ENSIGN COLLEGE OF PUBLIC HEALTH, KPONG EASTERN REGION

GHANA

KNOWLEDGE, ATTITUDE AND PRACTICES TOWARDS HYPERTENSION AMONG ADULTS IN THE NANDOM DISTRICT OF THE UPPER WEST REGION OF GHANA

By

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A Thesis submitted to the Department of Community Health in the Faculty of Public Health in partial fulfilment of the requirement for the degree

MASTERS OF PUBLIC HEALTH

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DECLARATION AND CERTIFICATION

I hereby certify that except for reference to other peoples' 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

This work is dedicated to the memory of the late Mr Peter Der, even in death you are still the force pushing us to the skies and to my siblings, Evans Mwinnomo Kuunyigr, Ephriam Zunuosob Kuunyigr, Francis Assisi Mwinmaalu Kuunyigr, Tiffany Yasob Saayeng, Kayla Buonou Saayeng, Owen Kurt Saayeng, Walier Peter Maalo Der and Audrey Mwinnome Der, you keep me going.

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ABBREVIATIONS

BMI	Body mass index
CDC	Center for Disease Control and Prevention
CHPS	Community Health Planning and Services
CSOs	Civil Society Organizations
CVD	Cardiovascular diseases
DBP	Diastolic Blood Pressure
GSS	Ghana Statistical Service
HBP	High Blood Pressure
JHS	Junior High School
JSS	Junior Secondary School
NCD	Non-communicable diseases
NGOs	Non-Governmental Organisations
NHFA	National Heart Foundation of Australia
SBP	Systolic Blood Pressure
SHS	Senior High School
SSS	Senior Secondary School
WHO	World Health Organization

ABSTRACT

Hypertension as a major risk factor for cardiovascular disease has proven its importance as a worldwide public health challenge because of its frequency and the associated complications and for its position as a leading risk factor for mortality.

A cross-sectional study was conducted in the Nandom District of the Upper West Region with the objective of contributing to the knowledge base on the burden of hypertension in the Nandom District and hence foster early diagnosis and management of hypertension. The study also sought to estimate the prevalence of hypertension among adults in the District and assess risk factors of hypertension as well as assess the attitude and perceptions towards hypertension.

The study was conducted among adult residents 20 years of age and above in the Nandom District. A proportion to size sampling procedure was used to select 383 adults from 6 communities in the District. Blood pressure and other anthropometric measurements were done with recommended tools. Questionnaires were also used to assess respondents' knowledge, awareness and risk factors for hypertension. In-depth interviews were also conducted to assess attitude and perception towards hypertension. Data was collected electronically using Kobocollect data collection software and was analysed using Stata version 14 and Microsoft Excel 2016. Chi-square tests were done for associations between hypertension and other identified risk factors including BMI, smoking, alcohol consumption, family history, age and sex. Logistic regression was used to estimate odds ratios for risk factors associated with hypertension.

The study revealed a hypertension prevalence of 38.8% with prevalence being higher among males. Additionally, prevalence of hypertension was observed to be increasing with age. Alcohol consumption was found to be associated with hypertension; persons who consume alcohol were found to be 1.17 times more likely to develop hypertension than persons who did not consume

alcohol (p-value=0.011). Also, alcohol consumption was found to be highest among persons in the younger age group of 20-29years. Knowledge on hypertension risk factors, complications and lifestyle were found to be quite high among respondents with each category scoring above 60%. Knowledge on the mode of diagnosis and treatability of hypertension was found to be very low, with each subject area scoring less than 20%. Hypertension awareness was found to be low among respondents. with about 38% of all respondents who were hypertensive being aware of their status, and about 41% of those aware were on treatment.

Prevalence of hypertension was found to be as high as those found in urban communities. Even though the majority of respondents had ever heard of hypertension, knowledge on some areas of hypertension was found to be low. There exists an opportunity for public health education on hypertension and on the importance of adherence to treatment.

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CHAPTER ONE

1.1 Introduction

Morbidity and mortality from cardiovascular diseases have been projected to increase over the coming decades, however, their high medical and economic burden, are yet to be accorded the needed priority globally (Bosu, 2010).

