ENSIGN COLLEGE OF PUBLIC HEALTH, KPONG, EASTERN REGION

KNOWLEDGE ON DIET RELATED CHRONIC DISEASES AMONG TERTIARY STUDENTS IN THE HO MUNICIPALITY OF VOLTA REGION, GHANA

by

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A Thesis submitted to the Department of Community Health in the Faculty of Public Health in partial fulfillment of the requirements for the degree

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DECLARATION

I hereby certify that except for reference to other people work, which I have duly cited, this Project submitted to the Department of Community Health, Ensign College of Public Health, Kpong is the result of my own investigation, and has not been presented for any other degree elsewhere.

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DEDICATION

I dedicate this thesis to my husband Dickson Fenuku, my children, Rose, Bright, Joshua and Caleb for your patience, support and encouragement during the period of study.

To my late mother, Mama Mewornu Atto II, the reasons are enormous

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DEFINITION OF TERMS

Diet-related chronic diseases	Nutritional Diseases
Diet	Kind of food that a person or community habitually eats
Dietary practices	Are the habitually decisions of individual or group of people regarding what they eat.
Diabetes	A group of metabolic disorders characterized by hyperglycemia that results from defects in the secretion or action of insulin, or both.
Hypertension	A medical condition in which the blood pressure in the arteries is elevate exceeding 140 over 90 mmHg.
Obesity	Abnormal or excessive fat accumulation that may impair health
Awareness:	Refers to a consciousness of internal or external events or experiences

LIST OF ACRONYMS

NCDs	Non Communicable Diseases
CDS	Communicable Diseases
UK	United Kingdom
BMI	Body Max Index
USA	United States of America
US	United States
CKD	Chronic Kidney Disease
GDHS	Ghana Demographic Health Service
CRC	Colon Rectal Cancer
SPSS	Statistical Package for Social Science
SDGs	Sustainable Development Goals
UN	United Nations
W H O	World Health Organization
GSS	Ghana Statistical Service
UCCCoDE	University of Cape Coast College of Distance Education
EPUC	Evangelical Presbyterian University College
ECOPH	Ensign College of Public Health

ABSTRACT

Diet-related chronic diseases are long-term diseases that are largely preventable. Such diseases can result from poor eating habits. The purpose of this study was to examine tertiary students' knowledge of diet-related chronic diseases and dietary practices.

The design used was a descriptive cross-sectional survey. The sample of 273 participants was drawn from 2 universities in the Ho Municipality of the Volta Region of Ghana. Purposive sampling techniques were adopted for selecting the participants. Structured interviews and dietary assessment were used to collect information on respondents' knowledge on diet-related chronic diseases. Both SPSS and Microsoft Excel were used to analyze the data.

Most participants (98%) had heard about diabetes, hypertension and obesity. The study found that students consume various categories of food average 5 days in a week. Knowledge of diet-related chronic diseases had a significant association ($p < 0.001$) with dietary practices.

Tertiary students in the Ho Municipality had good knowledge of diet-related chronic diseases. Students who had good knowledge of the diseases had better dietary diversity. As knowledge of diet-related chronic diseases increased, dietary practices improved.

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CHAPTER ONE

INTRODUCTION

1.1 Background

The way people eat and their lifestyles of late have resulted in some chronic diseases increasingly affecting both developed and undeveloped countries. Diet-related chronic diseases are long term conditions or diseases that are not contagious and largely preventable. They present a great burden for society, particularly diseases such as obesity, diabetes, hypertension, cardiovascular disease, cancer, dental diseases and osteoporosis WHO (2011). Once affected, people often live with the consequences for the rest of their lives; these include frequent doctor's visits, medical tests, medications, therapies and sometimes surgery (Nti et al., 2012).

According to the World Health Organization WHO (2011), non-communicable diseases are the leading causes of death, accounting for 63% of the 57 million deaths reported every year. Diet related chronic diseases are now the major cause of death and disability worldwide (Bosu, 2013). Globally, cardiovascular diseases, diabetes, obesity, cancer and respiratory diseases account for 59% of the 57 million deaths annually and 46% of the burden of disease (WHO, 2011). The global burden of non-communicable diseases is rising rapidly, with the trend shifting towards the younger population (Rahul et al., 2014).

Africa is leading with the fastest rate of increase of various diet-related diseases; for example, the number of persons living with diabetes aged 20-79 years in Africa is projected to increase by 98% from 12.1 million in 2010 to 23.9 million by 2030, compared with a global average of 54% increase over the same period (Bosu, 2013). In Ghana, non-communicable diseases (NCDs) kill 78,000 persons annually, representing 354 deaths per 100,000 populations

accounting for 34% of total deaths and 31% of disease burden (WHO, 2008). Surveys conducted in the Accra Region suggest that the prevalence of hypertension has increased from 25-27% in the 1976-1998 period to about 3%-45% in the 2002-2006 period. (Bosu, 2013) In the Kassena-Nankana District of the Upper East Region, it was found that about a fifth of adults had elevated blood pressure. The Ghana Demographic and Health Survey (GDHS, 2008) reported that 30% of women in Ghana were overweight and 9% obese. According to (Blum, 2011) deaths related to NCDs are increasing, especially in low and middle income countries. Over half of these deaths are associated with behaviours that begin or are reinforced during adolescence, including poor eating habits and lack of exercise. Global trends indicate that these NCD-related behaviours are on the rise among young people, and that they establish patterns of behaviours that persist throughout life and are often hard to change (Blum, 2011). Evidence points to adolescence as a crucial period in the development of adult NCDs; nearly three quarters of obese adolescents remain obese as adults, increasing their risk of heart disease, type 2 diabetes, stroke and cancers (Blum, 2011).

NCDs have impact on individuals and families, economies, health structures and societies. Reduction in life expectancy, overall reduction in consumption, income and savings of individuals plus households, and early retirement are some implications of NCDs, all of which have great impact on the economic productivity of a country, bringing about the spiral of ill health and poverty (Abegunde and Stanciole, 2006; Suhreke et al., 2005). Unhealthy diet has been identified as one of the key risk factors for diet-related chronic diseases (WHO, 2003; Steyn et al., 2004; WCRF, 2007). Inadequate consumption of fruit and vegetables increase the risk of cardiovascular diseases and several cancers; high salt consumption is an important determinant of high blood pressure and cardiovascular risk and increases the risk of stomach cancer; high consumption of saturated fats and trans-fatty acids are linked to heart

disease; a range of dietary factors have been linked with diabetes; and red and processed meat consumption is linked with some cancers (Hawkers, 2013). These display relationships between dietary practices and diet-related chronic diseases.

There is evidence that consumption of energy-dense foods and sugary drinks contribute to overweight and obesity, which have been linked to a range of health problems, including NCDs (WHO, 2000). There is a strong relationship between diabetes and obesity (Steyn et al., 2004), and body fatness is also associated with some leading cancers (WCRF, 2007). It is estimated that 2.8 million people die each year as a result of being overweight or obese (WHO, 2011a). The prevalence of overweight is highest in upper-middle-income countries; very high levels have also been reported from some lower-middle income countries in Europe, the Middle East and the Americas, and it is reported to be rising throughout low and middle-income countries WHO (2011).

(Nti et al., 2012) reported that changes in dietary habits and physical activity have major impact in reducing the rates of these diseases, often in a relatively short time. According to (Demory-Luce, 2016), sound nutrition can play a role in the prevention of several chronic diseases, including obesity, coronary heart disease, and certain types of cancer, stroke, and type 2 diabetes. To help prevent diet-related chronic diseases, researchers have proposed that healthy eating behaviors should be establish in childhood and maintained during adolescence. Despite the importance of healthful eating habits, the lifestyles adopted by the youth, which is influenced by the desire to fit social norms, may not be conducive to encourage the youth to eat in a manner that prevents them from contracting NCDs (Nuemark-Sztainer et al., 1999). Quest for independence, acceptance by peers, increased mobility, and greater time spent at school and or work activities and preoccupation with self-image contribute to erratic and

unhealthy eating behaviours that are common among young people (Nuemark-Sztainer et al., 1999). There is evidence that NCDs are increasing among young people, and it is essential that interventions in the prevention and control of diet-related chronic disease should be targeted at young people (Aikins et al., 2012); this offers a chance to acquire knowledge about optimal nutrition among the youth that could prevent or delay adult onset of diet-related chronic illness. Understanding and promoting nutritional health, with appropriate assistance to the youth, will help them improve their dietary intakes and avoid diet-related chronic diseases. The WHO has proposed a number of actions to address the problem of unhealthy eating behaviours; among these, educating the people is expected to be more effective to control diet-related chronic diseases; this is widely practiced in many developed countries at different educational levels (Mufas et al., 2013).

1.2 Statement of problem

Chronic NCDs have contributed significantly to Ghana's disease burden for more than fifty years; currently, there is a consistent increase in chronic NCDs. It has been identified that regular inclusion of fruits and vegetables in the diet of young people daily are needed to combat malnutrition and reduce the risk of overweight and obesity. However, studies have shown that fruit and vegetable consumption is among the lowest in Africa (Aikins et al., 2012). Globally, the burden of Non-Communicable Diseases (NCDs) is rising rapidly with the trend shifting towards the younger population (Rahul et al., 2014). WHO estimates that behaviours began in young adulthood account for 70 percent of premature deaths in adults worldwide, (Naik and Kaneda, 2016).

The GDHS (2008) indicated national diabetes prevalence of 12% and hypertension 28%. Several programmes have been undertaken to manage the situation; however, policy response to Ghana's NCDs burden has been inadequate (Aikins et al., 2012). The Annual Health

Sector Report of the Ho Municipal Health Directorate (2012) reported that diabetes cases increased from 3,851 in 2010 to 10,522 cases in 2011; hypertension cases increased from 12, 510 in 2010 to 21,858 in 2011 and 30,069in 2012.

Poor eating habit is one of the main risk factors that account for the majority of NCDs death. This risk factor is modifiable behaviour that is typically initiated or established during young adulthood which set the stage for NCDs late in life. Life styles adopted by the youth, which is influenced by the desire to fit social norms, may not be conducive to encourage the youth to eat in a manner that prevent them from contracting NCDs (Nuemark-Sztainer et al., 1999). Evidence of NCDs increasing among young people makes it important that interventions in the prevention and control of diet – related chronic diseases should be targeted at young people (Aikins et al., 2012).

