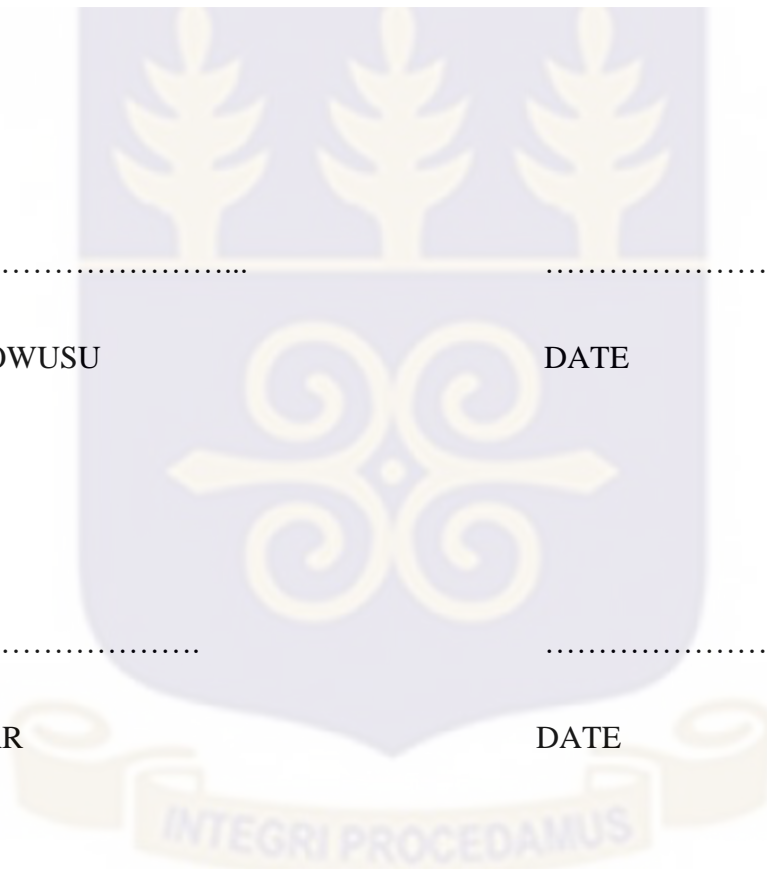
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GLORIA OSEI OWUSU

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DR. AMOS LAAR

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DATE

(SUPERVISOR)



DEDICATION

This thesis is dedicated to the almighty God who has been with me throughout these years and given me strength to complete this work successfully. I also dedicate this book to my parents, siblings and the adolescents who made this work a success.



ACKNOWLEDGEMENT

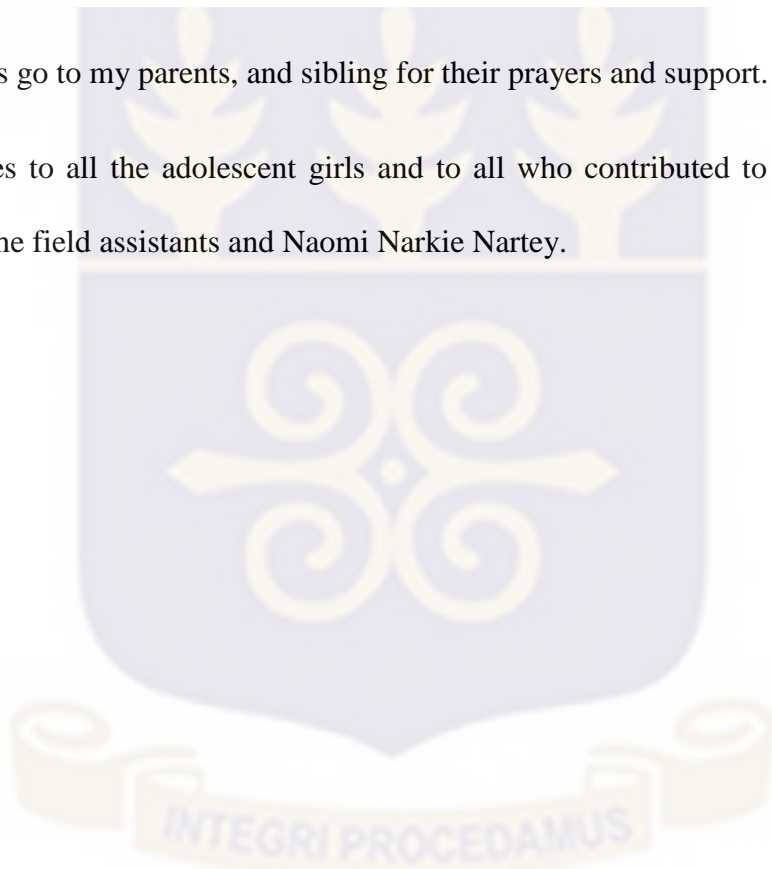
This project would not have been successful without the help of some people.

My appreciation goes to my supervisor, Dr. Amos Laar, whose guidance has made me complete this work successfully.

Many thanks to the Lower Manya Krobo District Assembly and the Municipal Health Directorate for the assistance they rendered me.

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ABSTRACT

Background

Adolescence is the transitional period from childhood onto adulthood. This life stage is essential because it is marked by rapid growth and development. Nutrient needs increase during this period to support their growth spurt. However, there is an increased independence during this stage and adolescents desire to make their food selection. They end up making unhealthy food choice which in turn makes them nutritionally vulnerable.

Adolescent girls have been shown to have unhealthy food choice which makes them malnourish and affect their reproductive health. This study was conducted to determine the drivers (determinants) of food choice among the adolescent girls in the Lower Manya Krobo District-Eastern region of Ghana.

Methodology

The study was cross sectional which comprised 270 adolescent girls between 10-19 years in the Lower Manya Krobo District. The adolescent girls were selected from four communities in the district using multi-stage sampling. A pretested structured questionnaire was used to obtain information on the adolescent girls' background characteristics, the foods they had consumed for a period of last one week during the study and the determinants (nutritional knowledge, environmental factors, social factors, economic factors, psychological factors and physiological factors) of their food choice (healthy or unhealthy food choice).

Univariate analysis using descriptive statistics was used to determine means, standard deviations of the continuous variables and frequencies for the categorical variables. Bivariate analysis using cross tabulation was used to find the associations between the socio demographic characteristics,

nutritional knowledge, environmental factors, social factors, psychological factors, economic factors, physiological factors and food choice of the study participants. Further analysis was done using multiple logistic regression to determine the factors independently associated with the food choice of the adolescent girls.

Result

101(37.4%) of the adolescent girls were early adolescents (10-14 years), 56(20.7%) were mid-adolescents (15-17 years) and 113(41.9%) were late adolescents (18-19 years). The majority (61.1%) of the adolescent girls made unhealthy food choice (They consumed foods from cereals, fruits and vegetables less than three times in a week). The food choice (healthy or unhealthy food choice) of the adolescents' was associated with their age group. The mid adolescents [AOR (95% CI= 0.53(0.27-0.97))] were less likely to make healthy food choice compared to the early adolescents and the late adolescents [AOR (95% CI= 0.41(0.20-0.82))] were less likely to make healthy food choice compared to the early adolescents.

Also, there was an association between psychological factors (body image) and food choice. Those who reported "it was not important to them to eat foods that will keep their body shape" [AOR (95% CI= 0.51(0.28-0.92))] were less likely to make healthy food choice compared to those who reported "it was important to them to eat foods that will keep their body shape"

Conclusion

Unhealthy food choice was common among the adolescent girls. Their food choices were associated with their age group. The mid and late adolescents made unhealthy food choice than the early adolescents. Body image was associated with the food choice of the adolescent girls.

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LIST OF ABBREVIATION

- RDA - Recommended Dietary Allowance
- WHO - World Health Organization



CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Adolescence is the transitional period from childhood onto adulthood. This life phase is characterized by several needs including nutrition. Nutrient requirements are higher during adolescence because of the rapid growth and development with biologic, psychosocial and emotional transformations (Jenkins & Horner, 2005). It is estimated that, 15-20% of adult height and 25-50% of adult weight are attained during this period (World Health Organization, 2006).

The sexual hormones and steroid hormones which bring about the adolescent growth spurt are controlled by nutritional factors (World Health Organization, 2006). One of the key factors to adolescent good health is healthy eating habit. Adolescents need optimal nutrition for their physical and cognitive development (Rode, 2015). Nevertheless, they have preference for foods with inadequate nutritional content as well as foods high in fats and sugars (Beres et al., 2009; Buxton, 2014). Skipping meals, especially breakfast is frequent among them (Buxton, 2014). Unhealthy eating habit among adolescents makes them fail to obtain adequate nutrients for good health and development (McNaughton, Ball, Mishra, & Crawford, 2008).

Dietary inadequacies among adolescents can have a negative effect on their reproductive health, growth and well being, thus making them malnourished. Malnutrition among adolescents is of great concern because of its repercussion on their health during childhood and in future. Double burden of overnutrition and undernutrition is common in this age group (Kotecha et al., 2013). A study in Nigeria reported a double burden of malnutrition (28.8%) among adolescents (Abdulkarim, Otuneye, Ahmed, & Shattima, 2014). In Ghana, Appiah-Kubi & Laar, (2014) reported that the prevalence of overweight, stunting and thinness among adolescents were 6.9%,

50.3% and 19.4% respectively. Another study by Adamu, Adjei, & Kubreziga, (2012), showed that 10% of adolescents were underweight, 7% were at a risk of becoming overweight and 4% were at risk of overweight. The findings of Teji, Dessie, Assebe, & Abdo(2016) on adolescent girls in Ethiopia revealed that 21.6% of the girls were thin, 4.8% were overweight and 1.1% were obese, 32% were anaemic and 15% of adolescents were stunted. Malnutrition can delay the onset of menarche in adolescent girls (Acharya, Reddaiah, & Baridalyne, 2006).

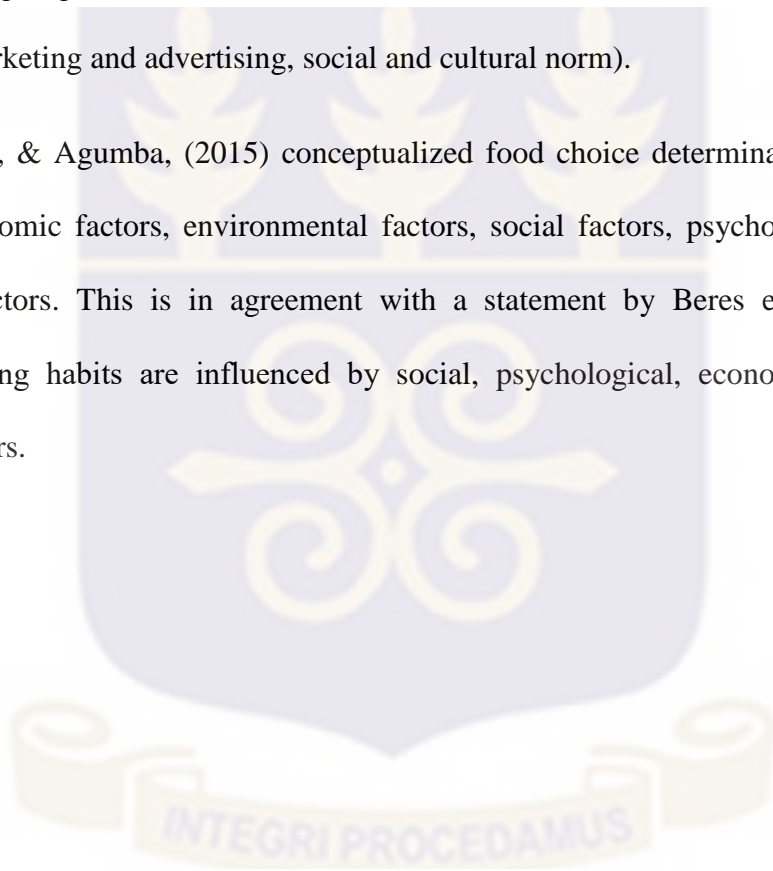
The physiological transformations in adolescents increase their nutrient requirements whereas changes in their behavior influence their eating habit and food choices ("Nutrition in Adolescent" , 2007) . Unhealthy dietary practices and food choices are common during adolescence (Mbithe, Loechl, Moleah, Mutie & Ndugu, 2015). These unhealthy dietary practices among adolescents can contribute to the aforementioned nutrition related problems (Mallick, Ray, & Mukhopadhyay, 2014;WHO, 2005). It is therefore important to advocate healthy diets in adolescents to improve long-term health (McNaughton et al., 2008).