Hypertension, a major risk factor for cardiovascular disease (CVD), has proven its importance as a global public health challenge because of its prevalence and associated complications, and for its position as a leading risk factor for mortality (Kearney *et al.*, 2005)

Both pharmacological and non-pharmacological treatment therapies are usually required for the management of hypertension. Pharmacological therapy usually includes treatment with prescribed medications, and non-pharmaceutical therapy usually requires some lifestyle education and modification (Anowie & Darkwa., 2016). These lifestyle changes usually include a reduction in salt intake, weight reduction in obese and overweight individuals, regular exercise and reduction in alcohol intake (Hedayati *et al*., 2011)

Effective lifestyle modification therapy will require an in-depth understanding of the knowledge level of people regarding hypertension, their attitudes towards hypertension and their perceptions of the condition. There is the need to understand what a person knows about hypertension and what they think of hypertension, their attitude towards hypertension, that is whether religious connotations are associated with hypertension, and their practices towards hypertension. An understanding of the various risk factors predominant among people in a community will also go to support the kind of health education messages that can be given to people. A good understanding of these dynamics will help the health system formulate appropriate policies and programs to address the issues of hypertension.

1.2 Problem Statement

Hypertension and its associated complications pose an important health challenge in Ghana, due to its high fatality rate. Management of hypertension requires long periods of therapy and expensive procedures as well. Controlling hypertension in Ghana requires a mix of interventions. An understanding of people's knowledge, practices and attitudes towards hypertension provide grounds for these interventions.

There is ample evidence about prevalence, knowledge, attitudes and practice towards hypertension among adults and rural folks in the southern part of Ghana. Not much of such information is available for adults in rural communities in the northern part of Ghana, particularly in the Upper West Region.

1.3 Objectives

The overall goal of this study was to contribute to knowledge regarding hypertension in the Upper West Region of Ghana.

1.4 General Objectives

Investigate knowledge, attitude and practices related to hypertension among adults in Nandom District.

1.5 Specific Objectives

The specific objectives of the study are:

1. To assess knowledge about hypertension among adults;
2. To estimate the prevalence of hypertension among adults;
3. To assess the attitudes, perceptions and practices of people towards hypertension

4. To examine risk factors of hypertension among adults in the Nandom District.

1.6 Justification of study

Regular screening (Ramsay *et al.,* 1999) and lifestyle modifications (Willett *et al.,* 2006) are the best ways to safeguard against hypertension. However, when people do not have any knowledge about hypertension, they may not appreciate the need to carry out regular blood pressure (BP) checks and practice healthy behaviours. Again, if people do not know about the key behaviours that will help to keep blood pressure within the normal range, then they may be unable to practice them, even when they know about hypertension.

Another area of concern is that even with knowledge of hypertension, negative perceptions and attitudes towards hypertension will prevent people from engaging in practices that will help reduce the occurrence of hypertension. Regular screening can result in early diagnosis and awareness of hypertension, leading to timely efforts towards its management, thus avoiding possible complications.

A drive to reduce the burden of hypertension in the country will require a good understanding of the knowledge level of people, and their practices and attitudes towards hypertension. It is therefore important to find answers to questions such as:

- what is the knowledge level of the people regarding hypertension?
- what are people's perceptions of hypertension?
- what are people's attitudes towards hypertension?

Answers to these questions will help inform specific strategies to address the problem of hypertension. For instance, if cultural practices negatively influence people's attitude and

perception towards hypertension, it will be necessary to address such cultural practices, in addition to efforts to encourage screening, early diagnosis and effective management of hypertension.