Tertiary students in the Ho Municipality may be experiencing sub-optimal feeding habits and if not checked are likely to predispose them to overweight and obesity, risk factors associated with chronic life style diseases. Data on tertiary students' knowledge of diet-related chronic diseases and dietary practices in the Ho municipality is scanty. Epidemiological studies have reported that one of the most effective methods of combating the epidemic rise of diseases is to evaluate the knowledge level of people concerned in order to put in place relevant and strategic plans for effective interventions. Therefore this study seeks to investigate tertiary students' knowledge of diet- related chronic diseases and dietary practices in the Ho Municipality.

1.3 Rationale of Study

A review of the targets of the WHO "Global Action Plan for the prevention and control of NCDs 2013-2030" and United Nation (UN)'s Sustainable Development Goals (SDGS) on NCDs reveal that most of the targets set to reduce premature NCD deaths addresses specific NCD risk factors and there is not much on knowledge and awareness of NCDs among the youth and other age groups, (Naik and Kaneda, 2016).

Though there is improvement in the health care of the youth off late, there is the need to put in extra and more diversified effort including the issues of knowledge of diet related chronic diseases and dietary practices among the youth and other age groups which is required for Ghana to achieve UN's SDGs on NCDs and targets of WHO.

Familiarity with knowledge of diet- related chronic diseases and dietary practices is important to curb NCD risk behaviors among young people to preserve health, guarantee a healthy adulthood and set the stage for thriving future (Naik and Kaneda, 2016)

1.4 Conceptual framework

It was hypothesized that there will be no relationship between knowledge of diet-related chronic diseases and dietary practices among university students in the Ho Municipality.

The conceptual framework is based on literature that knowledge plays a role in individual's health decision. The independent variable in the study is the knowledge of diet-related chronic diseases whilst the dependent variable is dietary practices. The dependent variable is defined in to two, healthy dietary practices and unhealthy dietary practices. According to (Al

Hamarneh, Crealy and Mc Elany,2011), good knowledge about non communicable risk factors among individuals will help them to take action in decreasing their risk factors since majority of the risk factors are modifiable. This implies that knowledge of diet-related chronic diseases in respect of awareness of the existence of disease is expected to influence the dietary practices of people.

1.5 Research questions

1. Do university students' have knowledge about hypertension, diabetes and obesity?
2. What are the dietary practices of university students

1.6 General objective

To examine university students' knowledge of diet-related chronic diseases and their dietary practices.

1.7 Specific objectives

1. To examine knowledge about hypertension, diabetes and obesity among university students in the Ho Municipality.
2. To assess dietary practices among university students in the Ho Municipality

1.8 Profile of Study Area

The area of this dissertation is Ho. The Ho municipality is the capital of one of the 25 political and administrative districts in the Volta Region of Ghana. It is also one of the five municipalities in the region. It is located in the middle zone of the Region. The Municipality shares boundaries with Adaklu and Agortime-Ziope on the south, Ho West District on the north and the Republic of Togo to the East. Its total land area is 2,361 square kilometers thus representing 11.5 percent of the region's total land area. The municipal has an estimated population of about 271,881 persons; males are 129,180 and female 142,701.according to the

Ghana Statistical Service (GSS) Population and Housing Census 2010, thus making Ho the largest urban center in Volta region with a cluster of informal sector activities; and as such a suitable area for this study

The Municipality houses the Regional Capital, Ho, which also serves as the economic hub of the Volta Region. The development needs and investment prospectus of Ho center on infrastructure, environmental management, social services, financial management and institutional capacity. Ho lies between Mount Adaklu and Mount Galenkui. It is a home to a museum, a cathedral and a large prison. The major local language spoken is Ewe and English being the official Language of the country. Unlike the capital of Ghana, Accra, Ho seems like a village that has swollen into a city, noted for a lively and huge open market that attracts people from all over Ghana and Togo. The central parts the roads are paved, whiles those roads outside are not. The total number of universities within the municipality is six.

The College of Distance Education of University of Cape Coast (formerly Centre for Continuing Education), was established in 1997 and upgraded to a college status on 1st August, 2014. The college currently has three academic departments including that of mathematics and science, business studies and education studies. The respondents were drawn from the Education Studies Department.

Evangelical Presbyterian University College is located in Ho in the Volta Regional capital, Ghana. It is a private tertiary institution established in 2007 by the Evangelical Presbyterian Church. It is affiliated to the University of Cape Coast. Courses offered include Secretaryship, Accounting and Finance, Governance Studies, Business Administration,

Agribusiness and Integrated Development Studies. The respondents for the study were drawn from Business Administration Department.

1.9 Scope of the study

The scope of the study covers tertiary students in two universities in the Ho municipality. The Universities are namely; University of Cape Coast Distance Education College (Mawuli Senior High School Study Centre Ho) and Evangelical Presbyterian University College in Ho. The criteria for selection of respondents were;

(a) Must be a tertiary student in the above universities

(b) The student must be two years and above in the school

(c) The student must be willing to participate in the survey

1.10 Organization of the study

The study consists of 5 chapters. Chapter 1 covers the background of the study, problem statement, objectives, research questions, significance, and organization of the study. Chapter 2 reviews the literature on related to the study, including knowledge of diet-related chronic diseases and dietary practices. Chapter 3 describes the methodology, study area, research design, study population, sample size determination, and sampling technique, data collection tools and procedures, and data analysis. Chapter 4 presents the results of the study. Chapter 5 covers the discussion. The final chapter presents the summary of major findings, conclusions, recommendations and suggestions for future study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter discusses related literature about students' knowledge of diet-related chronic diseases and dietary practices, and some of the concerns various researchers have expressed and suggestions made towards improving the situation. The review will help develop a conceptual framework for the study.

2.1 Concept of chronic disease

According to the Government of Australia (2012), chronic diseases are ailments with a prolonged duration, do not occur spontaneously, and are rarely cured completely. Chronic diseases are complex and varied in terms of their nature, causes, and impacts on individuals and communities. Globally, the phrase non-communicable diseases is used, as opposed to infectious or communicable diseases (CDs) (Whyte, 2012). The prototypes of NCDs are cardiovascular conditions (heart disease, hypertension, and stroke), cancers, chronic respiratory conditions and type 2 diabetes (Daar et al., 2007). Other chronic diseases include epilepsy and sickle cell anemia. The health implications of chronic diseases are two-fold: some are responsible for premature death, and others result in permanent disability (Whyte, 2012).

According to Jordan and (Osborne, 2007), chronic diseases are illnesses lasting longer than three months which are not self-limited; they are not contagious and largely preventable. The most common chronic diseases are cardiovascular disease (primarily heart disease and stroke), cancer, obesity, and diabetes; others are osteoporosis and dental diseases, and they all

present a growing burden for society. As the population ages the incidence of chronic disease increases, even though all age groups are affected by chronic conditions (WHO, FAO Expert Consultation, 2003). In 2001, chronic diseases accounted for approximately 60% of deaths worldwide; almost half of these deaths were attributed to cardiovascular diseases; in addition, obesity and diabetes already affect a large proportion of the population, and they have started to appear earlier in life (Green Fact, 2003).

Shifts towards a high-fat, energy-dense diet and a sedentary lifestyle, first occurred in industrial regions, and more recently also in developing countries (Green Fact, 2003). Factors that can increase the risk of developing chronic diseases are an unhealthy diet, physical inactivity, tobacco use, and alcohol consumption; genetic and economic factors also play a role (Green Fact, 2003). Diet-related chronic diseases are largely preventable, and global strategies on diet, physical activity, and health are needed. Changes in the diet that may be helpful in reducing the risk of chronic diseases include eating a diet that is low in fat and sugars and rich in fruits, vegetables, and whole grain foods (Jha, Chaloupka et al., 2006).

2.2 Types of Diet-related chronic diseases and their risk factors

2.2.1 Cancer

One of the major health concerns confronting the world in recent times is cancer. An estimated 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer were reported worldwide in 2012 (International Agency for Research on Cancer (IARC, 2012). Among the 10 leading causes of deaths as at 2012 were lung, prostate, colorectal (intestine), stomach, liver, esophagus, bladder, and kidney cancers; and the overall incidence of cancer is almost 25% higher in men than in women (IARC, 2012). According to

Fellay and others (2013), Armenia has the highest cancer mortality rate in males (201 per 100,000), while Zimbabwe topped the cancer mortality rate in females (146 per 100,000) in 2012. Tobacco is considered the single most important risk factor for cancer cases worldwide, causing 22% of cancer deaths (1.7 million in 2008) and 71% of lung cancer deaths in 2008 (Eriksen, 2012).

Globally, reproductive behavior, the use of exogenous hormones, excessive weight and physical inactivity, diet (especially consumption of red and processed meat), and alcohol consumption are believed to be responsible for the risk of breast and colorectal cancers (WHO, 2012); there is little known about risk factors for prostate cancers, besides genetic or hereditary factors. Significant risk factors for other types of cancers include obesity, excessive sunlight exposure and hazardous occupational exposures to radiation (Cogliano et al., 2011). Infections of various forms have also been implicated in causing cancers. According to the WHO, (2012) 16% of new cancer cases in 2008 were attributed to infections, and the proportion is greater in less developed countries (23%) compared to developed countries (7%).

2.2.2 Hypertension

Also, known as high blood pressure, hypertension is the force of blood against the artery walls as it circulates through the body, resulting in extra effort needed to circulate blood, and is mainly due to fat or plaque buildup in the veins (Giles, et al., 2009). The risk of developing hypertension increases with age, high intake of salt (sodium) and lower intake of potassium (from fruits and vegetables), sedentary lifestyle, hereditary factors, stress, alcoholism and smoking (WHO, 2011); poor eating habits can lead to obesity, which is also a risk factor for hypertension, and other chronic diseases such as diabetes are also implicated. Generally, the

situation gets more complicated when the heredity factor is combined with an unhealthy lifestyle, such as poor eating habits and physical inactivity. Usually, hypertension does not show symptoms except in severe cases, where an individual experiences nausea, anxiety, chest pain, tiredness and muscle tremor (Batisky, 2010). An adverse health effect of hypertension is heart failure a condition that occurs when the heart cannot pump enough blood and oxygen to other organs; another effect of hypertension is heart attack-a condition that occurs when the blood supply to the heart is blocked and heart muscle cells die from lack of oxygen (Wilson, Hoeg, et al., 1997). A study has revealed that infants and teenagers who are obese have a higher risk of developing hypertension later in adulthood (Stabouli et al., 2005). Control of hypertension, therefore, should therefore include them, and have to do with healthy eating habits, increased physical activity and avoidance of problem behaviors such as alcoholism (Barnard et al., 2009).