During this transitional period, there is an increased independence and adolescents desire to make their own food selection. Fitzgerald, Heary, Nixon, & Kelly, (2010) in their study on factors influencing the food choices of Irish children and adolescents found that the adolescents wanted to be independent in choosing their foods, hence decreasing parental control of their food selection.

Food choice is a complex process and it may require more or less consideration (Vabø & Hansen, 2014).There are several parameters which influence adolescents in making their food choices and these include food attributes, food habits and experience (Ensaff, Coan, Sahota, Braybrook, Akter & Mcleod, 2015). Adolescent eating habits are driven by personal and environmental influence (World Health Organization, 2005)

Story, Neumark-Sztainer, & French (2002) developed a conceptual model which integrated social cognitive theory and ecological model to explain the eating behaviors and food choices of adolescents. In this model, the adolescents eating behaviors and food choices were influenced by personal factors and environmental factors. These factors were further grouped into four levels of influence and they include: individual and intrapersonal influence (psychosocial, biological); social environment or interpersonal influence (e.g. Family and peers); physical environment or community setting (e.g. Schools, fast food outlets, convenience stores); macro system or societal (mass media, marketing and advertising, social and cultural norm).

Okoro, Musonda, & Agumba, (2015) conceptualized food choice determinants into nutritional knowledge, economic factors, environmental factors, social factors, psychological factors and physiological factors. This is in agreement with a statement by Beres et al., (2009) that adolescents' eating habits are influenced by social, psychological, economic, political, and educational factors.



1.2 Problem statement.

The consumption of foods varies among girls and boys and changes as they grow older (Ostachowska-Gasior, Piwowar, Kwiatkowski, Kasperczyk, & Skop-Lewandowska, 2016). Unhealthy eating habit is common among adolescent girls and this in turn affect their nutritional status and reproductive health (Garg & Latesh 2015; Mallick, Ray, & Mukhopadhyay, 2014). A previous study conducted among Ghanaian adolescents showed unhealthy eating habits among adolescents girls than boys (Amos, Intiful, & Boateng, 2012). The findings of Daradkeh, Muhannadi, Chandra, Fadlalla , Hajr & Muhannadi,(2015) revealed that the frequency of consumption of (sweets, French fries and cake/doughnuts) was higher among females than among males.

In addition, Garg & Latesh (2015) found that adolescent girls were malnourished because of their unhealthy dietary habit and choices. In Nigeria the prevalence of overweight and obesity among adolescent girls were higher (17.7% and 2.9%) as compared to boys which were 7.6% and 2.3% (Abdulkarim, Otuneye, Ahmed, & Shattima, 2014). Malnutrition can delay the onset of menarche in adolescent girls (Acharya et al., 2006)

There are several factors that influence adolescent girls' dietary habits and food choices. Adolescent girls' unhealthy dietary habits and choices can stem from their concern of body weight and desire to become thin. The findings of Kim (2007) on 319 elementary school children in Korea showed that girls (50%) were more dissatisfied with their body shape than boys (38%). In addition 22% of the girls were decisive of being in the underweight group compared to 9% of the boys. The mass media, peer pressure and culture are key determinants of adolescent girls eating habits and choices (Mallick et al., 2014).

Unhealthy food choice among adolescent girls will not only affect their future and current health but that of their offspring in future. Malnutrition among adolescent girls can persist into adulthood and when pregnant, they are more likely to give birth to low birth weight babies (WHO, 2006).

In Ghana much priority is attached to infant and young children feeding practices than adolescent girls, who are potential mothers. When healthy eating habits and food choices are established among adolescent girls, it will persist into adulthood and help improve their current and future nutritional status and reproductive health.

1.3 Justification for the study

Optimal nutrition among girls during the transitional period from childhood to adulthood is essential to improve their reproductive health, cognitive development and nutritional status. Adolescent girls can obtain better nourishment when they make appropriate food choice. There are several determinants that stimulate adolescent girls to eat or avoid certain kind of foods. These factors can drive adolescent girls to make healthy or unhealthy food choices that can affect their health. When adolescents take on healthy eating habits it does not only improve their health but it has positive impact on their friends, family and community members (World Health Organization, 2005).

Adolescent girls with improved nutritional status are at less risk of obstetric complication of teenage mothers, low birth weight, and it enhances their sexual maturation and growth. Identifying the determinants of food choices among adolescent girls is an important approach to develop effective nutrition programs to empower girls to make healthy food choices to improve their current and future health outcome.

The findings of the study will inform policy makers and intervention programs to integrate programs that will promote healthy food choices among adolescent girls based on the various determinants that influence the food choices of the adolescent girls so as to improve their health and nutritional status.

1.4 OBJECTIVES OF THE STUDY

General Objective: To determine the drivers (nutritional knowledge, environmental factors, social factors, economic factors, psychological factors and physiological factors) of food choice among adolescent girls in the Lower Manya Krobo District-Eastern Region of Ghana.

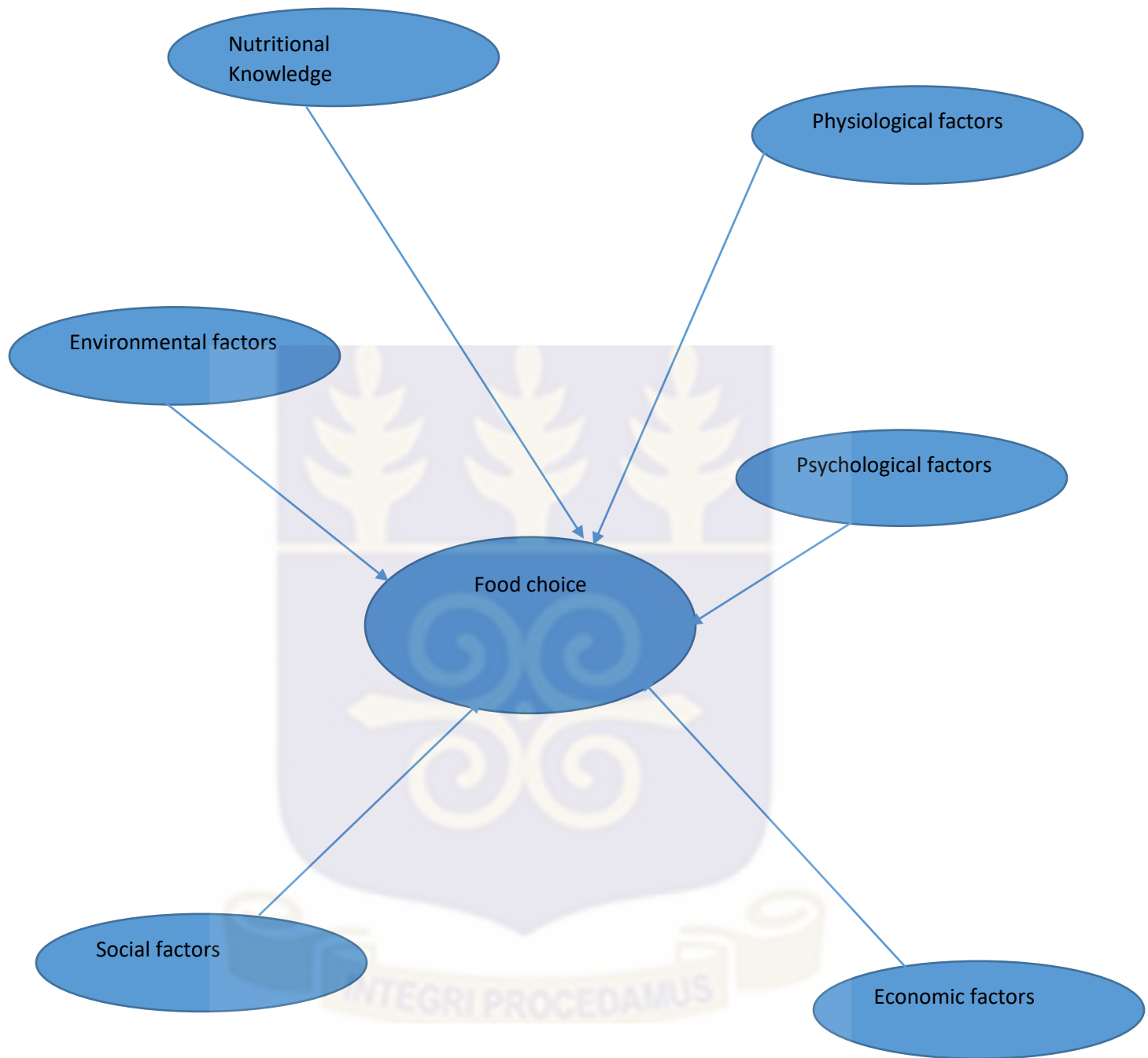
Specific Objectives:

1. To determine the foods eaten by adolescent girls in the Lower Manya Krobo District.
2. To identify the determinants of food choice among the adolescent girls in the Lower Manya Krobo District.

Research questions

1. Which foods or diets do adolescent girls in the Lower Manya Krobo District choose to eat?
2. What factors influence the food choice among the adolescent girls in the Lower Manya Krobo District?

1.5 The conceptual framework



Theoretical framework to study the determinants of food choice among the adolescent girls

Authors: Okoro, Musonda & Agumba (2015).

The framework above, theorize the determinants that could drive the food choice of adolescent girls into nutritional knowledge, economic factors, environmental factors, social factors, psychological factors and physiological factors. Food choice was defined in this context as healthy when the adolescent girl's food intake was characterized by cereals, fruits and vegetable three times or more in a week.

Nutritional Knowledge: The nutritional information an adolescent girl receive can influence her to make informed decision when selecting her diet. This knowledge on nutrition can drive adolescent girls to make healthy food choice or eat diverse foods. The nutritional knowledge include knowledge about the health benefit of the foods, knowledge about the sources of nutrients in the diet and cooking skills (Okoro, Musonda & Agumba, 2015).

Economic factors: Economic factors can play significant role in influencing the kind of foods an adolescent girl eats. The cost of the food, the income of their parents, availability of foods and the advertisement of the foods are some of the economic factors that can drive the food choice of adolescent girls (Okoro, Musonda & Agumba, 2015; Soyer, Ergin, & Gursoy, 2008).

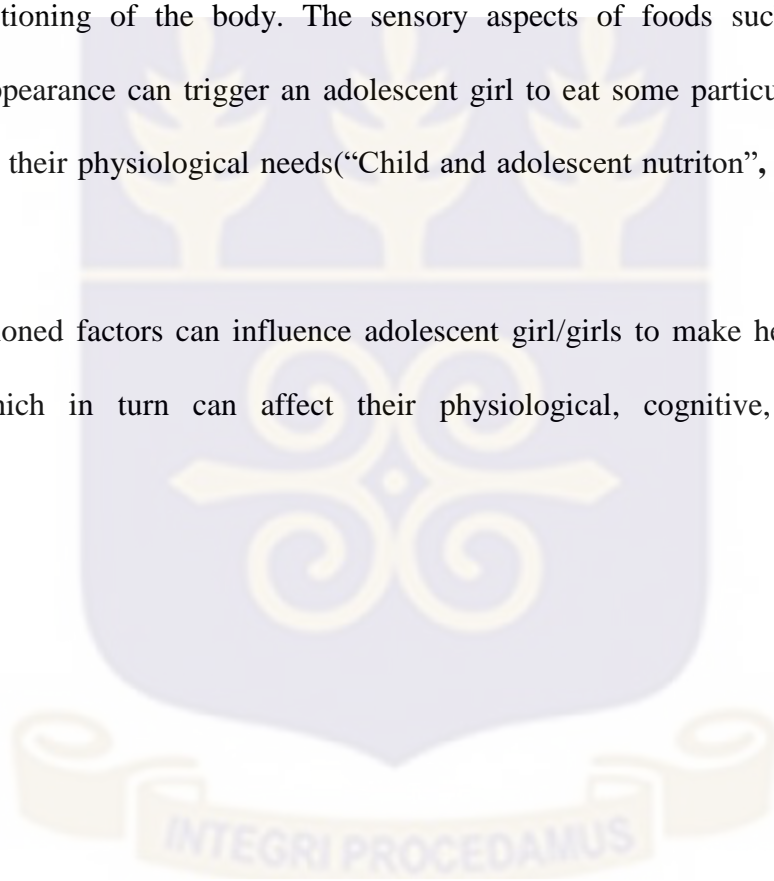
Environmental factors: The environment in which an adolescent girl finds herself can influence her food choice. The location, seasonality, on-site eating facilities, and time constraint are some of the environmental factors that can affect the food selection and diet diversity of adolescent girls (Okoro, Musonda & Agumba, 2015; Klutse 2015; Buxton, 2014).