1.6 Conceptual Framework

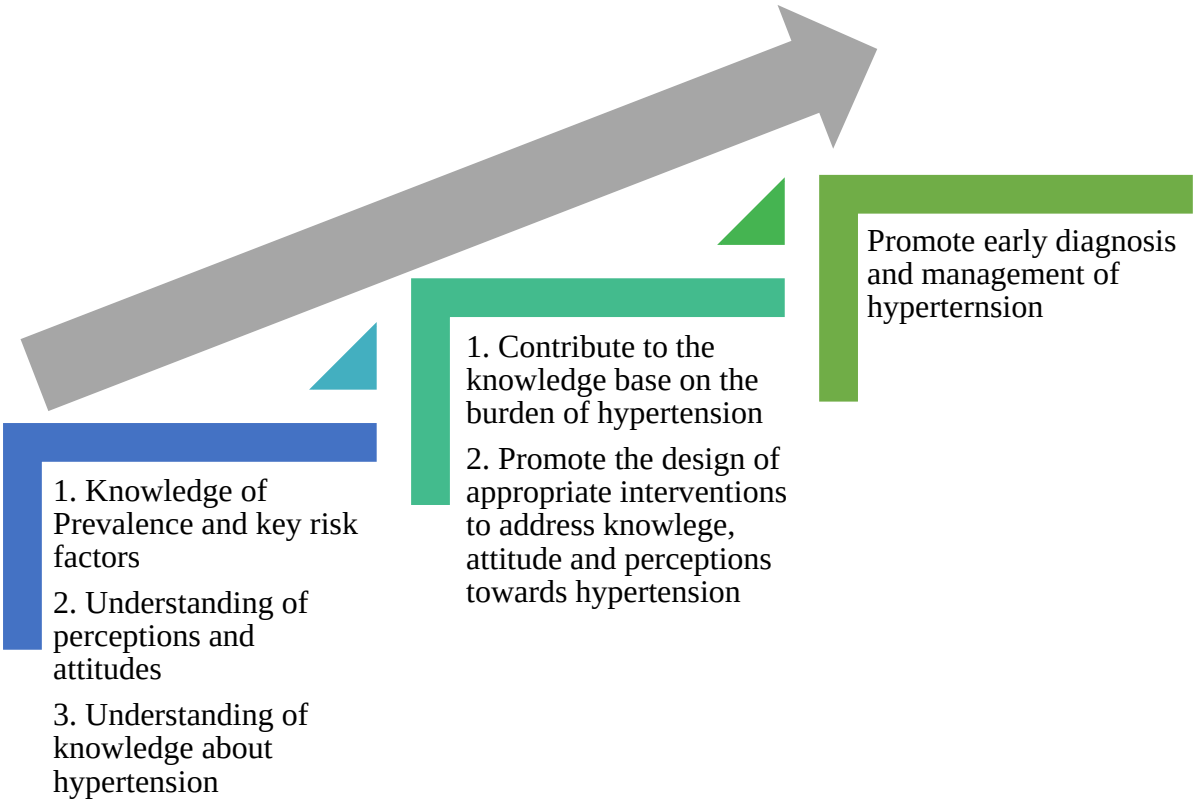


Figure 2.1: Conceptual Framework

Availability of data on the burden of hypertension, the knowledge of the people about hypertension and their attitudes and practices towards hypertension promotes the establishment of a knowledge base for hypertension. Appropriate information on

hypertension and the attitudes and practices towards it will support the formulation of appropriate policies and interventions targeted at the early diagnosis and management of hypertension and culminating into the control of hypertension in the district and in the country.

CHAPTER TWO

LITERATURE REVIEW

2.1 Non-communicable diseases

Globally, chronic Non-Communicable Diseases (NCDs) have shown an increasing impact on health status in populations, and the rates are relatively higher in sub-Saharan Africa (Islam *et al.*, 2014). The Director-General of the World Health Organization (WHO) commented that NCDs such as CVDs, cancers, diabetes and chronic lung diseases have overtaken infectious diseases as the leading cause of mortality globally (WHO, 2013). NCDs, predominantly CVDs, cancers and diabetes kill approximately 38 million people each year; over 14 million of these deaths occur among adults between the ages of 30-70 years (WHO, 2014). NCDS are defined as diseases of long duration, generally slow in progression and are the major cause of adult mortality and morbidity worldwide (Bloom *et al.*, 2011). and 4 main diseases are generally considered to be dominant in NCD mortality and morbidity: CVD (including heart disease and stroke), diabetes, cancer and chronic respiratory diseases (including chronic obstructive pulmonary disease [COPD] and asthma) (Bloom *et al.*, 2011). The WHO estimates that by 2020, NCDs will account for 80% of the global burden of disease, causing 7 out of every 10 deaths in developing countries, with about half of these premature deaths occurring among people below the age of 70years (Islam *et al.*, 2014).

According to the WHO, major risk factors that cause NCDs, are economic transitions, rapid urbanisations and 21st-century lifestyles including tobacco use, unhealthy diets, insufficient physical activity and the harmful use of alcohol (WHO, 2010).