2.2.3 Diabetes

Diabetes is a condition that occurs as a result of high blood glucose (sugar) levels, either due to the inability of the pancreas to produce enough insulin to neutralize the glucose, or the body's inability to make use of the insulin produced, or both (WHO, 1999). There are 2 main types of diabetes: type 1 diabetes (also known as insulin-dependent diabetes) and type 2 diabetes (also known as diabetes mellitus which is the commonest type and diet-related. Type 1 diabetes occurs at the infant stage, when the immune system attacks insulin-producing cells in the pancreas, involuntarily causing permanent damage to the cells (Charvatova, 2016); common symptoms of type 1 diabetes include excessive excretion of urine, tiredness, frequent hunger and vision impairment. Type 2 diabetes usually occurs later in life and constitutes about 90% of all cases (Diabetes UK, 2010). Recent studies report that type 2 diabetes is increasing among children and younger people of all ethnicities (National Health

Service, UK, 2008). Diabetes studies for one and half decades revealed an annual increasing trend. In 1985, the worldwide estimate for people living with diabetes was 30million; a decade later the figure rose to 135 million, and by 2000 the reported number of diabetes cases was 171 million people (WHO, 2005). Currently, about 347 million people worldwide are diagnosed as diabetic (Danaei et al., 2011). Like hypertension, the rising number of diabetes cases worldwide have been partly linked to aging, unhealthy eating habits and lack of exercise. Obesity is considered to be the key risk factor for developing diabetes; as the number of obese people keeps rising annually, it is, therefore, valid to postulate that the increasing trend in diabetes is likely to continue with the rising incidence of obesity. (Snowdon and Philip, 1985) reported that people depending solely on plant-based food reduce their chances of developing diabetes by 45%.(Van et al. 2008) found that eating meals containing meat once per week could increase the risk of diabetes by 74%. Unlike type 1diabetes, which is permanent, type 2 diabetes can be managed or reversed by strict adherence to a healthy diet such as a high consumptions of plant-based foods, high intake of water, and a low intake of salt and sugar (American Diabetes Association, 2010; Bernard et al., 1997, 2006, 2009; Liu et al., 2009).

2.2.4 Obesity

The World Health Organization defined obesity and overweight as abnormal or excessive fat accumulation that may impair health (WHO, 2006). Obesity is usually measured by using the body mass index (BMI) which has long been established as the preferred method of measuring adiposity in epidemiological studies (Keys et al., 1971). BMI is an index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m2) (WHO, 2010).

Considering type 2 diabetes mellitus, the problem of overweight and obesity is rising radically. In the USA, the National Health and Nutrition Study (NHANES I, II, III) has shown the prevalence of obesity. Adults with BMI greater than 35 increased from 25% in 1980 to 60% in 2000. In children there was an increase from 14% to 24%. If this trend of increase in the prevalence of obesity continues, in the year 2025 the obese population in America could be 100 % (Mukdad et al., 2000; Ogden, 2006).

In Africa, the number of people who are overweight or obese, increased by nearly 35% from 1990 to 2000 (Abdhalah et al., 2009). In recent time a new report from the World Health Organization shows the alarming extent of the problem: The prevalence of overweight and obese children living on the African continent has surged from 4.8 per cent to 6.1 per cent in the last 25 years. The number of these children has doubled, from 5.4 million to 10.3 million. The obesity is as a result of change in lifestyles. With the issues of migrants from rural areas to cities, children are getting less physical exercise and eating more sugary and fatty foods.

2.2.5 Stroke:

Stroke is a condition that occurs when blood flow to a certain region of the brain is impeded, resulting in the death of brain tissue; ischemic stroke is usually caused by a blood clot in an artery that supplies blood to the brain (Terent, 1993). Globally, stroke accounts for 5.5 million deaths annually, with 44 million disability-adjusted-life-years lost (Debraj and Patil, 2011). An estimated 16 million people suffered from a first-ever stroke in 2005, with 62 million stroke survivors (Strong et al., 2007), and if nothing was done to curb the situation, global estimates could rise to 23 million first-ever strokes, with an associated 7.8 million deaths, by 2030. The authors revealed an inverse relationship between a country's income and stroke deaths, with lower income countries recording higher stroke deaths. O'Donnell et al

(2010) in a study covering comprising 22 countries to assess risk factors for stroke, the top risk 10 factors for stroke were smoking, excessive use of alcohol, poor diet, physical inactivity, hypertension, elevated waist-to-hip ratio, diabetes, psychosocial factors such as depression, history of heart disease, and elevated apolipoprotein B to A_i ratios (O'Donnell et al., 2010); the two most important risk factors were smoking and hypertension. Approximately 54% of strokes worldwide were attributed to hypertension, and increasing rates of hypertension were noted particularly in China and Indian (Johnston, Mendis and Mathers, 2009). According to Swierzewski (2010), awareness of how to maintain an individual's normal blood pressure levels using appropriate diet, increased physical activity, and adherence to medication schedules can decrease the risk of stroke and associated fatalities.

2.3 Knowledge of causes of chronic disease

Chronic diseases knowledge included healthy lifestyle, symptoms, risk factors, control, and prevention. (Song et al., 2013) emphasize that even though awareness rates were not high, people who were aware of chronic diseases stressed on 4 healthy lifestyles habits to help combat chronic diseases: quitting smoking and less drinking, being broad-minded, and maintaining a balanced diet and moderate physical activity. A study by (Chow et al., 2014) to examine knowledge and causes of chronic kidney disease in Hong Kong concluded that the public was poorly informed about chronic kidney disease (CKD), as well with major knowledge gaps regarding the influence of hypertension on kidney disease. (Roomizadeh et al., 2014) reported generally low levels of knowledge about CKD and its risk factors in an Iranian population. According to (Goff 1998), individuals, especially in low socioeconomic and racial or ethnic minority groups, had high knowledge of chest pain as an important heart

attack symptom. However, knowledge of the complex constellation of heart attack symptoms was deficient in the US population.

In sub-Saharan Africa, knowledge of the cause of chronic diseases has been explored. A study by (Okoh and Jaja, 2014) on knowledge and awareness of diabetes among adolescent students in selected public secondary schools in Port Harcourt, Nigeria reported that about one-third of the respondents identified the cause of diabetes to be high blood glucose, whilst less than 1% attributed the cause to insulin deficiency; about one-third of respondents reported excessive consumption of sugar as the cause of diabetes.

In Ghana, (Anabilla et al., 2011) that church leaders and health committee members of churches in Accra appreciated hypertension and diabetes as major causes of morbidity and mortality amongst the church members; they also identified advancing age, physical inactivity, unhealthy food consumption and stress as major risk factors for cardiovascular disease development. Further analysis showed that about 90% of the congregants were conscious of the risk factors same as those identified by their leaders but added smoking, monitoring blood pressure and the control of diabetes; it was also observed that while most identified the aforementioned factors, a little above half of the congregants were aware that poor eating habit regarding fatty foods, red meat consumption and the irregular monitoring of blood pressure pose a greater risk of non-communicable diseases (Anabilla et al., 2011). Another study which sought to investigate the explanatory models of diabetes and its complications among diabetic patients in urban poor communities in Ghana, respondents emphasized poor dietary habits, poor lifestyle risk factors (smoking, excessive alcohol intake and lack of physical activity), family history, stress and supernatural factors as the factors that explain the cause of diabetes (de-Graft Aikins et al., 2014).

2.4 Source of knowledge of chronic disease

There are various sources that individuals derive their knowledge of chronic diseases. A qualitative study by de-Graft Aikins et al., (2012) examined the lay representations of chronic diseases and how their major risk factors provide public health specialists with the conceptual tools to develop primary prevention strategies in Ghana reported five main sources of knowledge for the respondents: the lay community with specific references to friends, relatives and work colleagues with chronic conditions (cancer, diabetes, hypertension, asthma, epilepsy, rheumatism); public health education by healthcare providers; mass media e.g. radio and television church (with specific mention of education by doctors on epilepsy and education by people with diabetes); and public transport (especially on long haul journeys).

Another investigation from clinicians in a study reported that the occurrence of chronic kidney disease was highest amongst the African American population, and their source of information on the disease was predominantly gotten from the internet, physicians, and personal experiences from friends and family members with the disease, others they know with renal failure effect (de- Graft Aikins et al., 2014; Kazley et al., 2014). Other studies conducted in sub-Saharan Africa about the source of knowledge of chronic diseases showed that obese and older-aged individuals who consequently suffer the disease, longer period of education, a positive family of hypertension were independent predictors of individual's awareness (Kamadjeu, 2006).

2.5 The concept of dietary practices

Nutrition knowledge has been shown to play an important role in influencing healthy food habits which ensure nutrient needs throughout lifecycle are met adequately since individual

needs are determined by the rate of growth; when an individual is aware on how to meet nutritional needs, it facilitates food choices that enhance health and wellness by preventing excess or less of intake of nutrients that could be associated with ill health (Worsely, 2002). To secure society health, nutrition security is an important factor to consider and means more than having adequate access to quality food and inadequate amounts but also encompasses the need for people to understand how to utilize a healthy diet for greater benefits to their health. Therefore nutrition education in community focuses on food behavior patterns by increasing knowledge on food value so as to improve dietary practices and consequently to enhance nutrition status of an individual (FAO, 2010).