Social factors: Societal influence can determine the choice of foods adolescent girl eats .The social factors such as friends, family norms and traditions, social media and network, and social class of the adolescent girl can drive her food choice (Epuru& Shammry, 2014; Okoro, Musonda & Agumba, 2015).

Psychological factors: The beliefs and feelings of an adolescent girl can change her attitude towards foods and eating behaviors. The cultural beliefs, mood and perceived body image of adolescent girl can influence her selection of foods (Epuru& Shammry, 2014; Okoro, Musonda & Agumba, 2015)

Physiological factors: Adolescent girl needs nutrient to stay healthy to enable their organs to function well. Hunger and satiety drive an individual to obtain energy and nutrients for survival and proper functioning of the body. The sensory aspects of foods such as taste, aroma, palatability or appearance can trigger an adolescent girl to eat some particular foods to obtain nutrients to meet their physiological needs(“Child and adolescent nutrition”, 2006, ;Soyer et al., 2008).

The above mentioned factors can influence adolescent girl/girls to make healthy or unhealthy food choice which in turn can affect their physiological, cognitive, and reproductive development.



CHAPTER TWO

LITERATURE REVIEW

2.1 Nutrition in adolescence

Adolescence is marked by rapid growth and development. This life phase has three stages; early adolescence, middle adolescence and late adolescence. The early adolescence (11-14years) is associated with the commencement of puberty and rapid cognitive development. Middle adolescence (15-17years) is characterized by an increased self-reliance and exploration. Late adolescence (18-19 years) is marked by firm identity, making personal and occupational decisions (Jahan & Shakil, 2015; Hashmi, 2013).

This period is an opportune time to improve health and the future outcome of adult health are ascertained. Yet, adolescents are not given much attention during this period because they are seen to be at less risk of diseases and suffer from fewer life threatening conditions compared to children and adult. The adolescent health is the effect of interactions between prenatal and early childhood development and the specific biological and social-role changes associated with puberty, defined by social determinants and risk and protective factors that influence the uptake of health-related behaviors (Sawyer et al., 2012; WHO 2005) .

There is higher nutrient and energy requirement during adolescence period to support the increased physical growth and development. The sexual hormones and steroid hormones which bring about the adolescent growth spurt are controlled by nutritional factors (WHO, 2006). However there are variation in meal consumption and nutrient needs among girls and boys, and changes as they grow older (Ostachowska-Gasior, Piwowar, Kwiatkowski, Kasperczyk, & Skop-Lewandowska, 2016; WHO, 2006). After age 10, there is sex difference in nutrient needs. For example, there is early maturation in females, so the recommended dietary allowance (RDA)

for protein of 11-14year old girls (46g) are higher than their male counterparts (45g) and less for 15-18 year old girls (44g) than boys (59g). In addition there is variation in iron requirement by sex. The RDA for iron is 15mg for 11-18year old girls and 12mg for 11-18year old boys (WHO, 2006). Individuals of the same sex and age may have different energy requirement due to their physical make-up and activities (Svedberg, 2000).

2.2 Dietary pattern of adolescents

Regular meal consumption is helpful for physical and psychological development (Ostachowska-Gasior et al., 2016). Diets contribute significantly to the growth and development of adolescents; therefore developing healthy eating habit during this period is very paramount (Kotecha et al., 2013). Healthy eating habit in adolescence contributes to a better health outcome in future (Song, Park, Paik, & Joung, 2009). Eating habits are acquired during childhood and predominantly during adolescence (“Child and adolescent nutrition”, 2006). Mostly, there is an increased independence during this stage and adolescents desire to be autonomous over their food choices and eating habits. They tend to make unhealthy food choices. Fitzgerald, Heary, Nixon, & Kelly, (2010) in their study on factors influencing the food choices of Irish children and adolescents found that the adolescents wanted to be independent in choosing their foods, hence decreasing parental control of their food selection. Adolescents’ diets are mostly characterized by high fat, sugar and salt (Kotecha et al., 2013; Buxton, 2014).

Epuru & Shammry (2014), reported unhealthy dietary pattern among students of Saudi Arabia. About 50% of the students took carbonated drinks. Another study among urban primary school children in Nairobi revealed that significant number of the children were not particular about the kind of foods they consumed and as a result had unhealthy dietary practices (Mbithe, Loechl, Moleah, Mutie & Ndugu, 2015).

In addition, Rodrigues, Pereira, Cunha, Sichieri, Ferraira, Vilela & Gonçalves-Silva (2012) found three dietary patterns among Brazilian adolescents and these were western, traditional and mixed. The western pattern was high energy dense foods such as fast foods, sweet and sugar sweetened beverages. The traditional comprised typical Brazilian diet found to be eaten among normal weight adolescents and the mixed dietary pattern which were high consumption of roots; tubers, meat and fish were associated with increase physical activity.

Furthermore, Adamu et al., (2012) found that majority(65%) of adolescents had monotonous diet while the remaining 35% varied their diet slightly. They further reported unhealthy snacking pattern among the adolescents. The snacks that the adolescents consumed were sugary. Bargiota et al., (2013) in their study found that the foods that were often consumed by the adolescents at school were toast with cheese and ham, soft drinks, beverages and sweets.

In Urban Baroda, considerable number of adolescents consumed healthy diets, nevertheless more than half consumed sugary foods and more than one-third had fast foods (Kotecha et al., 2013). Corrêa, Vencato, Rockett, & Bosa,(2017) revealed that 22% of the study participant practiced healthy dietary pattern; high intake of healthy foods (salads, vegetables and cooked vegetables; fruits; beans; milk/yogurt) and low consumption of unhealthy foods (fried foods; burger and processed meats; crackers or packaged snacks; cookies, sweets, candies and chocolates; and soft drinks)

Diets that are low in glycaemic index (fruits, vegetables, whole grains and low dairy product) are relevant in weight loss (Radula, Rusu, Dragomir, Posea, 2009). Adolescents' concern of their body image can result in unhealthy eating habits and skipping of meals among them ("Child and adolescent nutrition", 2006). In Bargiota, Delizona, Tsitouras & Koukoulis (2013), 29% of boys and 30% of girls reported they were on slimming diet with the intention of losing weight.

Similarly, this concurs with the findings of Kotecha et al., (2013) where the desire of adolescent girls to look slender and good-looking whereas that of boys to build their muscles influenced them to take on unhealthy eating pattern. However, unhealthy eating habit can result in malnutrition (Adamu, Adjei, & Kubreziga, 2012). Recent study in Nigeria, showed a double burden of malnutrition among adolescents and the prevalence was 28.8% (Abdulkarim, Otuneye, Ahmed, & Shattima, 2014). This can retard growth, sexual development and predispose them to chronic diseases (World Health Organization, 2005).

2.3 Dietary pattern of adolescent girls

Unhealthy dietary practices are common among adolescent girls (Amos, Intiful, & Boateng, 2012). Pérez-rodrigo et al., (2016) identified unhealthy lifestyle pattern (low physical activity-poorer diet) among girls in their study. Unhealthy eating such as fat food consumption, skipping meals and low consumption of fruit and vegetables were common dietary behaviour among adolescent girls in Haryana. This poor eating behaviour was key determinant of malnutrition among the adolescent girls (Garg & Latesh 2015) . Intiful & Lartey, (2014), reported that breakfast skipping was common among Ghanaian girls (16.9%) in their study compared to boys (12.2%).

Disordered eating habit among adolescents can stem from their concern of their body image. They are influenced by the fad that trend on the mass media (Mallick et al., 2014). The findings of Kim (2007) on 319 elementary school children in Korea showed that girls (50%) were more dissatisfied with their body shape than boys (38%). In addition 22% of the girls were decisive of being in the underweight group compared to 9% of the boys. A study in Nigeria showed that overweight was gender specific among the adolescents. Adolescent girls were more likely to become overweight (Duru, Iwu, Uwakwe, Diwe, & Nnebue, 2016).

On the contrary to these findings, Bargiota et al. (2013) found healthy food choices among girls than boys. The girls ate fruits and vegetables, homemade prepared snacks than boys. This agrees with the findings by Fismen, Smith, Torsheim, & Samdal, (2014), where adolescents girls were more likely to consume fruit and vegetables daily and less likely to consume soft drink daily than were boys.

Improved nutrition in adolescent girls is essential to enhance their nutritional status and sexual maturation. In Acharya et al., (2006) menarche was delayed in adolescent girls who were malnourished. The adolescence period is a window of opportunity to prepare adolescent girls of the nutritional needs of pregnancy and lactation later in life ("Nutrition in Adolescent" , 2007). Adolescent girls with improved iron status are at less risk of anemia in pregnancy, low birth weight, maternal morbidity and mortality, and megaloblastic anemia in pregnancy. In addition improved folate status in adolescent girls reduce the risk of neural tube defects in newborns and megaloblastic anemia in pregnancy (World Health Organization, 2005). Therefore it is important for adolescent girls to adopt a healthy eaten habits and food choices to improve their nutritional status and reproductive health.



2.4 Nutritional related problems.

Poor nutrition can be associated with diseases such as beriberi, pellagra, rickets, scurvy, osteoporosis and anaemia (“Factors affecting food selection”, n.d). Healthy nutrition in adolescence conduce long term health benefit (McNaughton et al., 2008). On the other hand, unhealthy eating patterns and diets are common among adolescents and this can pose them at risk of chronic illness particularly obesity, heart attack, and possibly cancer (Kotecha et al., 2013). Stunting can also stem from prolong undernutrition (Teji, Dessie, Assebe, & Abdo, 2016).

Poor diet has adverse effect on their mental and physical health (Zahra, Ford & Jodrell, 2014). There is evidence that the occurrence of Attention-Deficit/Hyperactivity Disorder (ADHD) among adolescents was related to unhealthy dietary pattern ;foods high in total fat, saturated fat, refined sugar and sodium (Howard , Robinson, Smith Ambrosini, Piek & Oddy, 2011).

2.5 Factors that influence food choices.

Food choice is a complex interplay of many factors in an individual’s environment (Soyer, Ergin, & GURSOY, 2008) and it is controlled by several factors such as culture, personal, economic, social and emotional factors (Bargiota et al., 2013). People make their food selections based on several reasons, these include nutritional knowledge acquired, social factors, psychological factors, economic factors, environmental factors and physiological factors (Okoro, Musonda, & Agumba, 2015).

Nutrition Knowledge and Health: Having adequate knowledge on nutrition is relevant in keeping up balanced and healthy diet (Calella, Iacullo, & Valerio, 2017). The knowledge people have on food can influence its consumption. They are able to make better food choices when they are well informed about the nutrient content of foods, dietary requirements and food preparation (“Factors affecting food selection”, n.d). Previous study by Bargiota et al., (2013)

showed that adolescents made food choices based on the nutritional knowledge they have acquired. The knowledge they had, evoked their interest to purchase foods that had low total calories, low amount of fats and also they paid attention to the expiring date of foods. Klutse (2015), also found that the adolescents had knowledge on the nutrient content of the foods they consumed. In Epuru & Shammry (2014), unhealthy dietary pattern and inadequate nutritional knowledge affected the food choices and dietary preference among students in Saudi Arabia. The findings by Ensaff et al., (2015) indicated that the adolescents had incomplete knowledge on plant-based diet and the health benefits of plant-based foods, hence these did not encourage the consumption of plant based diet. On the contrary, some studies have reported discrepancies between the knowledge on healthy eating and practice. Adolescents did not put into practice the knowledge they have on healthy foods. (Kigaru, Loechl, Moleah, Macharia-Mutie, & Ndungu, 2015; Kotecha et al., 2013)

The consumption of certain foods and/or less of other kind of foods may stem from an individual health condition. People avoid certain foods because of the reactions they may encounter. These reactions may include swelling, vomiting, diarrhea, itches and skin rashes, wheezing, headaches and disturbed sleep (“Factors affecting food selection”, n.d). Adamu et al., (2012) reported that the study participants would not eat specific foods because they were allergic to such foods. In Bargiota et al., (2013), 22% of the adolescents reported that, they made their food choices mainly on health concerns.