2.2 Hypertension and its dynamics

2.2.1 Definition

One very common CVD that has become key global health issue is hypertension. Blood is carried from the heart to all parts of the body in blood vessels. Blood pressure is created by the force of the blood pushing against the walls of blood vessels as it is pumped by the heart. The higher the pressure in blood vessels the harder the heart has to work in order to pump blood. Blood pressure is measured in millimetres of mercury (mm Hg) and is recorded as two numbers usually written one above the other. The upper number is the systolic blood pressure - the highest pressure in blood vessels and happens when the heart contracts, or beats. The lower number is the diastolic blood pressure - the lowest pressure in blood vessels in between heartbeats when the heart muscle relaxes (WHO, 2013). Hypertension, or high blood pressure, is defined as a persistent increase in systolic blood pressure equal to or above 140 mm Hg and/or diastolic blood pressure equal to or above 90 mm Hg (NHFA, 2016). Normal adult blood pressure is defined as a systolic blood pressure of 120 mm Hg and a diastolic blood pressure of 80 mm Hg (NHFA, 2016). Table 2.1 shows the clinical classification of BP levels for adults as found in the clinical guidelines for the diagnosis and management of hypertension by the NHFA, 2016. Normal levels of both systolic and diastolic blood pressure are important for the efficient functioning of vital organs such as the heart, brain and kidneys and for overall health and well-being (WHO, 2013).

Table 2.1: Classification of clinical blood pressure levels in adults

Category	Systolic		Diastolic
Optimal	<120	and	<80
Normal	120–129	and/or	80–84
High normal	130–139	and/or	85–89
Grade 1 hypertension	140–159	and/or	90–99
Grade 2 hypertension	160–179	and/or	100–109
Grade 3 hypertension	≥180	and/or	≥110
Isolated systolic hypertension	≥140	and	<90

(Source: NHFA, 2016)

2.2.2 Clinical aspect and management of hypertension

Hypertension is an independent risk factor for myocardial infarction, chronic kidney disease, ischemic and hemorrhagic stroke, heart failure and premature death (NHFA, 2016). Hypertension is the driver of the CVD epidemic in Africa where it is a major independent risk factor for heart failure, stroke and kidney failure (Kayima *et al.*, 2013).

Hypertension was taught to be common in Europe and in North America but rare in Africa in before the 1930s however by the end of the 1950s post mortem reports suggested HBP was becoming a key problem in Sub-Saharan Africa, it became a public health concern in 1961 (Britwum et al, 2005 cited in Owusu-Afriyie,2015).

Clinical and pathological studies in the 1970s showed growing evidence of CVDs especially hypertension (Pobee, 2006 cited in Owusu-Afriyie, 2015). They prevalence of hypertension

increased by 67% in 20 years from 1990 and by 2010 it was responsible for more than 500,00 deaths and 10 million years of life lost (Echouffo-Tcheugui *et al.,* 2015). Hypertension poses a great risk to people because it's a major cause of serious health conditions including heart disease, stroke and renal diseases (BeLue *et al.*, 2009). Studies conducted among SSA populations indicate that 42% of cases of ischemic heart disease (IHD) are related to hypertension.(Echouffo-Tcheugui *et al.,* 2015). Evidence shows that hypertension increases the risk of stroke by at least five-fold and a half of heart failure cases are caused by hypertension (Cited in Echuoffo-Tcheugui et al., 2015). Cognitive impairments, blindness, and chronic kidney diseases are other complications of hypertension (WHO, 2013).

Not only does hypertension present with health problems, it also imposes heavy economic burden on individuals and the national health system since controlling hypertension and managing its complications is expensive and it is estimated that 7.3% of total healthcare spending related to HBP and its complications in SSA and in 2001, US $ 2 billion was spent on hypertension related diseases (Echuoffo-Tcheugui *et al*., 2015).

Studies from various countries in Sub-Saharan Africa identify hypertension as a disease burden that requires concerted preventive and control efforts (BeLue *et al.*, 2009). There is the need for a comprehensive approach which includes both pharmacological and nonpharmacological interventions in controlling hypertension (Owusu-Afriyie, 2015).

The management of hypertension usually requires both pharmacological and nonpharmacological interventions. Pre-hypertensive individuals (SBP 120-139 mmHg or DBP 80 -89 mmHg) usually require promoting nonpharmacological interventions which include lifestyle modifications to prevent progression (Aram et al, 2003 cited in Owusu-Afriyie, 2015.). Efforts to reduce hypertension in Ghana have focused more on

pharmacological management with very little effort on non-pharmacological management (cited in Anowie and Darkwa, 2016).

Pharmacological management of hypertension usually involves the use of pharmacological agents to bring down the BP of an individual. Common classes of drugs used for hypertension management include Diuretics, Vasodilators, calcium channel blockers, Beta blockers among others (Owusu-Afriyie, 2015, NHFA, 2016).