In the recent past trends toward healthier diets have increased as the society becomes more food conscious. Dietary practices have also continued to change due to the widening food choices. Food market systems continue to be infiltrated by both healthy and unhealthy food products. Consumers are facing a dilemma in food choices in spite of current upsurge of nutrition information however in absence of correct knowledge consumer confusion and anxiety is likely to affect their food choices. To facilitate consumers to make healthy choices, empowerment with right nutrition information will help to promote society health (Contento, 2007). Food choices continue to be influenced by wide range of factors such as advertising through social marketing, economic status, and environmental concerns. The need to enhance consumer knowledge is being reflected in the changing lifestyle particularly in urban areas as more people continue to increasingly eat away from home. There is increased demand for food and markets, on the other hand, have responded to demand foods by providing fast and convenient foods. This has also increased processed and imported foods which have continued to replace fresh and culturally accepted foods. Therefore food markets and choices are becoming complex and overcrowded. Therefore much attention

should be given to enhancing right information and clear labeling of products to address concerns by consumers on the intake of adequate nutrients and healthy choices (Contento, 2007).

2.5.1 Healthy dietary pattern and reduced Risk of chronic diseases

The is consensus by cancer experts and from studies that a variety of fruit and vegetable intake, grains, and legumes (dried peas and beans) help prevent cancer development (Slattery et al., 1998; Satia et al., 2009). (Slattery et al., 1998) in a casecontrol study on a United States population- reported a significant association between a higher intake of vegetables and fruits and a reduced risk of colon cancer in both genders. According to study in the United States by (Fung et al.,2003), a good pattern of vegetables, fruits, legumes, fish, poultry and whole grains consumption was reported to be negatively associated with colon cancer. A plant-based diet emphasizes vegetables, fruits, legumes, and whole grains. These foods are good sources of protein, carbohydrates, fat, vitamins, and minerals. Plant-based foods have lower calories than foods made from animals. Fruits and vegetable consumption has been considered to have some nutritionally essential factors for the achievement of a balanced diet (Sijtsema et al., 2012). It plays an important role in preventing chronic disease and premature death (Van't Veer et al., 2000; Trichopoulou et al., 2003) and consumers perceive fruit as healthy (Verbeke, 2006). It has been reported that the consumption of fruit is recently below recommended intake (Pomerleau et al., 2004).

Briz et al., (2008) outlined some reasons for declining fruits consumption; major factors include health, pleasure, and convenience, whilst appearance, habit, and price were minor factors. It has been suggested that there is a correlation between the preference for sweet taste and the consumption of sweet-tasting products (Pangborn and Giovanni, 1984).

(Wansink et al., 2006) assume from another viewpoint that people who eat sweet snacks frequently may also frequently eat fruits. Their study correlated fruit consumption to sweet snack intake than salty snack consumption. They explain that as compared to other types of food, fruits are relatively sweet. Therefore, (Wansink et al., 2006) hypothesize that an important group for increasing fruit consumption might be the group of consumers that already frequently eat sweet snacks. The taste of fruit and sweetness, in particular, is said to be an essential factor which affects consumer's fruit choices and consumption (Neuhouser et al., 2000). This notwithstanding, religious beliefs and laws have served as a source of checks on their members. Some religions in the world such as some sects of Buddhism and Islam forbid certain meat consumption. In other cases, particular animal products are a charge to limit consumption. Such include abstaining from pork and shellfish to keep one ritually pure in Judaic religion. A study by Chowdhury et al. (2000) emphasized that Moslems in Bangladesh keep to foods forbidden by their religion such as pig products and even amongst those ambivalent Muslims who do not observe regular prayers. Decker (2005) in a study on the eating habits of some members of a Somali community found that some foods and products were not consumed because they were either untraditional or forbidden by the Islamic religion;

2.5.2 Unhealthy consumption pattern and prevalence of chronic disease

Food consumption patterns are relevant to disease risk (Kant, 2004). Analyzing patterns of food consumption emerges as an important focal point for researchers understanding of the role of diet in disease risk. Recent nutritional epidemiological studies have linked the consumption of a variety of food groups, and diverse of eating patterns, to differences in disease outcomes. Dietary patterns characterized by high intakes of fruits, vegetables, legumes, fish, whole grains, and low-fat dairy products have been linked to lower risks of

cancer (Chen et al., 2015; Key et al., 2004; Slattery, 1998) and coronary heart disease (Kerver, 2003). A study by Chen et al (2015) derived 3 major dietary patterns using factor analysis; a meat-diet, a Plant-based diet and diet pattern; individuals with the meat-diet/Sugary-diet patterns had a higher risk of colorectal cancer (CRC) whilst those with the plant-based diet patterns decreased their risk of CRC.

Raschke and Cheema (2007) argue that the urbanization in East Africa has contributed to a move away from traditional high-fibre, home-cooked foods to the consumption of pre-prepared, packaged and processed ready-to-eat foods. Recent evidence from the urban centers of sub-Saharan Africa revealed a positive relationship between the consumption of a Westernized (globalized) diet and the prevalence of NCDs.(Njelekela et al., 2005) in a study of the association between dietary habits, polyunsaturated fatty acids and s coronary disease risk factors in Tanzania found that, elevated consumption of trans fats, refined sugars, refined flours and preservatives, and low intake of dietary fiber and vital micronutrients, as a result of "Westernized or globalized" foods are the increasing drivers of adverse health effects in the urban East African population.

Diversity of food patterns can be explained by the diverse ethnic and racial groups. Steyn (2005) from a nutritional point different types of nutrient intakes of the two racial groups in South Africa could be explained by their different food group's intake. Whites had higher fat and saturated fat intakes based on their high consumption of meat, full-cream dairy products, and vegetable fats, and the blacks had high cereal consumption, low intake of fruit and vegetables.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter deals with the methodology used for the research. It presents the research approach, research design, study area, population of the study, sample and sampling procedure, data collection instrument, data collection procedures, and data analysis.

3.1 Research design and methods

The study employed a descriptive cross sectional survey design to achieve its objectives. Orodho (2005) states that descriptive survey research design enables the collection of information about people's attitudes, opinions, values and behaviour on educational or social issues. It is a systematic method of studying behaviour that cannot be observed or experimented without manipulating the environment. This design was suitable in investigating and collecting information about the attitudes, opinions and experiences regarding knowledge of diet-related chronic diseases and dietary practices among students in tertiary institutions in the Ho Municipality, Ghana.

3.2 Data collection and tools

The research instruments employed in this study were a semi-structured questionnaire, which demographic information on respondents, knowledge of diet-related chronic diseases and frequency of food intake from different groups.

The respondents were interviewed individually and by the researcher and two trained assistants. Efforts were made to ensure high accessibility and response rate. The research team visited the various schools armed with a letter of introduction obtained from the researcher's department to obtain permission to interview the respondents. The research team

explained the nature and purpose of the study, using the consent form. The respondents were made to understand that all information they provided would be treated with confidentiality and used only for the purposes of research only. Respondents who were willing to be part of the study signed the consent forms before interviewing commenced. Data collection covered a period of 3 weeks to complete 27th January to 19th February 2017. In all a total of 273 respondents were interviewed.

3.3 Study population

Lokesh (2004) defines a target population as a large population from which a sample population is to be selected. The population for the study encompasses tertiary students studying at universities in Ho Municipality of Ghana. The study population included students of University of Cape Coast College of Distance Education (UCC CoDE), Mawuli Senior High School study centre and Evangelical Presbyterian University College (EPUC) in Ho.

3.4 Study variables

This section of the study looks at the dependent variables and Independent Variables. It also discusses how the variables were used and measured. The independent variable in the study is the knowledge of diet-related chronic diseases whilst the dependent variable is dietary practices. The dependent variable is defined in to two, healthy dietary practices and unhealthy dietary practices.

3.5 Sampling method and procedure

The sample size was estimated using Raosoft sample size calculator, (2004). Precision level was 5% at 95% confidence level and population size of 2000 with an estimated 23.5% prevalence of hypertension (Simao et al, 2008). The estimated sample size was 273.

A sample was selected from the target population using proportion allocation formula in selecting from the two schools. Since respondents were from different schools (strata), the selection of the 273 respondents from each stratum was determined by applying the proportional allocation formula: $n_h = \frac{N_h}{N} x273$, where n_h denotes the number of samples to be selected from stratum *h;* N_h denote the total number of elements (students) in stratum *h;* and *N* the total population. The table below is the summary of the sampling results.

Table 3.3 Sample Size Calculation

School	**Population of students**	**Proportion allocation**
EPUC	2004	$\frac{2004}{2887} \times 273 = 190$
UCC CoDE	883	$\frac{883}{2887} \times 273 = 83$
Total	**2887**	**273**

According to Trochim (2006), sampling is the process of selecting units such as people or organization from a population of interest. Wimmer and Dominick (2003) state that a sample is a representative subset of a population. This study used the purposive sampling technique to gather qualitative data. Purposive sampling, also known as judgmental, selective or subjective sampling is a technique by which a researcher makes deliberate choice of an informant due to the qualities the informant possesses. This is a type of non-probability sampling technique.

The Ho Municipality was purposively selected because of its diversity and contained a lot of the university colleges. The total number of universities within the municipality was six. The universities were purposively selected for the study and they had the characteristics desired.

Purposive sampling was used to select the respondents present during class hours. The researcher and research assistants approached students individually and interviewed them after informed consent was obtained.

3.6 Pre-testing

The questionnaire was pretested at Ho Technical University which had similar characteristics to the data collection sites. The questionnaire was pretested to:

(a) check its validity and reliability;

(b) assess the respondents understanding of the questionnaire;

(c) document the time duration for answering each questionnaire; and

(d) give the researcher the opportunity to make necessary corrections and modify the questionnaire as appropriate.

After pretesting, some questions had to be rephrased and those that were not relevant were removed.

3.7 Data handling

The raw data obtained out of a study amounts to nothing if it cannot be transformed into information to be used for decision making (Emory et al., 2003). The data was edited to detect and correct possible errors and omissions that were likely to occur, to ensure accuracy and consistency across responses.

3.8 Data analysis

Data analysis refers to the reduction of the raw data into a more convenient size, developing summaries and applying statistical inferences. Consequently, the following steps were taken to analyze the data for the study. Both descriptive and inferential statistics were computed using both SPSS version 23 and Microsoft Excel 2016. The descriptive statistics employed frequency tables; pie and bar charts. The inferential analysis employed binomial tests to categorize the proportion of participants who agreed or disagreed with specific statements and questions. At a significant level of 5%, Chi-square tests were used to ascertain the relationships between knowledge of diet-related chronic diseases and dietary practices among university students of Ho Municipality. Results are considered statistically significant at a $p<0.05$.