Social factors: Peer influence, family and the mass media are key factors that determine food choices of people. There is peer influence during the adolescence period (Jahan & Shakil, 2015; Hashmi, 2013). In order for adolescents to feel belong among their peers, they tend to eat foods recommended by their peers without considering the nutritional value of the food (Majabadi et

al., 2016 ;“Factors affecting food selection”, n.d). Even though adolescents may have knowledge on healthy and unhealthy diet and the consequences associated with practicing unhealthy diet, they are likely to make unhealthy choices when they are with their peers (Kotecha et al., 2013). Amos, Intiful, & Boateng (2012) found higher significant association between peer influence and eating habit of adolescents. They further explained that peer influence was the main predictor of unhealthy eating habits of adolescents, since they spend most of their time with their peers at home and school. They tend to eat foods recommended to them by their peers. This study is consistent with a study by Epuru & Shammry (2014), where 60% of student prefer to eat with their peers often. Furthermore, a study among adolescents in rural areas found higher consumption of junk foods among adolescents who ate with their peers, from the school and on site facilities such as canteen (Bargiota et al., 2013).

Moreover, studies have shown that parents can control the diet of their children. A study conducted by Adamu, Adjei, & Kubreziga, (2012) to determine the effect of dietary patterns on the nutritional status of upper primary school children in the Tamale Metropolis revealed that 94% of the adolescents consumed foods for supper made by their parents where as 4% ate foods of their choices. In addition, 51.5% of the adolescents ate foods for lunch chosen by their parents, 28.6% made their own food choices for lunch and 16.2% bought foods that they could afford. The food choices of the adolescent were influenced by the socioeconomic status of their parents. Bargiota et al., (2013) revealed that a higher proportion (93%) of the adolescents’ food choices were controlled by their parents and it was more pronounced in younger adolescents. In addition they noticed in their study that adolescents whose mothers were younger were eating out more often than those whose mothers were older.

On the contrary, Amos, Intiful, & Boateng, (2012) found no correlation between parental influence and adolescents eating habit.

The media is pivotal in an individual food choice. Foods that are advertised by the media are introduced as healthier nevertheless; they are of low nutritional value compared to the unprocessed or less processed form (“Factors affecting food selection”, n.d).

Psychological factors: Psychological factors are complex and it varies among individuals based on lifestyle and upbringing. Psychological factors like former encounter with foods, beliefs and values have continual effect on food choice whereas food selection based on emotion, self concept and attitude can vary on daily basis (“Factors affecting food selection”, n.d). The foods that people consume are associated with their beliefs, culture and religion. Some foods are widely consumed by people from certain culture and religion whiles other foods are prohibited by certain culture and religion. In Adamu et al. (2012), 37.8% of the adolescent detested certain foods because of their religion. Another study in Saudi Arabia among students revealed that psychological factors such as emotions and the attractiveness of the food influenced them to eat foods than the physiological hunger mechanism (Epuru & Shammry, 2014). Nutrition in adolescence is critical because the psychological changes and development of their personality affect their dietary habit (WHO, 2006).

Economic factors: The price and accessibility of foods can determine the kind of foods people afford to buy. Abdulkarim, Otuneye, Ahmed, & Shattima, (2014) revealed that higher access to fast foods and cheap sweetened drinks were contributing factors to the prevalence of over nutrition among adolescents in Nigeria. A study by Adamu et al. (2012) showed that money was the main determinant that prevented majority (78%) of participants from eating breakfast. Also, the cost of food influenced the food choice of adolescents in turkey (Soyer et al., 2008). Canales

& Hernández, (2016) found that adolescents considered the price of foods when making their food selection.

Environmental factors: The environment where an individual finds himself or herself plays a major role in their choice of food. The choice of foods that people make can be ascribed to their food system. In the low income countries, there may be variations in the foods consumed by people in the rural and urban areas. The people in the rural areas are more likely to rely on their self production and spend on staple when they run out of their produce. Unlike the urban areas, a lot of people are not involved in food production so they depend much on markets and shops, for this reason, the majority eat a lot of processed foods (Chang & Ruel-bergeron, 2016). The kind of foods available in a particular season can make people resort to those foods. A study among adolescents in Tamale showed that, the adolescents ate mango because it was in season (Adamu et al, 2012).

In addition, availability of on-site facilities such as fast food shops, school tuck-shops, food stores and sellers in the neighborhood may be key factors influencing adolescent decision making towards foods (Steyn, 2010).

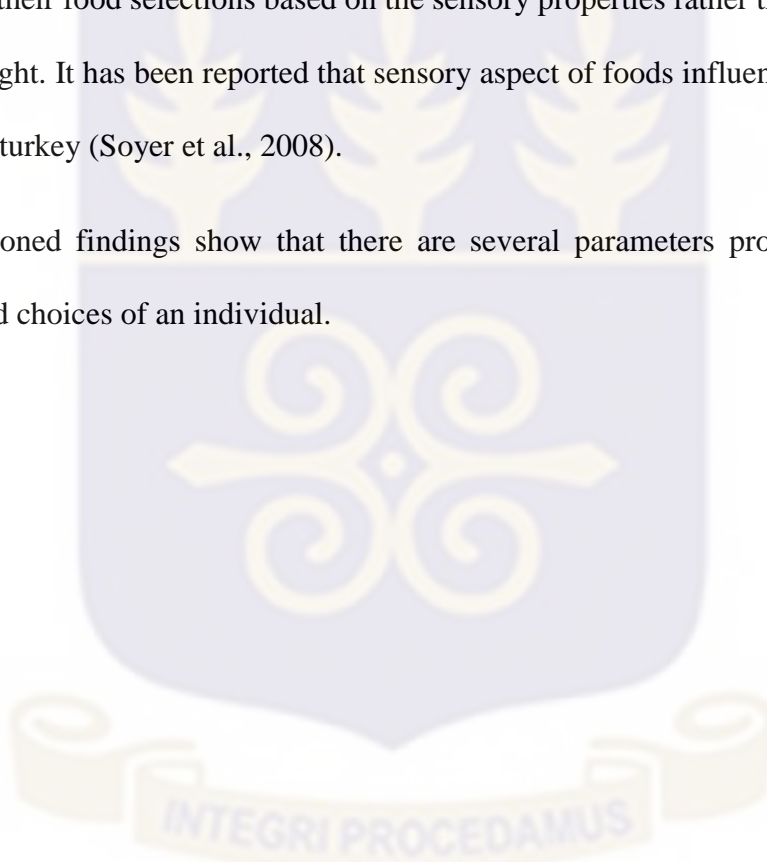
Also time constraint can affect the food choices of adolescents. Despite the knowledge adolescents have on healthy food habits, time constraint is one of the impediments to better their food selection (Kotecha et al., 2013). Some studies have shown that adolescents skipped breakfast because of time constraint (Klutse 2015; Buxton, 2014).

Physiological factors: Physiological factors influence an individual's intake and preference for food. Hunger can trigger a person to eat to meet their physiological needs (“Child and adolescent nutrition”, 2006). The selection and rejection of some specific foods may depend on the sensory

perception of the food, which may comprise the physical appearance of the food, presentation, smell and texture (“Factors affecting food selection”, n.d).

Taste is one of the key elements that influence adolescents’ food selection. Taste preference can influence adolescents to select certain foods over healthier ones. (Ensaff, Coan, Sahota, Braybrook, Akter & Mcleod, 2015). Adolescents may not eat certain foods because of its unpleasant taste and aroma (Adamu et al., 2012). In Canales & Hernández, (2016), the adolescent made their food selections based on the sensory properties rather than the effect it will have on their weight. It has been reported that sensory aspect of foods influenced the food choice of adolescents in turkey (Soyer et al., 2008).

The above-mentioned findings show that there are several parameters proven by research to influence the food choices of an individual.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter shows the techniques and tools that were used to collect data from the study participants. It includes study design, study site, study variables, sampling techniques and sample size determination. In addition, it presents data collection tools, quality assurance, data processing and analysis, and ethical consideration.

3.2 Study design

A cross sectional study design was conducted to determine the drivers of food choices among adolescent girls in the Lower Manya Krobo District.

3.3 Study site

The study was conducted in four communities (Odumase, Amedeka, Okwenya and Kpongour) in the Lower Manya Krobo District. Lower Manya Krobo District is among the twenty six administrative districts in the Eastern region of Ghana. It comprises urban and rural communities. The district covers an area of 304.4 square kilometres, with a population density of 293.2 persons per square kilometre. The district has estimated population of 89,246 according to the 2010 Population and Housing Census. There are 41,470 males and 47,776 females. Majority (83.7%) reside in the urban communities while remaining (16.3%) live in the rural communities. The adolescents aged 11-19years are 21,108 of which 10,272 are males. There are 22,150 households in the district of which 18,771 are in the urban communities and 3,379 are in the rural communities. In addition, there are 12,491 houses in the district, 9,739 houses are in the urban communities while 2,752 houses are in the rural communities (Ghana Statistical Service, 2014).

3.4 Study variable

The outcome variables of interest were the choice of foods (healthy food choice and unhealthy food choice) the adolescent girls consumed. The predictor variables were the determinants of food choices (socio-demographic characteristics, nutritional knowledge, environmental factors, social factors, economic factors, psychological factors and physiological factors). The following are variables that were used to measure the various determinants: socio demographic characteristics (age, family structure, household size), environmental factors (time/seasonality), social factors (family/peers/media), psychological factors (body image), economic factors (cost/price), physiological factors (sensory aspect of food).

3.5 Study population

The study participants were adolescent girls from the ages of 10years to 19 years in the Lower Manya Krobo District.

3.6 Sample size determination

A target sample size was calculated based on Cochran's Formula (1977):

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Where: n = required sample size

t^2 = confidence level at 95%

p = estimated prevalence of healthy dietary pattern (22%) among adolescents (Corrêa et al., 2017).

m^2 = margin of error at 5%

Hence:

$$n = \frac{1.96^2 \times 0.22 (1-0.22)}{0.05^2}$$

$$= 264 \sim 270$$

3.7 Sampling technique

A multistage sampling was used to select the 270 adolescent girls from the Lower Manya Krobo District. The district was stratified into rural and urban communities to represent diverse socioeconomic and educational levels. Two communities were selected from each of the strata (urban or rural) by balloting from the list of communities that was obtained from the Lower Manya Krobo District Assembly.

Afterwards, the sex ratios of 84.6 for urban and 99.2 for rural areas in Lower Manya Krobo District (Ghana Statistical Service, 2014) were used to determine the number of adolescent girls in each of the communities, since the total number of adolescents in each of the communities was already documented. Proportionate sampling was used to allocate the sample size to each of the communities. This was done by means of ratio and proportion among the adolescent girls in the various communities to obtain the required number of adolescent girls needed in each of the communities. At the community level, the community was divided into clusters and the clusters were numbered. Some clusters were selected randomly by balloting. In every house, one household was selected. One adolescent (10-19 years) per household in the selected clusters who assented and the parents consented was interviewed. An adolescent in a household was selected by balloting (yes and no). All those who selected yes were interviewed. This procedure was carried out until the required number of adolescents was attained.

3.8 Data collection technique and tools

The adolescent girls (10-17years) whose parents consented to the study and they themselves assented to the study were interviewed. For those adolescent girls who were eighteen years and above, consent was obtained from them only. Data were collected using paper questionnaires which were administered by trained personnel. Girls were interviewed independently to avoid other people from influencing their responses to the questions. The questionnaire comprised three sections:

Section 1 comprised socio demographic characteristics of the adolescent girls. The socio demographic characteristics comprised sex, age, and educational level of the adolescent girls, who they were staying with, family size, and the parents' or guardians' occupation.

Section 2 included semi-structured food frequency questions to collect data on the foods eaten for a period of last one week and this was done by recall. There were questions on nutrition education, family meal frequency, breakfast consumption and the frequency of eating-out. The foods that the adolescent girls consumed were categorized into 7 days, 4-6 days, 1-3 days, and none before the frequencies of the various food consumptions were obtained. Also the questions on the frequency of eating-out and the family meal frequency was categorized as frequent eating-out (everyday and 3-5 days) or not frequent eating-out (≤ 2 days or never) and regular family meal frequency (everyday and 3-5 days) and not regular family meal frequency (≤ 2 days or never).