Non-pharmacological management of hypertension usually involves lifestyle modification practices such as engaging in physical activity, reducing alcohol intake, quitting smoking, eating healthy foods rich in fruits and vegetables and low in fat and sodium, weight reduction (Owusu-Afriyie, 2015, Anowie & Darkwa., 2016)

2.3 Hypertension from a global perspective

Kearny et al (2004) as cited in Addo et al (2012), report that hypertension is a key public health challenge for both economically developing and developed countries (Addo *et al.*, 2012). CVDs account for 17 million deaths per year globally, and out of this, hypertension is responsible for more than half (9.4 million) of these deaths (WHO, 2013). Recent studies indicate that nearly 1 billion of the world's adult population had hypertension by the year 2000, and this proportion is predicted to increase to 29% (1.56 billion) by 2025 (Kearney *et al.*, 2005). Studies by Lim SS et al (2013) showed that the 3 leading risk factors for global disease burden were high blood pressure (HBP), tobacco smoking including second-hand smoke, and household air pollution from solid fuels, with HBP leading the trio with 7.0% of global Disability Adjusted Life Years (DALYS) (Lim *et al.*, 2012)

2.4 Hypertension in Sub-Saharan Africa

Sub-Saharan African countries are currently experiencing one of the most rapid epidemiological transitions, characterised by increasing urbanisation and changing lifestyle factors which have raised the incidence of NCDs, especially CVDs (BeLue *et al.*, 2009). It is anticipated that within the next few years, CVDs will soon overshadow infectious diseases as the leading cause of mortality (Bonow *et al.*, 2002). Of the 14 million deaths from NCDs among people between the ages of 30-70 years, 85% occur in developing countries (WHO, 2014)

Historically, reported prevalence of hypertension in rural African communities has been relatively low, ranging from 2%-13%; more recent studies have however revealed that hypertension is on the rise with prevalence rates approximating 28% (Spencer *et al*., 2005). 65% of the 972 million people living with hypertension in 2000 lived in the developing world including SSA and this number is expected to increase by 2025 (Guwatudde *et al.*, 2015). Studies to examine the trends of age-adjusted mean systolic BP around the world show that age-adjusted systolic BP was highest in low-income and middle-income countries (Danaei *et al.*, 2011). Between 1980 and 2008, mean adjusted systolic BP declined in economically developed regions such as Australia, North America and Western Europe and increased in economically developing regions such as East Africa, South and South East Asia for both sexes and among females in West Africa (Danaei *et al.*, 2011)

2.5 Hypertension in Ghana

Ghana, like other countries in Sub-Saharan Africa, is bedevilled with a double burden of communicable and noncommunicable diseases (BeLue *et al.*, 2009). Epidemiological transition, often characterised by a shift in communicable disease, involves a shift in the

pattern of mortality and diseases (BeLue *et al.*, 2009). Nutritional transition, characterised by a shift to low physical activity and high caloric content, is also a product of urbanisation and economic development (BeLue *et al.*, 2009). These two transitional phases have been highly blamed for creating enormous public health challenges such as the increasing burden of NCDs (BeLue *et al.*, 2009). These challenges, if not addressed, pose a great threat to the health sector and the economy.

Despite the growing NCD burden in Ghana, the health care structure has over the years placed more emphasis on addressing communicable disease and maternal and child health (Lamptey *et al.*, 2017) as well as other poverty-related diseases than on chronic lifestyle diseases such as CVDs. The prevalence of chronic NCD and their risk factors have increased over time and contribute to Ghana's disease burden (De-Graft Aikins *et al.*, 2012). NCDs are estimated to account for 42% of total deaths in Ghana (WHO, 2014). Cardiovascular diseases contributed 18% to all total deaths in Ghana among both sexes and all age groups (WHO, 2014) NCDs have very devastating health and economic implications for the individual and the economy. As reported in the 2014 WHO NCD country profiles, the probability of dying between the ages of 30-70 years from any of the four main NCDs (CVDs, cancers, chronic respiratory diseases and diabetes) in Ghana is 20% (WHO, 2014). People in this age category generally constitute a greater chunk of the working population of Ghana, thus posing a challenge to the working force of the country that could possibly result in low productivity, poverty and increasing dependency.