3.9 Ethical consideration

It is very important to adhere to ethical issues in any serious research work. Ethical approval was obtained from the Ensign College of Public Health (ECOPH) Review Board; administrative approvals were obtained from EPUC and UCC CODE. An introductory letter was obtained from the Dean of Public Health Department, ECOPH to inform and seek the permission and consent of management of the educational institutions and respondents. Respondents were assured of the researcher's absolute adherence to the tenets of ethics which include respect for respondents' dignity, confidentiality and autonomy.

3.10 Limitations of the study

The study was limited to tertiary students in the Ho Municipality, so findings may not be applicable to other organizational settings. Also, institutional-based surveys cannot capture information about out-of-school youth who equally face NCD risks.

3.11 Assumptions

The study is important and findings will contribute to the body of literature on students' knowledge of diet-related chronic diseases and dietary practices in the country. The study would be of significance to policy makers, schools, students and health institutions since it will generate information on students' knowledge of diet-related chronic diseases and dietary practices, and consequently guide the adoption of feasible and effective mechanisms to control the problem of chronic NCDs.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter presents the results from the study using tables and charts.

4.1 Demographic characteristics of participants

Table 4.1: demographic distribution of university students in the Ho Municipality

Variables	Categories	Frequency N (%)
Gender	Male	146 (53.5)
	Female	127 (46.5)
Age	18-25	59 (21.6)
	26-33	160 (58.6)
	34-41	40 (14.7)
	42-49	12 (4.4)
	50-57	2 (0.7)
Religion	Christian	255 (93.4)
	Muslim	12 (4.4)
	Traditionalist	6 (4.4)
Marital Status	Single/Never married	176 (64.5)
	Married	77 (28.2)
	Co-habitation	14 (5.1)
	Widow/Widower	3 (1.1)
	Divorced	3 (1.1)

Note: Data is presented in frequencies and percentages

About 54% of the respondents were mail and majority of the respondents were between the ages of 26 to 33years (table 4.1). About 93% of the respondents were Christians and 65% were single or never married (table 4.1).

4.2 Knowledge about hypertension, diabetes and obesity

This section sought students' knowledge of diabetes, hypertension and obesity based on their awareness, causes and preventions.

Table 4.2: Knowledge of diet-related chronic diseases and their causes.

Variable	**Category**	N (%)
Awareness	Have heard	268 (98.2)
	Have not heard	5 (1.8)
Causes of diet-related chronic diseases	Environment	43 (15.8)
	Lifestyle	165 (60.4)
	Family	22 (8.1)
	Microbes	11 (4.0)
	Don't know	32 (11.7)

N represents frequencies and % represents percentages

About 98% of respondents had knowledge about diabetes, hypertension and obesity and 60% indicated that lifestyle choices led to diet-related chronic diseases (table 4.2)

Table 4.3: Knowledge of the role of risk factors in the development of diet-related chronic diseases

Risk Factors		Number (%)
Food	Agree	250 (93)
	Disagree	19 (7)
Obesity	Agree	240 (90)
	Disagree	27 (10)
Childhood diet	Agree	233 (86)
	Disagree	38 (14)
Habit	Agree	243 (91)
	Disagree	24 (9)
Transmitted from one person to another	Agree	86 (32)
	Disagree	183 (68)

Data is presented in frequencies and percentages; $\alpha<0.05$ meaning the measure is statistically significant.

Food, obesity, childhood diet and habit has were the most cited factors related to causes of diet-related chronic diseases (table 4.3)

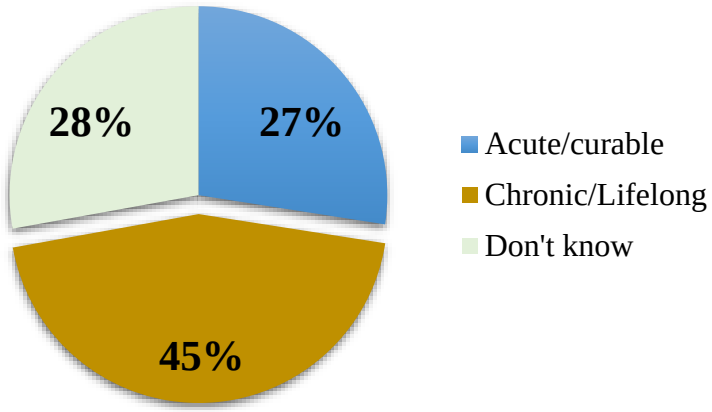

Figure 4.1: Knowledge of respondents about courses of diet-related chronic diseases

About 45% of participants indicated that the course of the disease is acute/curable and 27% indicated the diseases were chronic/life-long (figure 4.1).

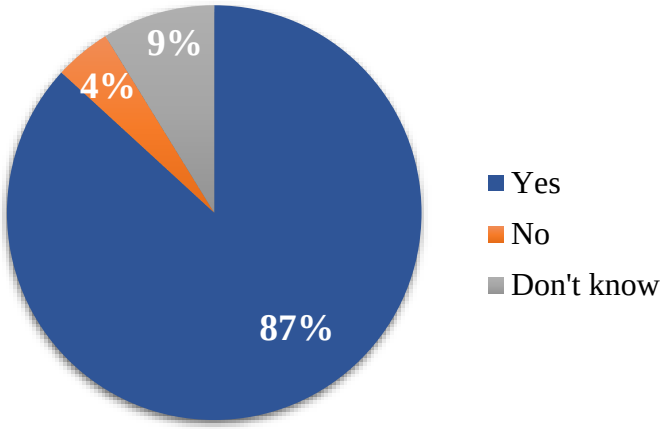

Figure 4.2: Knowledge of whether diet-related chronic diseases are serious conditions

Majority (87%) of the respondents; indicated that diet-related chronic diseases were a serious condition, whilst 4% indicated that they were not serious conditions (figure 4:2)

Table 4.4: Knowledge of appropriate treatment of diseases and whether the diseases are preventable

Variables	Categories	N (%)
Appropriate treatment for diet-related chronic diseases	Orthodox medical care	96 (35.2)
	Traditional care	28 (10.3)
	Change in lifestyle	120 (44.0)
	Being active	17 (6.2)
	Don't know	12 (4.3)
Knowledge of whether diet-related chronic diseases are preventable	Yes	265 (97.1)
	No	3 (1.1)
	Don't know	5 (1.8)

Note: N represents frequencies and % represents percentage distributions

About 44 % of the respondents indicated that the appropriate treatment for diet-related chronic diseases were a change in lifestyle, 35% indicated orthodox medical care, and 10% reported traditional care (table 4.4)

Table 4.5: Knowledge of measures to control diet-related chronic diseases

Indicator		N (%)
Is it necessary to monitor one's blood pressure, sugar level and bodyweight in order to control the diseases	Yes	264 (99)
	No	4 (1)

N represents frequencies; % represents percentages

Source: Field Survey, 2017

Majority of the respondents indicated that it is necessary to monitor one's blood pressure, sugar level and body weight in order to control diet-related chronic diseases. (Table 4.5)

Table 4.6 Knowledge of importance to maintain treatment records and history of family member suffering diet-related chronic disease

Variables	Frequency (%)
Whether is important to maintain record treatment	
Yes	241 (88.0)
No	33 (12.0)
Whether any family member suffer the disease	
Yes	101 (37.0)
No	129 (47.3)
Don't know	43 (15.8)

Data presented are frequencies and percentages

From the above table (4.5), majority of the respondents; indicated that it is important to maintain record of treatment, for the following reasons:-, In order to keep track record of how the diseases are treated and serve as record for health status and reference for future medication, In order to know what to do in case it occurs again, In order to monitor progress of treatment and maintain one's health status, It helps to know how you are doing medically, It will serve as a guidance for the patient, it helps you to know your current health status, to check the prevalence of disease, to check whether there is improvement or not, to know how to control and prevent should subsequent issues occur, to know the rate at which the patient is responding to treatment and to know whether there is improvement.

Again, 37.0% of the respondents indicated that their family members suffer from the diet related chronic diseases and 47% indicated that none of the family members suffer from the diet-related chronic diseases.

Furthermore, on the effect of the diet-related chronic diseases on personal life of the suffer, those whose indicated that their family members suffer diet-related chronic diseases stated the following effects: Disability, wound takes long time to heal, Always sick and becomes, Amputation of legs and death, Body pains and becomes weak and easily gets fever, Constant illness and difficulty of wounds to heal, Death, stunted growth and difficulty in movement, Depression, loss of self-esteem, socially discomfort and financial stress, Stigmatization and gradually becomes an introvert, It damages the brain and other internal organs, Restricted lifestyle in terms of not participating in certain activities, Unstable health condition limits happiness and also taking medicine daily is frustrating to the individual.

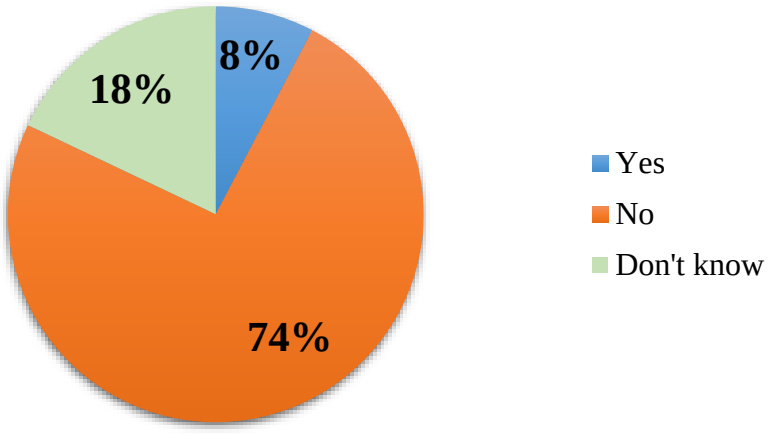

Figure 4.3: Incidence of diet-related chronic diseases among respondents

About 8% of the respondents indicated that they were experiencing diet-related chronic diseases, whilst 74% indicated they were not experiencing diet-related chronic diseases

(figure 4.4) participants who were experiencing the disease got to know their status through regular check up at the hospital, and health screening at work place.