The consumption of the various foods was further categorized into healthy food choice and unhealthy food choice. This was done by grouping all the participants who consumed from cereals, fruits and vegetables three or more times in a week as making healthy choice since these

foods are associated with the prevention of non-communicable diseases such as diabetes, stroke, hypertension and obesity (Ranjana, Mahomoodally, & Ramasawmy, 2013; WHO,2015)

Section 3 measured the factors that influenced the food choice of the adolescent girls. The adolescent girls were asked on a four point scale on a food choice scoring questionnaire adopted from Steptoe, Pollard, & Wardle, (1995) and Okoro,Musonda & Agumba (2015) to determine the various factors that influenced their food choice. The scale was responses of “not important at all/a little important/moderately important/very important”. The first two (not important at all and a little important) was grouped as “not important” and the last two (moderately important and very important) was group as “important” before the analysis was done.

3.9 Quality assurance

The questionnaire was pretested on five adolescent girls with similar characteristics from distant communities which were not part of the study to see if the wording and order of the questions were clear before they were finalized.

The questionnaires were reviewed after every interview to ensure that the answers were consistent and there were no missing data. The Data were cleaned after entry into the SPSS version 16 before analyzed.

3.1.0 Data processing and Analysis

The data were entered in excel before they were imported into SPSS version 16 for statistical analysis. The foods that the adolescent girls consumed the last one week during the study were grouped into healthy and unhealthy food choice. All adolescents who consumed cereals, fruits and vegetables three times or more in a week were considered as making healthy choice whiles the adolescents who consumed cereals; fruits and vegetables less than three times in a week were considered as making unhealthy choice.

Univariate analysis using descriptive statistics was used to find the means and standard deviations of the continuous variables and frequencies for categorical variables. Bivariate analysis using Pearson Chi-square was used to determine the association between the outcome variables (healthy food choice and unhealthy food choice) and the explanatory variables: socio-demographic characteristics (age, family structure, and household size), physiological factors (time/seasonality), psychological factors (time/seasonality), economic factors (body image), environmental factors (cost/price), nutritional knowledge and social factors (sensory aspect of food).

Multivariate analysis, using multiple logistic regression was further performed to determine the association between the outcome and exploratory variable at 95% confidence interval.

3.1.1 Ethical Consideration:

In keeping with research standards, approval was obtained from Ghana Health Service Ethical Review Committee (GHS-ERC: 100/02/17). The Permission was obtained from the Lower Manya Krobo District Assembly, the municipal health service, community leaders, and community members as well. Community entry protocol was observed appropriately.

One-on-one interview was conducted with the study participants to avoid any interruption by other people. The data was collected by trained research assistants, who were trained on research ethics to introduce themselves properly to the respondents and to conduct themselves well. The study participants were provided with the information about the study before any consent to participate was sought. Participants were adequately informed about the:

- Aim of the study and methods to be used
- Institutional affiliations of the researcher

- Possible benefit
- Possible risk and discomfort
- Measures to ensure confidentiality of information provided
- Right to abstain from participating in the study, or to withdraw from it at any time, without reprisal

Possible benefit

There was no direct benefit to the participants, however the information obtained from the participants would enable us understand adolescent girls eating behavior and food choices so that appropriate implementation project could be done to improve adolescent girls' food choices.

Possible risk and discomfort

There was no risk associated with the participation in the study.

Compensation

There was no monetary compensation and there was no cost to the study participants.

Confidentiality

The interviews were carried out in a private setting. All the information that the participants provided have not been disclosed to anyone and their name would not appear in any report or publication and no reference would be made that could link the participants to their information. The information would be kept in a safe place and only the researcher would have access to the information. The information would be kept for five years, after which it would be destroyed.

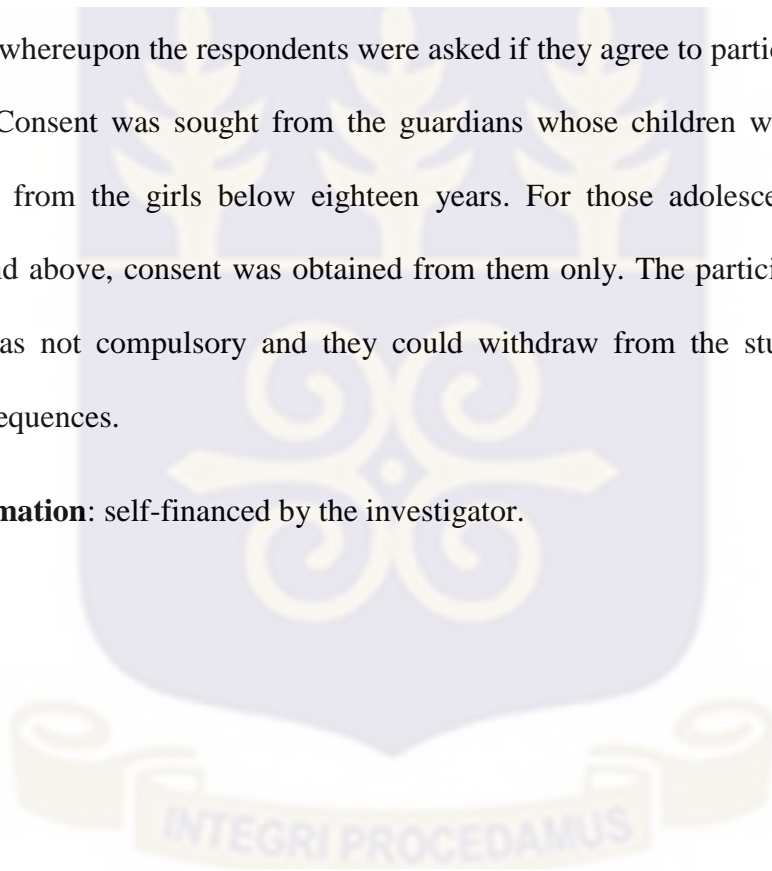
Dissemination

The researcher would keep all the data collected for 5 years to allow for publication, after which it would be destroyed. Also the results from the study would be presented at professional meetings and published in scientific journals.

Voluntary participation and right to leave the study

The consent forms were read aloud by interviewers to the respondents or respondents were given the form to read, whereupon the respondents were asked if they agree to participate by signing or thumb printing. Consent was sought from the guardians whose children were below eighteen years and assent from the girls below eighteen years. For those adolescent girls who were eighteen years and above, consent was obtained from them only. The participants were assured that the study was not compulsory and they could withdraw from the study for any reason without any consequences.

Financial Information: self-financed by the investigator.



CHAPTER FOUR

RESULTS

4.1 Introduction

This section shows the findings of the study and they answer the objectives of the study. This chapter gives a summary of the socio- demographic characteristic of the study participants, their eating habits and factors that influenced their food choice in the Lower Manya Krobo District. The data collection spanned from June to July 2017.

4.2 Socio demographic characteristics of the participants

Table 4.2 represents the sociodemographic characteristics of the study participant. The participants comprised 270 adolescent girls of which 101(37.4%) were early adolescents (10-14 years), 56(20.7%) were mid-adolescents (15-17 years) and 113(41.9%) were late adolescents (18-19 years). The mean age was (15.7 \pm 2.9) years. Only 2.2% of the 270 adolescent girls had not received any formal education. The majority (51.2%) of the adolescent girls lived with biological parents and 57.8% lived in households made up of five or more people.

Table 4.2: Socio demographic characteristics of the Participants (n=270)

Characteristics	Number (n)	Percent (%)
Age		15.7 \pm 2.9*
Age categories		
10-14	101	37.4
15-17	56	20.7
18-19	113	41.9
Educational Level completed		
No formal education	6	2.2
Primary	82	30.4
JHS	102	37.8
SHS/Vocational	79	29.3
Tertiary	1	0.4

Table 4.2 cont'd: Socio demographic characteristics of the Participants (n=270)

Characteristics	Number (n)	Percent (%)
Guardian of participants		
Biological Parents	139	51.5
Mother	65	24.1
Father	11	4.1
Other relatives	55	20.3
Father's employment		
Salaried worker	46	17
Trader	51	18.9
Artisan	84	31.1
Unemployed	14	5.2
Farmer	70	25.9
Don't Know	5	1.9
Mother employment		
Salaried worker	17	6.3
Trader	202	74.8
Artisan	17	6.3
Unemployed	14	5.2
Farmers	18	6.7
Don't Know	2	0.7
Household size		
Less than five	114	42.2
Five or more	156	57.8

*Mean (standard deviation)

4.3 The dietary habit of the study participants.

The majority (63.3%) of the participants ate foods from cereals every day, followed by sweets (45.2%) and fatty foods (43.3%). About 8% and 10% of the participants ate fruits and vegetables every day. A higher proportion (81.9%) of the participants ate-out of home every day. About 48.9% ate breakfast frequently and 43.7% had received nutrition education over the past one year.

Table 4.3: Dietary intake frequency of the study participants for past one week during the study (n=270).

Dietary intake	frequency	Percent (%)
Cereals		
7 days	171	63.3
4-6 days	89	33
1-3 days	10	3.7
Roots and tubers		
7 days	42	15.6
4-6 days	78	28.9
1-3 days	132	48.9
None	18	6.7
Vegetables		
7 days	22	8.1
4-6 days	85	31.5
1-3 days	153	56.7
None	44	3.7
Fruits		
7 days	27	10
4-6 days	66	24.4
1-3 days	133	49.3
None	44	16.3
Meat		
7 days	18	6.7
4-6 days	46	17
1-3 days	185	68.5
None	21	7.8
Egg		
7 days	14	5.2
4-6 days	22	8.1
1-3 days	161	59.6
None	73	27
Fish and sea foods		
7 days	100	37
4-6 days	62	23
1-3 days	82	30.4
None	26	9.6

Table 4.3 cont'd: Dietary intake frequency of the study participants for the past one week during the study (n=270)

Dietary intake	frequency	Percent
Legumes		
7 days	42	15.6
4-6 days	81	30.0
1-3 days	134	49.6
None	13	4.8
Diary product		
7 days	31	11.5
4-6 days	47	17.4
1-3 days	151	55.9
None	41	15.2
Fatty foods		
7 days	117	43.3
4-6 days	103	38.1
1-3 days	48	17.8
None	2	0.7
Sweets		
7 days	122	45.2
4-6 days	82	30.4
1-3 days	64	23.7
None	2	0.7
Eating-out		
Frequent	221	81.9
Not frequent	49	18.1
Family meal frequency		
Regular	211	78.1
Not regular	59	21.9
Breakfast consumption		
Daily	132	48.9
Not daily	138	51.1

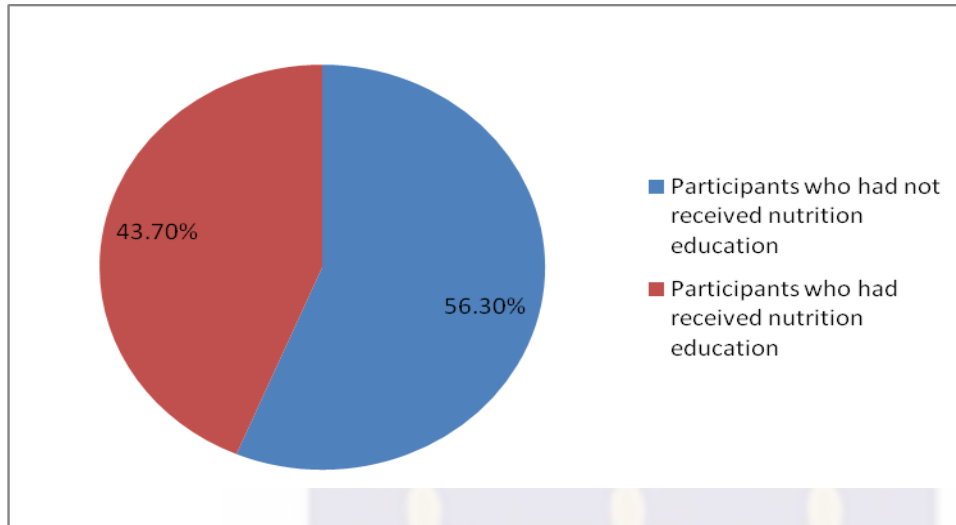


Figure 4.3: Nutrition education of the participants

4.4 Food choices of the participants

Figure 4.4 describes the food choice of the participants. Out of the 270 participants, 105(38.9%) made healthy food choice (consumption of cereals, fruits and vegetables three or more times in a week) while the remaining 165 (61.1%) made unhealthy food choice (consumption of whole cereals, fruits and vegetables less than three times in a week).