Hypertension prevalence in Ghana as at 2014 was reported to range from 19.3% in rural areas to 54.6% in urban communities (Ogedegbe *et al.*, 2014). A study conducted in 1973 among 20 rural Ghanaian villages reported a hypertension prevalence of 2-5%; it was concluded that

hypertension was not a significant health problem in rural Ghana, as cited in Addo et al. (2006). Over 30years down the line, studies by Addo et al. on the changing patterns of hypertension in Ghana revealed that the prevalence of hypertension for both systolic and diastolic BP ≥ 140/90 was 25.4% and for systolic and diastolic BP ≥ 160/95 was 15.4% (Addo *et al.*, 2006). This clearly shows that hypertension has now become a public health concern for both rural and urban communities in Ghana. Between 2008 and 2012, the prevalence of hypertension was reported to be on the increase in all ten regions of Ghana with Ashanti region recording the highest prevalence (2.19% - 14.45%), and followed by Eastern (3.36% - 5.22%). Upper West Region had the lowest prevalence (0.67% - 1.22%) (Anowie & Darkwa., 2016)

This significant change in the prevalence of hypertension can be attributed to the transformation of rural areas, which could have resulted in a decrease in physical activity and increase in unhealthy lifestyles (Addo et al., 2006). Many more people have resorted to the use of automobiles for transportation in recent times, as compared to the past when people had to walk several kilometres to go about their regular activities (Addo et al., 2006). Also, mechanised agriculture has almost taken out the use of hoes and cutlasses for farming and the use of manual labour in sowing and harvesting (Addo et al., 2006). In addition, transformations of the rural communities have also resulted in dietary changes as well (Addo et al., 2006); people are now eating more foods with high caloric contents (BeLue *et al.*, 2009).

The number of hypertension cases in outpatient public health facilities in Ghana increased more than 10-fold in 2007 (Bosu, 2010). In the 2008 issue of The Health Sector in Ghana: Facts and Figures report, hypertension was number 7 (4.1%) on the list of top 10 causes of death among all ages nationwide and was number 5 on the list of top 10 causes of admissions, accounting for 3.1% of all admissions in 2007 (Saleh, 2012). Between 2001 and 2007,

hypertension consistently remained the 5th leading cause of outpatient morbidity, accounting for about 3% of all outpatient reported cases (Saleh, 2012).

Despite the growing burden of hypertension in Ghana, efforts towards its control are yet to achieve substantial results. Lloyd-Sherlock et al revealed that just about 4% of all hypertensive cases in Ghana are under control (Lloyd-Sherlock *et al.*, 2014). A review of population-based studies on hypertension between 1973 and 2009 by Addo et al showed that control of hypertension among hypertensive in Ghana ranged from 1.7% to 12.9% (Addo *et al.*, 2012). These statistics could be attributed to the level of awareness and knowledge of hypertension and hypertension status among people; as revealed by Lloyd-Sherlock et al (2012), just about 23.3% of hypertensives in Ghana were aware of their status, and the number of people who due to their knowledge of their condition had reached control was just about 18%. Comparing the rates of control among hypertensives and the prevalence of hypertension in Ghana, it is undebatable that much more needs to be done if Ghana as a country intends to address the growing burden of hypertension.

These revelations about the status of hypertensives in Ghana regarding control and awareness point to the fact that knowledge and awareness of hypertension among people in Ghana, which are key to the early diagnosis, management and control of the disease, is very much limited. Other aspects that need to be understood and worked around are people's perceptions and attitudes towards hypertension. People's perceptions, attitudes, knowledge about risk factors regarding hypertension, and practices commonly engaged in will help inform appropriate strategies and interventions that can be implemented to address the increasing burden of hypertension in the Nandom District and in Ghana at large. Based on these grounds, this study is deemed relevant and a step in the right direction.

2.6 Knowledge, attitudes, and practices towards hypertension

Increasing public knowledge and awareness about hypertension including risk associated with uncontrolled blood Pressure(BP) are among measures to control hypertension (Oliveria *et al.*, 2005). As cited by Iyalomhe & Iyalomhe suggested that failure to achieve BP goals may be attributable to the inadequacy in patients knowledge, perception, attitudes and lifestyle practices (Iyalomhe & Iyalomhe., 2010*).* A study by Spencer et al (2005) revealed that 58% of patients reported that hypertension was curable; this creates a misconception that hypertension is an acute condition rather than the chronic condition that it is (Spencer *et al.*, 2005). This also has links to the control rates of hypertension since this misconception will clearly affect adherence to antihypertensive medications. The study also further revealed that patient's beliefs were mostly discordant with the traditional medical paradigm of hypertension. (Spencer *et al*, 2005). Aubert et al, in their study, found a good basic knowledge of hypertension among respondents, however, specific knowledge of hypertension was found to be low; they found that just about 28% of respondents knew hypertension rarely causes symptoms (Aubert *et al.*, 1998). In their study, it was found that basic knowledge showed similar trends among respondents who were aware of their status and those who were not, however, specific knowledge on hypertension was significantly better among hypertensives who were aware of their status than those who were not aware of their status (Aubert *et al.*, 1998). Available evidence has shown that even though many people have heard about hypertension, Only a few know of its risk factors (Mlunde, 2010). Anowie and Darkwa found in their study in Cape Coast that knowledge on hypertension among participants was generally poor; they found that more than 95% of respondents showed a poor level of knowledge about

the causes of hypertension, signs and symptoms, risk factors, prevention and treatment of hypertension (Anowie and Darkwa, 2015)