4.7 Dietary practices of students

Table 4.7: Drinks normally taken

Variables	Number (%)
Milk, including fresh, tinned, or powdered milk	124 (45.4)
Tea leaf	112 (41.0)
Coffee	59 (21.6)
Cocoa drink such as Milo, Vita milk, Choco Shake, or any other cocoa drink	64 (23.4)
Yogurt drink	138 (50.5)
Fresh juice made from fruit	101 (37.0)

Data is presented in frequencies and percentages

About 45.5% of the respondents indicated that they normally take milk and milk products and 37% indicated that they normally take fresh juice made from fruits (table 4.7)

Table 4.8: Categories of food normally eaten by respondents daily

Category		Number (%)
Cereals and grain foods (Rice Porridge, Koko, Ekuegbemi, Oblayo, Akple, Banku, Oats, Boiled Rice, Jollof Rice, Abolo, Spageti, Tuozafi, Bread, Kenkey)	Yes	187 (96)
	No	8 (4)
Starchy roots and plantain (Fufu, Konkonte, Gari, Yams, Cocoyam, Potatoe, Plaintain)	Yes	116 (59)
	No	79 (41)
Fruits (Ripe Mangoes, Ripe Pawpaw, Banana, Pineapple, Apple, Avocado Pear, Orange, Tangerine, Watermelon, Other fruits)	Yes	134 (69)
	No	59 (31)
Vegetables (Kontomire stew, Borkorborkor stew, Gboma soup, Adem soup, Aleefi stew, Bitter Green leaves soup, Tomato sauce, Garden egg stew)	Yes	137 (74)
	No	48 (26)
Animals and animal products (Meat, Fish, Eggs, Crab, Snail, Milk/Fresh powdered, Cheese, One-man thousand)	Yes	155 (84)
	No	29 (16)
Legumes, nuts and oily seeds (Koose/Akala, Egushie stew, RedRed, Wakye, Bambara beans, Groundnut, Soya Khebab, Cashew nuts)	Yes	129 (68)
	No	60 (32)
Fats and oil (Vegetables oils, Palm oil, Margarine, Butter, Foods made with oils such as stew or soup, Mportompoto, Aprapransa, Yam Chips, Yam oto, Plantain oto, Margarine, Bofrot, Spring rolls)	Yes	149 (78)
	No	41 (22)
Snack (Yogurt, Meat Pie, Pastry, Biscuits, Cakes, Rock, Buns, Plantain Chips, Spring Rolls, Candies, Chocolates)	Yes	107 (58)
	No	76 (42)

Data is presented in frequencies and percentages

The variables above are categories of food normally taken daily. From above, group 1 are those who said yes to the various categories of food normally taken daily whiles group 2 are those who said no. Majority of the respondents unanimously agreed with the respective of categories of food normally taken daily (table 4.8).

Table 4.9: Number of days different categories of food are eaten per week

Category of food	Number of days
Cereals and grain foods (Rice Porridge, Koko, Ekuegbemi, Oblayo, Akple, Banku, Oats, Boiled Rice, Jollof Rice, Abolo, Spageti, Tuozafi, Bread, Kenkey)	5
Starchy roots and plantain (Fufu, Konkonte, Gari, Yams, Cocoyam, Potatoe, Plaintain)	3
Fruits (Ripe Mangoes, Ripe Pawpaw, Banana, Pineapple, Apple, Avocado Pear, Orange, Tangerine, Watermelon, Other fruits)	4
Vegetables (Kontomire stew, Borkorborkor stew, Gboma soup, Adem soup, Aleefi stew, Bitter Green leaves soup, Tomato sauce, Garden egg stew)	4
Animals and animal products (Meat, Fish, Eggs, Crab, Snail, Milk/Fresh powdered, Cheese, One-man thousand)	5
Legumes, nuts and oily seeds (Koose/Akala, Egushie stew, RedRed, Wakye, Bambara beans, Groundnut, Soya Khebab, Cashew nuts)	3
Fats and oil (Vegetables oils, Palm oil, Margarine, Butter, Foods made with oils such as stew or soup, Mportompoto, Aprapransa, Yam Chips, Yam oto, Plantain oto, Margarine, Bofrot, Spring rolls)	4
Snack (Yogurt, Meat Pie, Pastry, Biscuits, Cakes, Rock, Buns, Plantain Chips, Spring Rolls, Candies, Chocolates)	4

Table 4.10: Relationship between students' knowledge of diet-related chronic diseases and dietary practices

Knowledge of disease (diabetes, hypertension and obesity)	Mean DDS	P-value
Good	4.91 ± 1.54	0.00
Poor	1.51 ± 0.91	0.00

Source: Field Survey, 2017

Knowledge of diet related chronic diseases had a significant association with dietary practices ($P < O.001$) (table 4.10).

CHAPTER FIVE

DISCUSSION

5.1 Introduction

Diet-related chronic diseases are public health and developmental problems that pose challenges to limited and poorly distributed health workforce and facilities in Ghana. Adults in their productive age are affected, pushing individuals and households into poverty and long-term health and economic burdens. The burden of NCDs is rising and shifting towards the young population (Rahul et al., 2014). Behaviours that begin or are reinforced during adolescence, including poor eating habit and lack of exercise among others have contributed to the development of obesity, diabetes and hypertension among the youth. This chapter discusses the key results collected from the field.

5.2 Students' knowledge about obesity, diabetes and hypertension

The study sought to investigate tertiary students' awareness of diabetes, hypertension and obesity and their understanding about causes, prevention, management and the burden of these diseases. The results indicated that tertiary students in the Ho Municipality had good knowledge of diet-related chronic diseases. This particular finding was however in contradiction to the findings of a study conducted among four universities in Uganda which revealed that 67% of tertiary students did not know what NCDs are. Also a study by de-Graft et al. (2014) on chronic non-communicable diseases and the challenge of universal health coverage also reported a high prevalence of chronic non-communicable diseases amongst individuals but low awareness and knowledge.

High knowledge rate on diet-related chronic diseases among tertiary students in the Ho municipality can be attributed to increase in the sources of information on diet-related

chronic diseases. A qualitative study by de-Graft Aikins et al. (2012) found 5 main sources of information on diet-related chronic diseases: The lay community with specific references to friends, relatives and work colleagues with chronic conditions (cancer, diabetes, hypertension, asthma, epilepsy, rheumatism); Public health education by healthcare providers; Mass media e.g. radio and television, Church (education by doctors on epilepsy and education by people with diabetes); and Public transport (especially on long haul journeys).

Results of knowledge in the of area causes of the diseases shows majority of the students identified lifestyle as the major causes of NCDs. It was not surprising that almost half of the students stated that change in lifestyle was appropriate in preventing NCDs. Despite the high knowledge rate about NCDs, many of them on did not know that family history can be an indication of hypertension, obesity and diabetes risk. A recent study in Thasongyang reported the risk of pre-diabetes among those with a family history of diabetes Kinyua, (2013). This implies that there is the need to intensify education on the heredity nature of hypertension, diabetes and obesity.

There is the likelihood that the high rate of knowledge on diet-related chronic diseases among tertiary students in the Ho municipality may aid them to take actions that may help in decreasing the risk of contracting diet-related chronic diseases since majority of the risk factors are modifiable (Al Hamarneh, Crealey and McElnay, 2011.) Most of the policies geared towards the prevention of NCDs, are mostly of curative dimensions rather than preventive measures. Policy operations that focus on preventive intervention are beneficial. However, behavioral changes serve as a fundamental tool for measuring effective preventive interventions. That is the longing desire to change certain lifestyle that will prevent people

from developing certain diseases (Aseidu 2015). This means that individual's knowledge concerning non-communicable diseases is of great importance. Having knowledge means understanding the risk, symptoms and lifestyle practices that influences its development. Thus good knowledge about non-communicable risk factors of chronic diseases in the respect of awareness of the existence of the disease is expected to influence an individual to take actions that will prevent them from contracting NCDs.

Through literature it has been noted that though knowledge plays a role in individual health decision, knowledge alone is not enough (de-Graft Aikins, 2010). The social cognitive theory emphasize that behavior is defined not by knowledge or awareness alone but by several determining factors, this means the social and the physical environment of the students should be improved to help them put into practice their knowledge of diet-related chronic diseases to their benefits. Even though the social cognitive theory emphasize that behavior is defined not by knowledge or awareness alone but by several determining factors it cannot be denied that knowledge about non-communicable disease and its modifiable risk factors is a vital pre-requisite to change the individuals' consumption habits and lifestyle practices (Becker et al, 1977).

Finally, this result might also imply that the Regenerative Health Programme initiated by the Ghana Health Service a few years ago to educate people on some chronic diseases was making impact (Nti et al., 2012).

5.3 Students' dietary practices

According to (Demory-Luce, 2016), sound nutrition can play a role in the prevention of several chronic diseases, including obesity, coronary heart disease, and certain types of cancer, stroke, and type 2 diabetes. To help prevent diet-related chronic diseases, researchers

have proposed that healthy eating behaviors should be established in childhood and maintained during adolescence. Regular eating practices and healthy food choices from the six food groups ensure young adults to meet their nutritional requirements for growth and health maintenance.

The results of the study indicated that tertiary students in the study consume various categories of food on the average 5 days in a week which is in agreement with results of a previous study at Lebanon University by Yahia et al., (2008) that reported majority of students consumed regular meals. Foods mostly consumed were cereals and cereal products. Most vegetables were consumed mainly in stews and soups with fish, meat or poultry. The consumption of fruits was high. This is an indication that most students are meeting their daily nutrient requirements. A good diet plays a role in the prevention of several chronic diseases, including obesity, coronary heart disease, and certain types of cancer, stroke, and type 2 diabetes. Nutrition knowledge influences healthy food choices and good dietary practices. This finding may imply that the respondents have good nutrition knowledge.