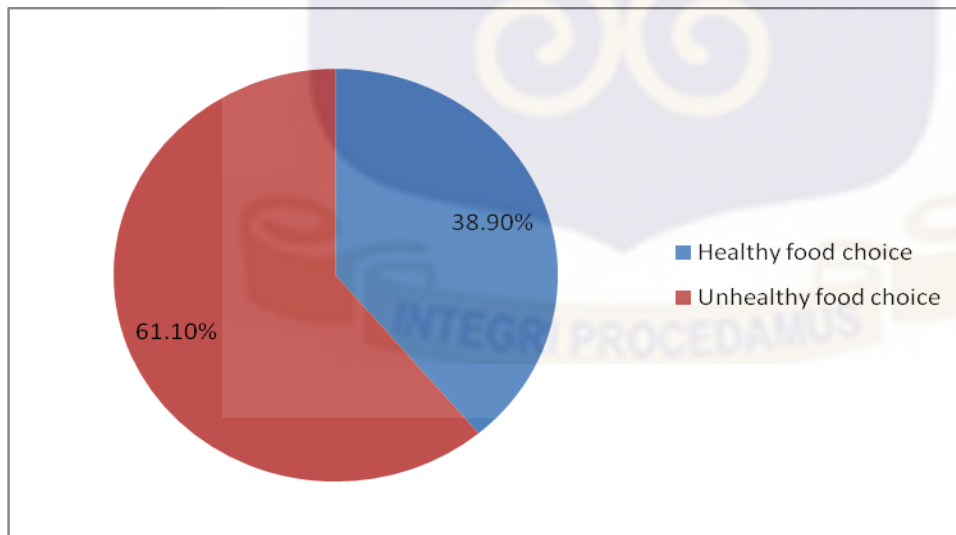


Figure 4.4: Food choice of the participants

4.5 The association between the socio demographic characteristics, nutritional knowledge, environmental, social, psychological, economic, physiological factors and food choice.

Bivariate analysis using Pearson chi-square test and multivariate analysis using multiple logistic regression were performed to determine the association between sociodemographic characteristics, nutritional knowledge, environmental factors, social factors, psychological factors, economic factors, physiological factors and food choice of the study participants. There was no associations between environmental (time/seasonality), social (Family/peers/media), economic (cost/price), physiological factors (sensory aspect) and food choice (healthy food choice and unhealthy food choice). However there were associations between the adolescents' age group, nutrition education, psychological factor (body image) and food choice at ($p < 0.05$; SEE TABLE 4.5).

Further analysis using multiple logistic regression showed statistical associations between the adolescents' age and food choice. The odds of making healthy food choice among the mid adolescents (15-17 years) were 47% less than in the early adolescents (10-14 years), [AOR (95% CI= 0.53(0.27-0.97)] and the odds of making healthy food choice in the late adolescents (18-19 years) were 59% less than in the early adolescents, [AOR (95% CI= 0.41(0.20-0.82)]. Also, there was an association between psychological factors (body image) and food choice. The odds of making healthy food choice among those who reported "it was not important to them to eat foods that would keep their body shape" were 49% less than in those who reported "it was important to them to eat foods that will keep their body shape" [AOR (95% CI= 0.51(0.28-0.92)]. On the other hand, after adjusting for nutrition education, there was no difference between those who had received nutrition education and those who had not received nutrition education and their food choice. Details are given in Table 4.5. The model was able to explain 10.4% variability in the outcome variable, food choice (Nagelkerke $R^2 = 0.104$)

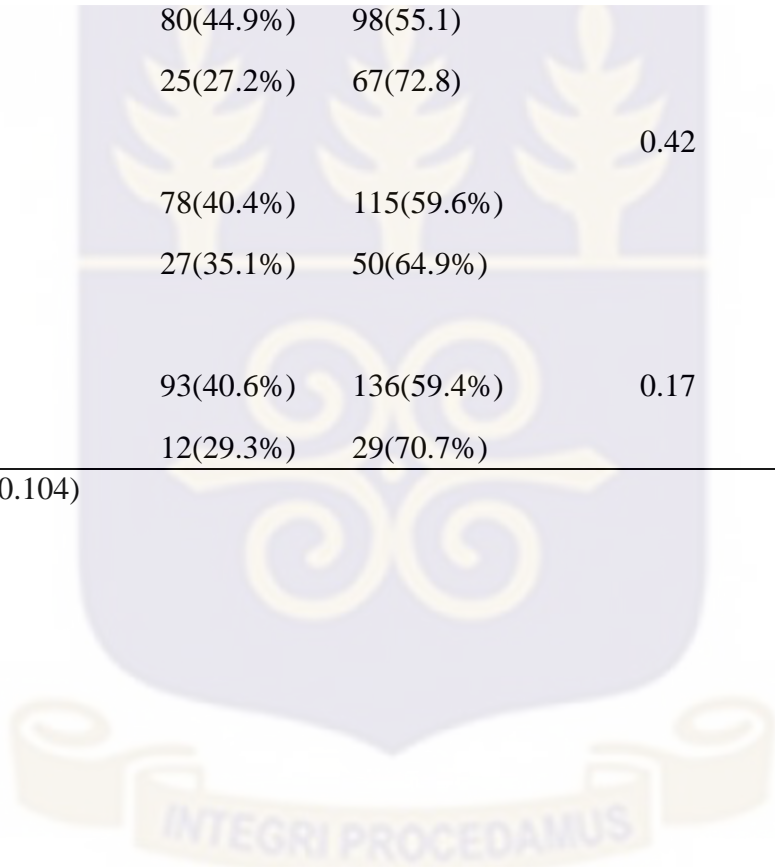
Table 4.5: Association between sociodemographic characteristics, nutritional knowledge, environmental, social, psychological, economic, physiological factors and food choice

<u>Food choice of the participants</u>				
Variables	Healthy choice	Unhealthy choice	P-value	OR(95%CI)
Age			0.001	
10-14 years	30(29.7%)	71(70.3%)		
15-17years	16(28.6%)	40(71.4%)		0.53(0.27-0.97)
18-19 years	59(52.2%)	54(47.8%)		0.41(0.20-0.82)
Family structure			0.78	
Staying with parents	127(58.5%)	90(41.5%)		
Not staying with parents	38(71.7%)	15(28.3%)		1.80(0.93-3.46)
Household size			0.74	
Less than five	71(62.3%)	43(37.7%)		
Five or more	38(71.1%)	15(28.3%)		0.92(0.56-1.51)
Eating-out			0.76	
Frequent	136(61.5%)	85(38.5%)		
Not frequent	29(59.2%)	20(40.8%)		0.91(0.48-1.70)
Family meal frequency			0.22	
Regular	133(63%)	78(37%)		
Not regular	32(54.2%)	27(45.8%)		0.70(0.39-1.25)
Nutrition education			0.04	
Received nutrition education	54(45.8%)	64(54.2%)		
Not received nutrition Education	51(33.6%)	101(66.4%)		0.63(0.37-1.08)
Time/seasonality			0.73	
Important	73(38.2%)	118(61.8%)		
Not important	32(40.5%)	47(59.5%)		1.10(0.64-1.88)

Table 4.5: Association between sociodemographic characteristics, nutritional knowledge, environmental, social, psychological, economic, physiological factors and food choice

<u>Food choice of the participants</u>				
Variables	Healthy choice	Unhealthy choice	P-value	OR(95%CI)
Family/peers/media			0.08	
Important	39(33.1%)	79(66.9%)		
Not important	66(43.4%)	86(56.6%)		1.56(0.94-2.56)
Body image			0.01	
Important	80(44.9%)	98(55.1%)		
Not important	25(27.2%)	67(72.8%)		0.51(0.28-0.92)
Cost/price			0.42	
Important	78(40.4%)	115(59.6%)		
Not important	27(35.1%)	50(64.9%)		0.80(0.46-1.38)
Sensory aspect				
Important	93(40.6%)	136(59.4%)	0.17	
Not important	12(29.3%)	29(70.7%)		1.65(0.80-3.40)

(Nigelkeke R² = 0.104)



CHAPTER FIVE

DISCUSSION

5.1 Food choice

This study discovered that a significant proportion (61.1%) of the adolescent girls made unhealthy food choices, indicating that they consumed foods low in whole grains, fruits and vegetables while the remaining (38.9%) did not. The components of healthy food choice in this study are consistent with other studies where healthy food choice by adolescents was characterized by high fruits, vegetables and cereals intake (Ranjana et al., 2013; Corrêa et al., 2017; Tavares, Castro, Levy, Cardoso, & Claro, 2014). However, unhealthy food choice was common among the adolescent girls in the study. Their foods were marked by low intake of fibre rich foods such as fruits, vegetables and cereals which contain essential nutrients including phytonutrients, potassium and fiber that enhance growth and development (Marchioni, Dias, Eluf-Neto, Wünsch-Filho, Fisberg, 2005). The high fiber in whole grains, fruits and vegetables is needed to reduce the risk of developing coronary heart disease, stroke, hypertension, diabetes, obesity and other gastrointestinal diseases (Anderson et al., 2009).

Wate et al., (2013) revealed that almost three-quarters of the adolescents in the study fell short of meeting the recommended servings of fruits and vegetables in a day. A previous study by Musaiger, Bader, Al-roomi, & D'Souza (2011) indicated that nearly 25% of the participants mentioned eating fruit daily, while 27.7% consumed fruit seldom. Of those who seldom ate fruit, 33.5% were males and 66.5% were females. Adolescents' diets are mostly characterized by high fat, sugar and salt (Kotecha et al., 2013; Buxton, 2014).

Corrêa, Vencato, Rockett, & Bosa, (2017) revealed that 22% of the study participant practiced healthy dietary pattern; high intake of healthy foods (salads, vegetables and cooked vegetables; fruits; beans; milk/yogurt) and low consumption of unhealthy foods (fried foods; burger and

processed meats; crackers or packaged snacks; cookies, sweets, candies and chocolates; and soft drinks). The low intake of fruit and vegetables coupled with high intake of energy dense foods, skipping of meals and regular intake of sugar sweetened beverage and snacks are associated with the wide spread of obesity (Wate et al., 2013). ALFaris, Al-Tamimi, Al-Jobair, & Al-Shwaiyat, (2015) in their study on the trends of fast food consumption among adolescents and young adult Saudi girls living in Riyadh reported that the adolescent girls that had a higher intake of fast foods often had high mean waist circumference. Diets that are low in glycaemic index (fruits, vegetables, whole grains and low dairy product) are relevant in weight loss (Radula, Rusu, Dragomir, Posea, 2009). Healthy eating habit in adolescence contributes to a better health outcome in future (Song et al., 2009).

However, unhealthy eating habit can result in malnutrition (Adamu et al, 2012). Recent study in Nigeria, showed a double burden of malnutrition among adolescents and the prevalence was 28.8% (Abdulkarim, Otuneye, Ahmed, & Shattima, 2014) . In Acharya et al., (2006) menarche was delayed in adolescent girls who were malnourished. Unhealthy food is associated with nutrition related non-communicable disease such as metabolic disorders, hypertension, diabetes and cardiovascular disease. There is evidence that the occurrence of Attention-Deficit/Hyperactivity Disorder (ADHD) among adolescents was related to unhealthy dietary pattern; foods high in total fat, saturated fat, refined sugar and sodium (Howard , Robinson, Smith Ambrosini, Piek & Oddy, 2011). Improved nutrition in adolescent girls is essential to enhance their nutritional status and sexual maturation.

5.2 Drivers of food choices of the adolescent girls

This current study also identified that age was significantly associated with the adolescents' food selection. The mid adolescents and late adolescents were less likely to make healthy food choice compared to the early adolescents.