Attitude towards hypertension risk factors is generally poor; Mlunde found in her study that as much as 76% of respondents smoked because they liked to smoke and 77% of respondents were drinking because they liked to drink and only 24% did not smoke and 11% did not drink because of risk to disease (Mlunde, 2010)

A study in Cape Coast found the attitude towards hypertension was highly negative with about 98% of study respondents exhibiting negative attitude towards hypertension; 62% of respondents had a negative attitude towards exercise (Anowie & Darkwa., 2015). Lack of education, fear, financial constraints and lack of commitment have been identified barriers to individual's efforts to maintain healthy lifestyles (Anowie & Darkwa., 2015). Even with high knowledge in hypertension, individuals still believed that once hypertension did not cause health problems in an individual, then it was not an issue (Anowie & Darkwa., 2015)

For behaviour to change, people must feel personally vulnerable to threats, view the possible consequences as severe and see that acting is likely either going to prevent or reduce risk at an acceptable cost with few barriers (Nisbet et al, 2008, cited in Anowie & Darkwa, 2015).

CHAPTER THREE

METHODOLOGY

3.1 Study design

This study was a mixed quantitative and qualitative study. A cross-sectional survey was used to gather data on demographics, knowledge, practices, attitudes and risk factors of hypertension among study participants. Key informant interviews were conducted to gather in-depth information on practices, perceptions, health-seeking behaviours and hypertension trends among people in the Nandom District.

Respondents' BP were measured using the Omron M6 digital sphygmomanometer (Omron Corporation) to enable the estimation of the prevalence of hypertension within the District. BP readings were taken 3 consecutive times on 1 occasion, with a minimum of 3 minutes' intervals between each of the 3 readings. The BP readings were first taken in both arms, after which the measurements were repeated on the arm with the highest BP reading. The average of 3 BP readings was used to determine hypertension status. Average systolic BP reading of ≥140mmHg and/or average diastolic BP reading of ≥ 90mmHg was classified as hypertensive (WHO, 2013; Kearney *et al*., 2005; NHFA, 2016). Weight and height measurements were obtained using standard procedures to allow for the calculation of the body mass index (BMI).

3.2 Study area

Nandom District, 1 of the 11 Districts in the Upper West Region, was carved out from the Lawra District; it is one of the new Districts created in 2012 by Legislative Instrument (LI 2102), with Nandom as its capital (GSS, 2014). The District is located between longitude 2°25 W and 2°45W and Latitude 10°20 N and 11°00 S. It is bound to the east and south by the Lambussie and Lawra Districts respectively, and to the north and west by Burkina Faso. The

District's proximity to Burkina Faso places it in a strategic location for international interactions and exchange (GSS, 2014).

Nandom District covers a land area of 404.6 square km, constituting about 3.1% of the Region's total land area. The District is made up of 84 communities, with 86% of the inhabitants living in rural areas (GSS, 2014). According to the 2010 Population and Housing Census, there were a total of 46,040 people in the District, with a total adult population (20 years and above) of 23,992 [males = 10834 (45%), Females =13158 (55%)], making Nandom District the most densely populated in the Region. Like other Districts in Ghana, there are more females (23,745) in the District than males (22,295) (GSS, 2014).

The Nandom District falls within the Guinea Savannah vegetation belt, consisting largely of short grasses with scattered drought-resistant trees such as acacia, shea and baobab (). The vegetation composition of the District makes it ideal for livestock rearing, which is a major source of household income (GSS, 2014). The District experiences 1 major rainfall season, between May and September (sometimes extending to October); this is also the major farming season for residents who are mostly farmers. There is an extensive dry season which affects the major sources of livelihood and income for residents (GSS, 2014). One grave impact of this is the large migration of the youth towards the southern parts of the country during the dry season to seek for greener pastures, leaving behind mostly women, children and the aged (GSS, 2014).