The results also revealed that there is high daily intake of fruits and vegetables by students, more than half of the students ate fruits and vegetables every day. This finding disagrees with a previous study in Lebanon University that reported low daily intake of fruits and vegetables by female students (25.8% and31.5%). It has been identified that regular inclusion of fruits and vegetables in the diet of young people daily are needed to combat malnutrition and reduce the risk of overweight and obesity. (Naik and Kaneda, 2016). As a result countries such as Bhutan, Indonesia, Nepal, and the Philippines are undertaking an initiative called Vegetables-Go-to-School by establishing comprehensive school vegetable gardens. (Naik and Kaneda, 2016.

The students' choice of snacks reflects those high in sugar, refined products and high in fats compared to healthy snacks. This shift shows nutrition transition associated with poor dietary practices linked to rising risks of overweight and obesity in developing countries (WHO, 2002). Students' attraction to these foods could be due to their palatability, convenience, ease of availability and affordability in many food places where students consume their meals. This agrees with a previous study in Lebanon that showed high consumption of fried foods by university students (Yahia *et al*, 2008). Educating them is expected to assist them choose more healthy snacks. Also the results shows that more than half of the respondents ate snacks 4 times in a week. However, other studies have identified that college students ate snacks 3 to 5 times per day (Khan and Lipke, 1982, Jakobovits, et al., 1977)

5.4 Relationship between students' knowledge of Diet-related Chronic Diseases and Dietary Practices

This section intends to use the Chi-square analysis to explore the relationship between the students' awareness of chronic disease and dietary practices in the two universities in the Ho municipality. A significant positive association was observed between individual tertiary students' awareness of NCD and their dietary practices. This implies that as awareness of NCDs increases, food diversity consumption also increased. The finding that knowledge of diet-related chronic diseases had a significant association with dietary practices is in agreement with the study by (Nti et al., 2012) which also found a significant association between knowledge of diseases and dietary diversity. Thus, as knowledge of the diseases increased, dietary diversity also improved. Findings from this study are inconsistent with studies on the assessment of dietary practice among diabetic patients in the United Arab Emirates and Riyadh, Saudi Arabia that indicated inadequate dietary practice (Mohamed et al.2013; Al-

Kaabi et al. 2008). Another study on compliance and control of diabetes in a family practice setting in Saudi Arabia indicated 60% poor diet compliance (Khattab, et al. 1999).

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

The way people eat and their lifestyles have resulted in chronic diseases increasingly affecting both the young and older population. Analyzing patterns of food consumption are an important focal point for understanding the role of diet in disease risk.This chapter deals with summary of findings of the study. Conclusions are drawn based on the findings and recommendations made based on the objectives.

6.1 Summary of findings

The purpose of the study was to examine tertiary students' knowledge of hypertension, diabetes and obesity; assess their dietary practices and examine the relationship between knowledge of diet-related chronic diseases and dietary practices. Most respondents were knowledgeable of the 3 diet-related chronic diseases diabetes, hypertension and obesity.

Majority of respondent's identified lifestyle choices and the environment as the major causes of diet-related chronic diseases. With regards to dietary practices, respondents normally took milk, tea, coffee, cocoa drinks, yoghurt and fresh juice made from fruit. Averagely, Cereals and grain foods, and animal products were normally taken 5 times in a week. Also, Fruits, vegetables, fats and oils and snack were normally taken 4 times a week, whilst and starchy roots and plantain, legumes, nuts and oily seeds were normally taken 3 times in a week.

Results showed that students' knowledge of diet-related chronic diseases was significantly associated with dietary practices.

6.2 Conclusion

University students in the Ho Municipality had good knowledge about hypertension, obesity and diabetes in terms of their causes, prevention, management and the burden of the diseases.

Most students consumed variety of foods from the major diferent food groups about 5 days in a week.

Knowledge of diet-related chronic diseases was significantly associated with dietary diversity As knowledge of the diseases increased, dietary diversity also improved.

6.3 Recommendations

6.3.1 Ghana Health Service (GHS)

A significant relationship was observed between students' knowledge of diet-related chronic diseases and their dietary diversity; this implies that as awareness of diet-related chronic diseases increase, dietary diversity improve. Based on the findings, the study recommends that nutrition educational programmes of the GHS should increase awareness and knowledge on diet-related chronic diseases.

6.3.2 School Management

1. The managers of schools should include nutrition education in the curriculum of first year students in tertiary institutions, in order to provide students with appropriate information and advice that will enable them to better understand the causes and consequences of diet-related chronic diseases importance of healthy diets.

2. Enhancing enabling environments where students can access wide range of nutrition information beyond the classroom set up.

3. Formation of health clubs where members would be sensitize about the dangers of these diseases that are slowly eating up the young adults today.

4. Food sales within university premises should be guided by nutrition principles to ensure provision of varied, well-balanced meals for students

6.3.3 Future Research

It would be more prudent to conduct research on the prevalence of obesity, hypertension and diabetes among tertiary students, and to measure knowledge on other risk factors associated with diet-related chronic diseases.

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APPENDICES

QUESTIONNAIRE

STUDENTS KNOWLEDGE OF DIET – RELATED CHRONIC DISEASES ON DIETARY IN THE HO MUNICIPALITY OF THE VOLTA REGION, GHANA

Section A. Background, socio-economic and demographic information

Participant code _____

Interviewer code _____

QUE.NO	CODE	QUESTION	RESPONSES	
1	NATLY	Nationality of respondent	1. Ghanaian 2. Other (specify) ……	
2	UNINAM	Name of University	1. UHAS 2. E. P. University	
3	LENSTAY	How long have you been in this University?	1. one year 2. two years 3. three years 4. four years 5. five years other 6. (specify) ……	
4	GENDER	Gender	1. Male 2. Female	
5	AGE	Age	……	
6	MARSTAT	.Marital status	1. Single/never married 2. Married 3. Co-habiting 4. Widow/widower 5. Divorced	
7	ETHNCT	Ethnicity	1. Ewe 2. Akan 3. Ga 4. Hausa 5. Others(specify)	
8	OCCUPTN	Occupation?	1. Full-Time Student 2. Trade/Businessman 3. Farmer 4. Civil Servant/public servant 5. Artisan/Vocational 6. Others (specify) ……	

9	FATOCCU	What is the occupation of father?	1. Trader/ Businessman 2. Farmer 3. Civil Servant 4. Other (specify) ……	
10	MATOCCU	What is the occupation of mother?	1. Trader 2. Farmer 3. Civil Servant 4. Other (specify) ……..	
11	RELIGN	Religion	1. Christian 2. Muslim 3. Traditionalist 4. Other (specify) ……	
12	EDUQUAL	Highest educational qualification of mother	1. None 2. Basic/primary 3. J.H.S 4. S.H.S 5. Tertiary 6. Others (specify) ……	
13	HSEHOLD	How many people are in your household?	……..	

SECTION B

KNOWLEDGE OF DIET –RELATED CHRONIC DISEASES

14	HERDABT	Have you heard about these disease conditions? **Diabetes, Hypertension and Obesity**	1. Have heard 2. Have not heard	
15	DICAUSE	What are the Causes of these diseases	1. Environment 2. Lifestyle 3. Family 4. Microbes 5. Witches 6. Don't know 7. Other (specify) _____	
16	FOODRES	Do you think food is responsible for such diseases?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
17	OBESROL	Do you think obesity has any role in the development of diabetes and hypertension?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
18	CHLHDIET	Do you think childhood diet has any influence in the development of these diseases?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
19	HABTROL	Do you think habit is responsible for the development of the diseases?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
20	TRANSMT	Can the diseases be transmitted from one person to the other?	1. Strongly disagree 2. Disagree 3. Neither Agree nor disagree 4. Agree 5. Strongly Agree	
21	COURSE	Is the Course of the diseases	1. Acute/ curable 2. Chronic/ Lifelong 3. Don't know	

22	DISROUS	Are the diseases a serious condition?	1. Yes 2. No 3. Don't know	
23	HWSROU	How serious are these diseases?	1. Life threatening 2. Not life threatening 3. Don't know	
24	TRMENT	Appropriate treatment for these diseases?	1. Orthodox medical care 2. Traditional care 3. Change in lifestyle 4. Being active 5. Other (specify) …….. 6. Don't know	
25	PRVNTBL	Do you consider these diseases as preventable?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
25	MONPRES	Is it necessary to monitor one's blood pressure, sugar level and body weight in order to control the disease?	1. Strongly Agree 2. Agree 3. Neither Agree nor disagree 4. Disagree 5. Strongly Disagree	
25	TRETPLCE	U	1. Hospital 2. Traditional 3. Self-medication 4. No treatment 5. Other (specify)	
26	RECTRET	Is it important to maintain record of treatment?	1. Yes 2. No **If No Skip 27**	
27	WHYES	If Yes Why	…… …… …….	
28	FAMSUFF	Do any of your family members suffer from these diseases?	1. Yes 2. No 3. Don't know	
29	EFFTPER	What are some of the effect of these diseases on personal life of sufferers?	…… …… …… …… …… …… ….....	
30	EFFTFAM	What are some of the effect	……	

		of these diseases on family members?	…… …… …… …… …… …….	
31	EXPDISE	Are you experiencing any of these diseases?	1. Yes 2. No 3. Don't know	
32	STATKWN	How did you get to know your status?		

SECTION C

FOOD FREQUENCY QUESTIONNAIRE

I would like to please ask you some questions about drinks that you may have had ***yesterday*** during the day or at night. For each item on the list, read the question below and tick

"1" for "yes", "2" for "no" and "9" for "don't know"

Did you drink/take any [item from the list] yesterday?