The odds of making healthy food choice among the mid adolescent was 47% less than in the early adolescents, [AOR (95% CI= 0.53(0.27-0.97))] and the odds of making healthy food choice in the late adolescent was 59% less than in early adolescents [AOR (95% CI= 0.41(0.20-0.82)]. The difference in the choice of foods between these age groups could be ascribed to the fact that the older adolescents are more independent during this stage and have greater control over their food choice than early adolescents where parents can influence their food choice. Gitau, Micklesfield, Pettifor, Norris, & Omardien, (2014) reported in their study that the prevalence of eating disorders among early and late adolescents were 11% and 13.1% respectively. Longitudinal studies by Craike et al., (2016) found that there was a significant difference between the younger girls and older girls. The adolescents tend to diet and have body dissatisfaction as they grow older.

On the contrary, Reicks et al.,(2015) in their review found that about one-third of the early adolescents were obese or overweight. The findings of Reed, Dancy, Holm, Wilbur, & Fogg,(2013) revealed that early adolescent African American girls had higher intake of milk, yogurt, and cheese with low consumption of vegetables than required. There are few studies that have assessed difference in the food choice across the different phases of adolescents.

In addition, there was an association between psychological factors (body image) and food choice. The odds of making healthy food choice among those who reported “ it was not important to them to eat foods that will keep their body shape” were 49% less than in those who reported “ it was important to them to eat foods that will keep their body shape” [AOR (95% CI= 0.51(0.28-0.92)]. This shows that those who wanted to keep their body image or shape made healthy food choice than those who did not. Eating healthy foods such as higher intake of fruits, vegetables, whole grains and low fat dairy product with low intake of high sugar and salt intake

reduces energy to prevent unhealthy weight gain (Todd, Street, Ziviani, Byrne, & Hills, 2015). There are other studies which have shown adolescents' concern of their body weight or shape result in unhealthy eating pattern. Mallick, Ray, & Mukhopadhyay, (2014) stated in their review that adolescents' girls concern over their body weight or desire to be slim can result in unhealthy eating habit. In Bargiota, Delizona, Tsitouras & Koukoulis (2013), 29% of boys and 30% of girls reported they were on slimming diet with the intension of losing weight. Similarly, this concurs with the findings of Kotecha et al., (2013) where the desire of adolescent girls to look slender and good-looking whereas that of boys to build their muscles influenced them to take on unhealthy eating pattern.

Furthermore, after adjusting for nutrition education, there was no association between nutrition education and food choice. This finding indicates that, there was no difference in the selection of healthy and unhealthy food choice on the grounds of nutrition education. Those who had received nutrition education were not more informed in making their food choice compared to those who had not. This study is contrary to other studies where nutrition education played significant role in the selection of healthy foods among adolescents (Grosso, Mistretta, Turconi, Galvano 2013; Bargiota et al., 2013).

In Epuru & Shammry (2014), unhealthy dietary pattern and inadequate nutrition knowledge affected the food choice and dietary preference among students in Saudi Arabia. The findings by Ensaff et al., (2015) indicated that the adolescents had incomplete knowledge on plant-based diet and the health benefits of plant-based foods, hence these did not encourage the consumption of plant based diet.

Previous study by Bargiota et al., (2013) showed that adolescents made food choice based on the nutritional knowledge they have acquired. The knowledge they had, evoked their interest to

purchase foods that had low total calories, low amount of fats and also they paid attention to the expiring date of foods. However, there have been other studies where adolescents who were knowledgeable on the nutrient contents of foods did not put it into practice, they rather made unhealthy choices. This is in relation to a study in Mauritius where these adolescents were aware of healthy foods nonetheless they made unhealthy choices (Ranjana et al., 2013).

Intensifying nutrition education in adolescents is important to enable them make informed decisions in their food selection to enhance their nutritional status and better health outcome.

Limitation of the study

Limitations of this study include the following:

- This study was cross sectional, so it could not capture whether the food choices of the adolescent girls were new, constant or poorer than before the study. Since the data was collected at a specific point in time, the results depict the food choice at that time frame of the study.
- The study could be subjected to recall bias. The adolescents were made to recall the food items they had consumed for the past one week during the study. They might tend to forget some foods they had consumed especially among the early adolescents and this would not give the actual reflection of their food intake.
- Although whole grains, fruits and vegetables are integral components of healthy diets, the frequency of consumption of these foods and the portion sizes serve play an important role of healthy diets. This study only focused on the frequency of consumption of cereals, fruits and vegetables to classify the study participants as making healthy and unhealthy food choice without considering portion sizes. An individual may eat fruits and

vegetables often but might not meet the recommended intake or he/she may have a sedentary life style that can pose them at risk of nutrition related disease.

- The sampling technique could have introduced bias into the study. At the community level, the adolescents were selected by means of cluster sampling. The clusters selected may not be homogeneous so the food choices of the individuals in the cluster might differ from one another.



CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study assessed the food choice and its determinants among the adolescent girls in the Lower Manya Krobo District. The findings of the study showed that a higher proportion (61.1%) of the adolescent girls made unhealthy food choice while the remaining 38.9% made healthy choice. Those adolescent girls that made healthy choice reported high intake of cereals, fruits and vegetables.

The age of the adolescent girls was associated with their food choice. The mid adolescents (15-17 years) and late adolescents (18-19 years) made unhealthy food choice than the early adolescents (10-14 years). The mid and late adolescents reported low intake of cereals, fruits and vegetables. These unhealthy food choices among the mid and late adolescents can put them at risk of nutrition related non-communicable disease in future.

The food choice of the adolescent girls was not associated with nutritional knowledge, environmental, social, economic and physiological factors, however their food choice was associated with psychological factors.

6.2 Recommendation

In order to create healthy food environment to promote healthy eating among adolescent girls in the study area, the following recommendations have been proposed:

- As the adolescent girls reported low intake of cereal, fruits and vegetables there is the need for policy makers to motivate farmers and food vendors to produce and sell fresh fruits and vegetables to encourage their consumption.

- Nutrition education should be intensified across all age groups in schools, work places and institutions so that individuals make informed healthy food choice.



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APPENDIX I
INFORMED CONSENT FORM

Title: Drivers of Food Choices among Adolescent girls in the Lower Manya Krobo District.

Researcher – Gloria Osei Owusu

Research Supervisor – Dr. Amos Laar

Address – School of Public Health, University of Ghana, Legon.

Introduction

My name is Gloria Osei Owusu, a master of public health student of University of Ghana. As part of the academic requirements, I am conducting a study on the factors that influence adolescent girls to make their food choice.

General information about the research

Studies have shown that adolescents want to be independent and control their diet and eating habit during this stage, as a result they make unhealthy or healthy food choices. Unhealthy eating habit is mostly common among adolescent girls and this can affect their health and nutritional well-being.

I am doing this study with adolescent girls to find out about the foods they eat and how they make their food choices. The information that will be obtained from the adolescent girls will help us understand adolescent girls' food choices and also help make informed decisions to improve the eating habit and food choices of adolescent girls.

If you agree to have your adolescent girl participate in the study, I will interview her on the foods she eats and how she makes her food choices.

Possible benefit

We will understand adolescent girls eating behavior and food choices so that appropriate implementation project can be done to improve adolescent girls' food choices.

Possible risk and discomfort

There is no risk associated with your child's participation in the study.

Confidentiality

All information your child provides will not be disclosed to anyone and her name will not appear in any report or publication. The information will be kept in a safe place and only the researcher will have access to the information.

Compensation

There is no cost to you for allowing your child to participate in the study.

Voluntary participation and right to leave the study

You are invited to have your child participate in the study and your child's participation is voluntary.

You can decide to have your child withdraw from the study for any reason without any consequences.

Please feel free to ask questions at any time regarding this study. You will be given a copy of the consent form if you agree to have your child participate in the study.

Contact for additional information

If you have any question about the study, please feel free to contact Gloria Osei Owusu,

MPH student, University of Ghana, Tel – 0275892477 Email: oseiowusugloria@gmail.com

Dr. Amos Laar (Supervisor), Email: amos.laar@gmail.com

Voluntary agreement

The above document describing the benefit and risk of the study has been read and explained to me.

I have been given an opportunity to ask any question on the study and it has been answered to my satisfaction. I understand that I have the right to withdraw my child from the study at any time without any consequences.

Name of Participant.....

.....

Date

Signature/thumbprint of participant

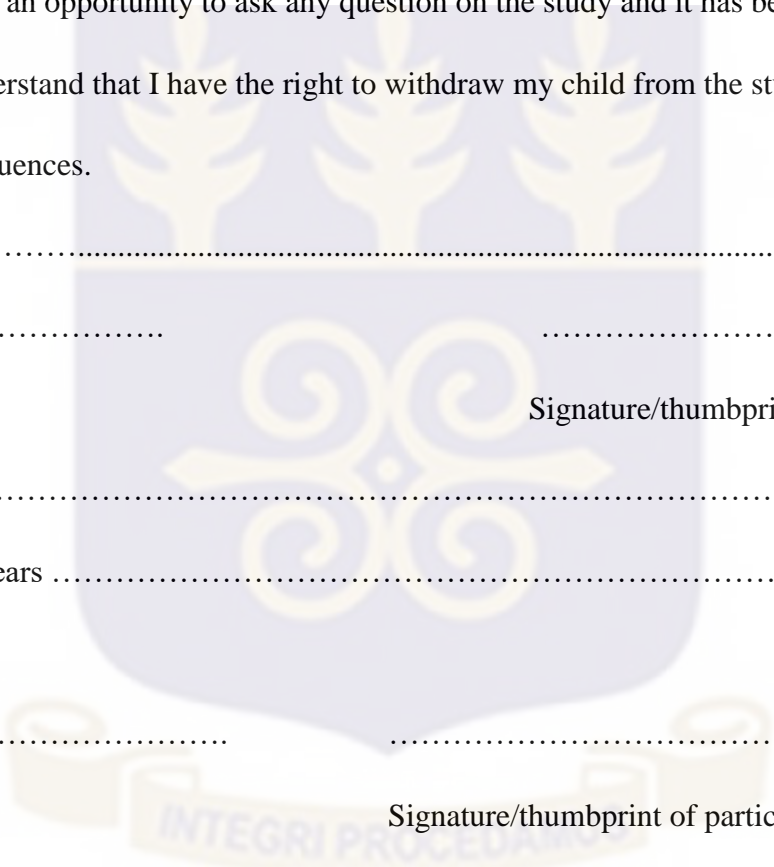
Child's name.....

Child's date of birth/years

.....

Date

Signature/thumbprint of participant



Declaration by witness (if participant cannot read the form herself)

I was present while the benefits, risks and nature and purpose of the study were read to the participant. All questions were answered and the participant has agreed voluntarily to take part in the study.

.....

Date

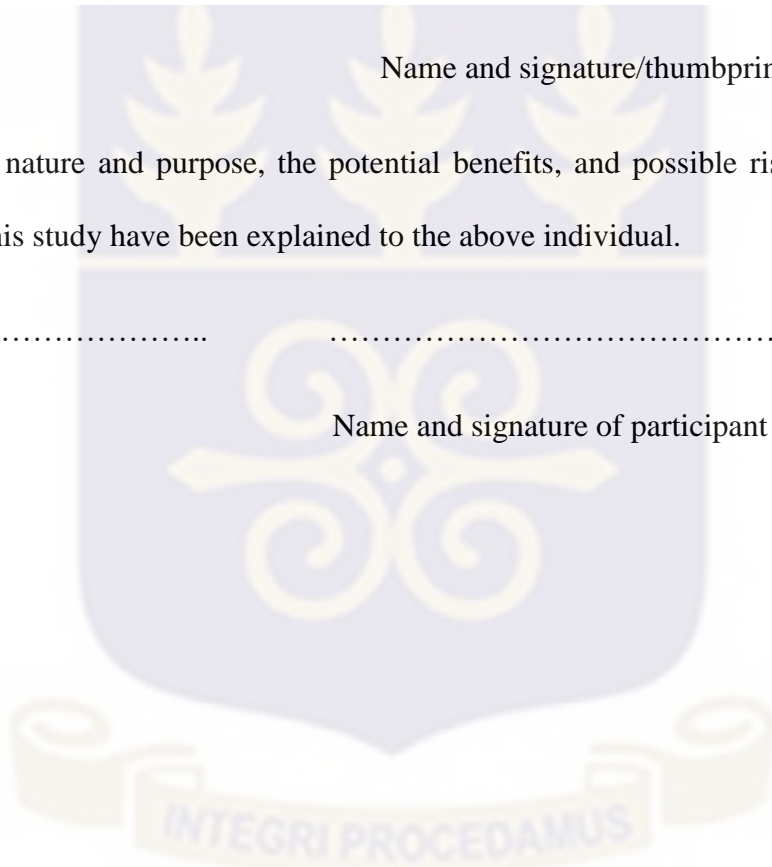
Name and signature/thumbprint

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this study have been explained to the above individual.

.....

Date

Name and signature of participant



APPENDIX II
INFORMED ASSENT FORM

Title: Drivers of Food Choices among Adolescent girls in the Lower Manya Krobo District.

Researcher – Gloria Osei Owusu

Research Supervisor – Dr. Amos Laar

Address – School of Public Health, University of Ghana, Legon.

Introduction

My name is Gloria Osei Owusu, a master of public health student of University of Ghana. I am doing a study with adolescent girls.

I am visiting you to learn more about how adolescent girls make their food choices. The information obtained will help improve the dietary practices and food choices of adolescent girls.

If you agree to take part in the study, I will ask you some questions on the foods you eat and how you make your food choices.

Possible benefit

We will understand adolescent girls eating behavior and food choices so that appropriate implementation project can be done to improve adolescent girls' food choices.

Possible risk and discomfort

There is no risk associated with your participation in the study.

Confidentiality

All information you provide will not be disclosed to anyone and your name will not appear in any report or publication. The information will be kept in a safe place and only the researcher will have access to the information.

Compensation

There is no cost to you for participating in the study.

Voluntary participation and right to leave the study

You are invited to participate in the study and it is not compulsory. You can withdraw from the study for any reason without any consequences. I will ask permission from your parent/guardian before you can participate in the study, if your guardian or parents say 'yes' you can still decide to participate.

Please feel free to ask questions at any time regarding this study.

Contact for additional information

If you have any question about the study, please feel free to contact Gloria Osei Owusu,

MPH student, University of Ghana, Tel – 0275892477 Email: oseiowusugloria@gmail.com

Dr. Amos Laar (Supervisor), Email: amos.laar@gmail.com

Voluntary agreement

This assent form has been explained. I have been given an opportunity to ask any question on the study and it has been answered to my satisfaction. I agree to participate in the study.

You and your guardian will be given a copy of this form after you have signed.

Child's Name: Date:

Child's signature/Thumbprint.....

Interviewer name:..... Date:.....

Interviewer's signature.....



APPENDIX III

**UNIVERSITY OF GHANA
SCHOOL OF PUBLIC HEALTH**

**PROJECT TITLE: DRIVERS OF FOOD CHOICES AMONG ADOLESCENT GIRLS IN
THE LOWER MANYA KROBO DISTRICT**

RESPONDENTS CODE RESPONDENT NAME.....

INTERVIEWER CODE

SOCIODEMOGRAPHIC INFORMATION

Now I would like to ask you few questions about yourself

1. How old are you? _____ (Completed years)

2. Are you currently in school?

Yes No

3. What is your highest educational level completed?

No Formal Education Primary Education Junior High Education Senior

High/Vocational/Technical University/ Polytechnic/ Training College

4. Who do you stay with?

Parents Mother Father Grandparents other (specify)

.....

5. What work does your father do?

- Salaried worker Trader Vocational worker (tailor, hair dresser, etc)
Artisan (carpenter, plumber, etc) Unemployed Don't know Other
(specify)..... Not applicable

6. What work does your mother do?

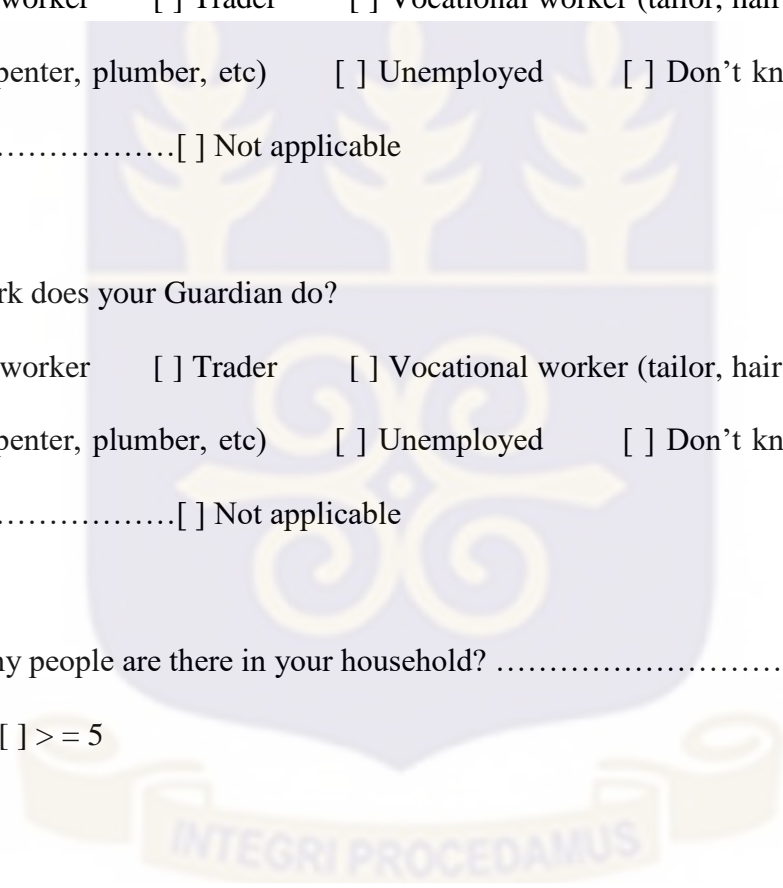
- Salaried worker Trader Vocational worker (tailor, hair dresser, etc)
Artisan (carpenter, plumber, etc) Unemployed Don't know Other
(specify)..... Not applicable

7. What work does your Guardian do?

- Salaried worker Trader Vocational worker (tailor, hair dresser, etc)
Artisan (carpenter, plumber, etc) Unemployed Don't know Other
(specify)..... Not applicable

8. How many people are there in your household?

- < 5 ≥ 5



FOOD FREQUENCY QUESTIONNAIRE

*Next, I would like to ask you some questions about foods you ate in the **last seven days**. For each food I ask about, please tell me how many days in the last seven days you ate that food. . I would like to know everything that you ate, whether at home or someplace else. I would like to know if you ate the food, even if it was combined with other foods in a recipe. For example, if you ate a stew or soup made with fish, onions, and tomatoes, you should say “yes” when I ask about fish, and again “yes” when I ask about vegetables. However, if you only had the soup, not the fish, do not say “yes” to the meat from birds because you did not eat it.*

Question number	Food groups	Example	Number of days
1	CEREALS	Corn/maize (koko, Aboloo, ekuegbemi, oblayo, Akple, banku, Kenkey), millet (Koko, Tuozaafi), rice (boiled rice, jollof, fried rice), oat, wheat (Bread), sorghum or any other grains or foods made from these.	
2	WHITE ROOTS AND TUBERS	Fufu, Kokonte , Plantain Cassava, Gari ,Yams (boiled/fried) Cocoyam (boiled/fried) Potato (boiled/fried)	

3	VITAMIN A RICH VEGETABLES AND TUBERS	Carrots Squash Sweet potatoes that are yellow or orange inside, red sweet pepper.	
5	DARK GREEN LEAFY VEGETABLES	Kontomire Cassava Borkorborkor Gboma Ademe AlefiBire/biton, lettuce, green beans, okro, green pepper, 11 green onions, other dark green leaves.	
6	OTHER VEGETABLES	Tomato, Cabbage, Mushroom, Garden eggs, onion, other vegetables that is not dark green	
7	VITAMIN A RICH FRUITS	Ripe mangoes, ripe pawpaw, 100% fruit juice made from these.	
8	OTHER FRUIT	Any other fruit such as banana, pineapple, apple, avocado pear (paya), orange, tangerine, watermelon, guava, sweet apple or other fruit, 100% fruit juice made from these.	
9	OTHER ORGAN	Liver, kidney, heart, intestines or other organ meat	

10	FLESH MEAT	Beef, pork, lamb, goat, rabbit, game, chicken, duck, turkey, insect, snail, grubs/akorkonowele
11	EGGS	Eggs from chicken, duck, guinea fowl, or any other eggs
12	FISH AND SEA FOODS	Any other type of dried or fresh fish, or seafood like shrimps/amonkor, adode, crabs, Anchovies, one-man-thousand or other small fish eaten whole, either fresh or dried
13	LEGUMES	Any other dishes made with beans, soya beans, bambara beans, egushie, groundnut, cashew or other nuts, including waakye, koose/akala and others
14	MILK AND MILK PRODUCT	Any milk, powdered milk, cheese, yogurt or other food made with milk
15	OIL AND FATS	Margarine, any oil, fats, or butter, or foods made with these such as fried rice or yellow rice, jollof, fried yam, fried plantain, fried potato, koose/akala,

		bofrot, spring rolls, meat pie, or cakes/pastry, Foods made with red palm oil, red palm soup or stew, aprapransa, mportompotom, yam/plaintaineto	
16	SWEETS	Sugar or sugary foods such as chocolates, sweets, or candies, honey, sweetened soda or sweetened juice drinks eg.coca cola.	
17	SPICES CONDIMENTS AND BEVEREGES	Spices (eg. Black pepper, salt, Hot pepper, Garlic, Onions, Ginger Spices Mixed spices Maggi cubes Herbs), condiment (soy sauce, hot sauce), coffee ,tea, as Milo or cocoa drink, Soymilk such as Vitamilk, Malt drink, etc. alcoholic beverages	

2.17. Over the past one week, did buy food from outside the house?

Every day 3-5 days <=2 days Never

2.18. Over the past one week, how often in the week did you eat with your household members?

Every day 3-5 days <=2 days Never

2.19. How often do you eat breakfast?

Rarely Once a week 2-3 times a week Every day

2.20 Did you eat breakfast today?

Yes No

2.21 For the past one year, have received any nutrition education?

Yes No

2.22 Where did you receive the nutrition education?

At school At home At the hospital/clinic other (specify)..... Not applicable

FOOD CHOICE QUESTIONNAIRE SCORING KEY.

Lastly I would like to ask you questions on how you select/make your food choices.

It is important to me that the food I eat on a typical day		Not important at all (1)	A little important (2)	Moderately important (3)	Very important (4)	Code
3.1	...is easy to prepare					
3.2	...is eaten by my friends					
3.3	...is low in calories					
3.4	...taste good					
3.5	...is eaten at home/family					

3.6	...is not expensive					
3.7	...is low in fat					

3.8	...is based on my culture beliefs.					
3.9	...is high in fibre and roughage					
3.10	...is nutritious					
3.11	...is easily available in shops and supermarket					
3.12	...is good value for money					
3.13	...cheers me up					
3.14	...smells nice					
3.15	...can be cooked very simply					
3.16	...helps me cope with stress					
3.17	...helps me control my weight					
3.18	...has pleasant texture					

3.19	...is advertised on the social media and networking (television, radio, internet etc.)					
3.20	...make me full/satisfied					
3.21	...contains a lot of vitamins and minerals					
3.22	...is like food I ate when I was child					
3.23	...keeps me awake and alert					
3.24	...is light to keep my body in shape					
3.25	...looks nice					
3.26	...keeps me relax					
3.27	...is high in protein					
3.28	...take no time to prepare					
3.29	...keeps me healthy					
3.30	...is good for my skin/teeth/hair/nails etc					

3.31	...makes me feel good					
3.32	...is based on their religion beliefs.					
3.33	...is what I usually eat					
3.34	...that is in season					
3.35	...can be readily available in shops close to where I live or work					
3.36	...is cheap					
3.37	...contains natural ingredients					
3.38	...it is cheap					
3.39	...contain no artificial ingredients					

4.1 How do you decide what you are going to eat or drink at any given time in the day?

.....

4.2 Who if anyone, affects your decision on what foods to buy?

.....

4.3 What encourages you to eat healthy foods?

.....

4.4 What discourages you from eating healthy foods?

.....

4.5 How do you choose what to buy or get from a store?

.....

4.6 Why don't you eat certain foods?

.....

4.7 Do you pay attention to healthy food choices when eating outside?