S/N	*ITEM*	*YES (1)*	*NO (2)*	*DON'T KNOW (9)*
33	Milk Drink, Yogurt, Fan Milk, Milk Shake	☐	☐	☐
34	Soft Drinks e.g. Fanta, Cocacola	☐	☐	☐
35	Pito, Brukutu, Solom,	☐	☐	☐
36	Palm Wine, Beer, Gin, Akpeteshie	☐	☐	☐
37	Tea, Coffee, Cocoa	☐	☐	☐
38	Fresh fruit drink	☐	☐	☐
39	Any Other Specify	☐	☐	☐

Next I would like to please ask you some questions about foods you ate ***yesterday*** during the day or night. I would like to know everything that you ate, whether at home or someplace else. ***Do not read the list below***. Just let her tell you what she ate. Circle each food and tick ***"1" for "yes", "2" for "no" and "9" for "don't know"***

S/N	*ITEM*	*YES (1)*	*NO (2)*	*DON'T KNOW (9)*
40	Rice Porridge, Koko, Ekuegbemi, Oblayo, Akple, Banku, Oats, Boiled Rice, Jollof Rice, Abolo Spageti, Tuo Zafi, Bread, Kenkey	☐	☐	☐
41	Fufu, Konkonte, Gari, Yams, Cocoyam, Potatoe, Plantan	☐	☐	☐
42	Ripe Mangoes, Ripe Pawpaw, Banana, Pineapple, Apple, Avocado Pear, Orange, Tangerine, Watermelon, Other Fruits	☐	☐	☐
43	Kontomire Stew, Borkorborkor Stew, Gboma Soup, Adem Soup, Aleefi Stew, Bitter Green Leaves Soup, Tomato Sauce, Garden Eggs Stew	☐	☐	☐
44	Meat (Chicken), Fish, Eggs, Crab, Snails, Insect, Milk/Fresh Powdered, Cheese, one man thousand	☐	☐	☐
45	Koose/Akala, Egushie Stew, RedRed, Wakye, Bambara beans, Groundnut, Soya Khebab, Cashew Nuts	☐	☐	☐
46	Vegetable Oils, Palm oil, Margarine, Butter , Foods made with oils such as Stew or Soup, Mportompoto, Aprapransa, Yam Chips, Yam Oto, Plantain Oto, Margarine, Jollof, Fried Yam, Meat Pie, Fried Plantain, Plantain Chips, Bofrot, Spring Rolls	☐	☐	☐
47	Yogurt, Meat Pie, Pastry, Biscuits, Cakes, Rock Buns, Plantain Chips, Spring Rolls, Candies, Chocolates	☐	☐	☐
48	Other Specify	☐	☐	☐

Now I would like to ask you some questions about foods you ate ***last seven days.*** Since last {SAY DAY, *SAME AS INTERVIEW DAY*}. For each food I ask about, please tell me how many days in the last seven days you think you ate that food. 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 chicken, onions, and tomatoes, you should say "yes" when I ask about meat from birds, and again "yes" when I ask about vegetables.

However, if you only had the soup, not the chicken, do not say "yes" to the meat from birds because you did not eat it. ***For each item on the list, read the question below and fill in the number of days the respondents says (0-7). If the respondents do not know, write "9"***

S/N	FOOD	NUMBER OF DAYS TAKEN
49	Rice Porridge, Koko, Ekuegbemi, Oblayo, Akple, Banku, Oats, Boiled Rice, Jollof Rice, Abolo Spageti, Tuo Zafi, Bread, Kenkey	[……..]
50	Fufu, Konkonte, Gari, Yams, Cocoyam, Potatoe, Plantan	[……..]
51	Ripe Mangoes, Ripe Pawpaw, Banana, Pineapple, Apple, Avocado Pear, Orange, Tangerine, Watermelon, Other Fruits	[……..]
52	Kontomire Stew, Borkorborkor Stew, Gboma Soup, Adem Soup, Aleefi Stew, Bitter Green Leaves Soup, Tomato Sauce, Garden Eggs Stew	[……..]
53	Meat (Chicken), Fish, Eggs, Crab, Snails, Insect, Milk/Fresh Powdered, Cheese, one man thousand	[……..]
54	Koose/Akala, Egushie Stew, RedRed, Wakye, Bambara beans, Groundnut, Soya Khebab, Cashew Nuts	[……..]
55	Vegetable Oils, Palm oil, Margarine, Butter, Foods made with oils such as, Stew or Soup, Mportompoto, Aprapransa, Yam Chips, Yam Oto, Plantain Oto, Margarine, Jollof, Fried Yam, Meat Pie, Fried Plantain, Plantain Chips, Bofrot, Spring Rolls	[……..]
56	Yogurt, Meat Pie, Pastry, Biscuits, Cakes, Rock Buns, Plantain Chips, Spring Rolls, Candies, Chocolates	[……..]

CONSENT FORM

Title of study: Knowledge of Diet-Related Chronic Diseases on Dietary practices among University Students in the Ho Municipality of Ghana

Principal Investigator: Rebecca Fenuku

Address: Department of Community Health, Ensign College of Public Health, Kpong. P.O. Box AB 136, Akosombo, Ghana.

Email: rebeccafenuku@st.ensign.edu.gh

Co-investigator: Moses K. Klevor

Address: Department of Clinical Nutrition and Dietetics, School of Allied Health Sciences, University of Cape Coast. University Post Office, Cape Coast. Ghana

E-mail:moses.klevor@ucc.edu.gh

Introduction

My name is Rebecca Fenuku, a final year Masters in Public Health student at Ensign College of Public Health, Kpong, in the Eastern Region of Ghana. I am doing a research on the knowledge of diet-related chronic diseases and association with dietary practices among University students in the Ho Municipality.

Purpose of Research

Diet-related chronic diseases have experienced a remarkable rise in their prevalence in recent times, particularly in developing countries. Such diseases are accounting for majority of the disability and deaths among adults in most parts of the world. Lack of knowledge about the causes and consequences of these diseases play a major role in their increasing prevalence. It is important to gain an understanding of the levels of knowledge of these diseases and their relation to dietary practices among the youth, in order to inform policy makers and health personnel about the appropriate steps to take to curb this rising global epidemic.

The Ho Municipality is equally affected by the increasing prevalence of diet-related chronic diseases, which have negative implications for the socioeconomic development of the country.

This research is being conducted to find out about University students' knowledge on the following diet-related chronic diseases: hypertension, diabetes and obesity, and how this knowledge affects dietary practices.

Study procedure

If you agree to participate in this study, we will complete an interview with you at your University. The interview will take about one hour of your time, and will involve the administration of a questionnaire. We will ask you some questions regarding your knowledge of hypertension, diabetes and obesity, and your dietary practices in relation to these diseases.

Participant Selection

You are being invited to participate in this research because your school is one of the Universities in the Ho Municipality that has been selected to be part of this study. All students aged 18 years and above are eligible to participate in this study.

Benefits;

If you decide to participate in this research, there will be no direct benefit to you. Your participation will indirectly benefit the Ho Municipality and other parts of the country by helping us to gain an understanding of the levels of knowledge about hypertension, diabetes and obesity, and dietary practices, to inform policy makers and health personnel to help implement intervention programmes that can save lives.

Possible Risks and Discomforts

There are no physical risks involved in participating in this study.

Confidentiality

All information we collect from you will be confidential, which means that we will not tell anyone what you say, or give out any information about you. Only the researchers will have access to this information. You will not be named in any oral or written reports, and no individual reference will be made that could be linked to your information.

Compensation

There is no compensation and there are no costs to you for being in the study.

Voluntary Participation and Right to Leave the Research

You are invited to participate in this study, and your participation is entirely voluntary. You may choose to skip any question that you do not want to respond to, and you may withdraw from the study at any time without any consequences. If you decide not to participate in the study, this is not going to affect you in any way. If you want to quit the study at any stage, you are free to do so, without any penalty or loss of benefits you are entitled to. Please ask questions at any time regarding this study. You will be given a personal copy of this consent form.

Contacts for Additional Information

If you have any questions, at any time, about this study or the procedures being used, you may contact any of the following individuals.

Dr. Moses Klevor	Rebecca Fenuku
University of Cape Coast, Cape Coast	Ensign College of Public Health, Kpong
Department of Clinical Nutrition and Dietetics	Department of Community Health
Tel: 0244-611096	Tel: 0209007184 / 0242322038
Email: moses.klevor@ucc.edu.gh	E-mail: rebeccafenuku@st.ensign.edu.gh

Your rights as a Participant

This research has been reviewed and approved by the Ethical Review Committee of the Ensign College of Public Health. If you have any questions about your rights as a research participant you can contact the Administrator of the Institutional Ethics Committee of the Ensign College of Public Health on the phone number +233245762229 or email address: pat.kuma@ensign.edu.gh

VOLUNTARY AGREEMENT

The above document describing the benefits, risks and procedures for the research title: *Knowledge of Diet –-Related Chronic Diseases and Dietary Practices among University Students in the Ho Municipality of Ghana* has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I understand that I have the right to withdraw from the study at any time without in any way affecting my future services.

Participant consent

I agree to participate as a volunteer in this study. I give permission for my responses to be used for research purposes, such as reports and presentations.

Participant's name: _____

Signature or thumbprint of participant: _____

Date signed (dd/mm/yyyy) __ __ / __ __ / __ __

If volunteers cannot read the form themselves, a witness (not research staff) must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered and the volunteer has agreed to take part in the research.

_____ _____

Date signed (dd/mm/yyyy) Name and signature or thumbprint of witness

Person Who Obtained Consent

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

_____

_____

Date signed (dd/mm/yyyy) Name and signature of Person Who Obtained Consent

ENSIGN COLLEGE OF PUBLIC HEALTH - KPONG

OUR REF: ECOPH/DO/EL/ST.RF/053
YOUR REF:
Tel: +233 245762229
Email: info@ensign.edu.gh
Website: www.ensign.edu.gh

P. O. Box AK 136
Akosombo
Ghana

February 16, 2017

The Administrator
University of Cape Coast
Ho, Volta Region

Dear Sir/Madam,

LETTER OF INTRODUCTION

We write to respectfully introduce to you Mrs. Rebecca Fenuku (Student Identification Number 157100053), a second year student of the Master of Public Health (MPH) degree program of the College.

As part of her graduation requirements, Mrs. Rebecca Fenuku is writing a thesis on; **Students knowledge of diet-related chronic diseases and dietary practice's at the Ho Municipality in Volta Region of Ghana.**

She has indicated that the research methodology she will use for the study includes an in-depth interview with students in your institution.

The student will seek the consent of the individuals involved and conduct a confidential and anonymous study.

We would be grateful if you kindly accede her any assistance she may require in this regard.

Thank you.

Respectively yours,

Patrick Kuma
Ag. Academic Registrar
For: Dean/ Head of Institution

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