The people of Nandom are predominantly Dagaabas, with few Mossi, Sisaala, Hausa and Akans, among others. The people are mainly Christians (85.7%); 6.6% are Muslims, 1% traditionalist and 2% have no religious affiliations (GSS, 2014)

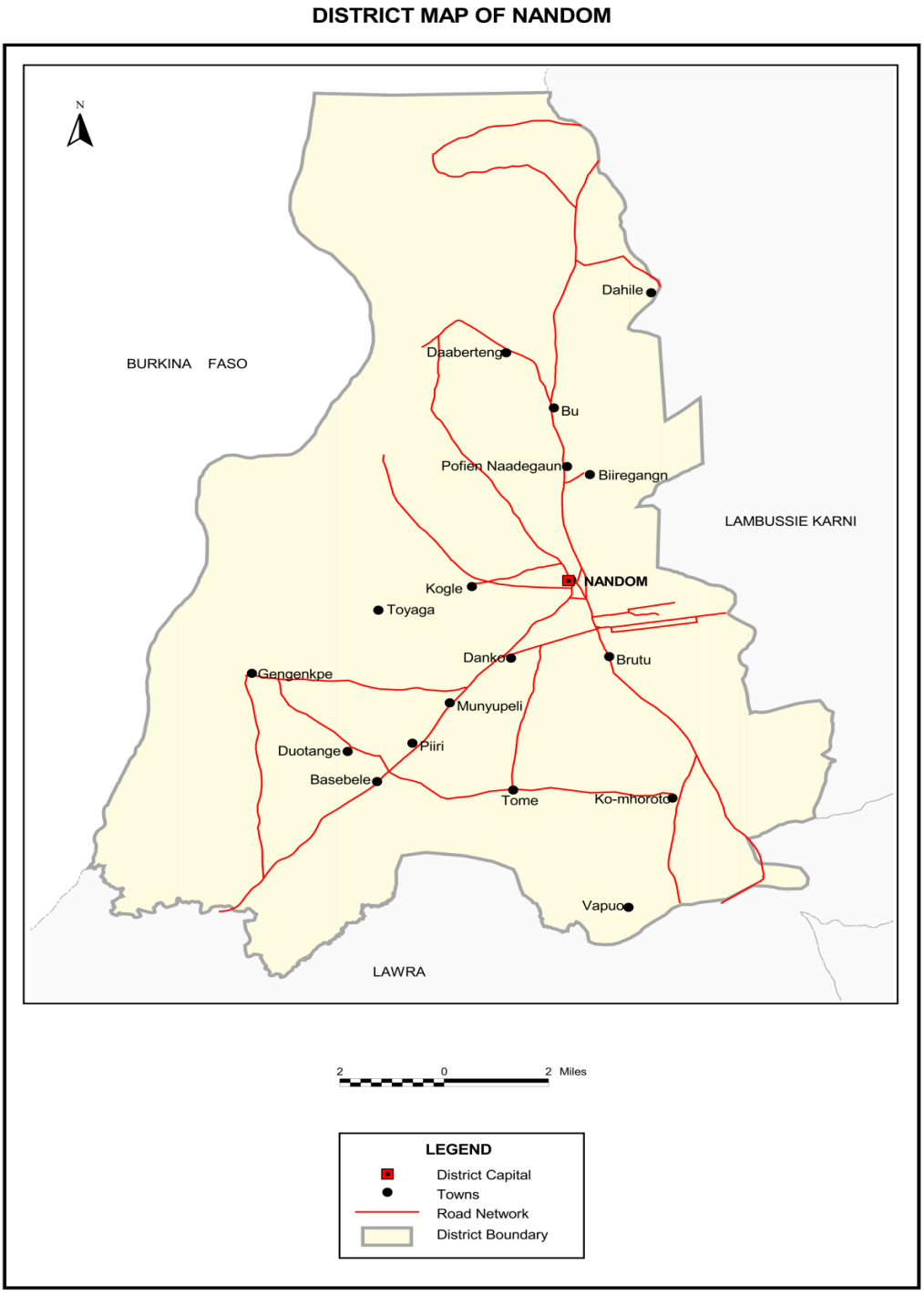


Figure 3.1: Map of Nandom District (Source: GSS, 2014)

3.3 Sampling and sample size

A mix of simple random sampling and systematic sampling methods was used. The Nandom District has 5 sub-Districts namely, Nandom, Puffien, Gengenkpe, Ko and Baseble. One community each was randomly selected from 4 of the sub-Districts, whilst 2 communities were selected from Nandom sub-District. Two communities were selected from the Nandom sub-District to cater for its rural and peri-urban mix. Raosoft sample size calculation software (Raosoft, 2004) was used to calculate the sample size. According to the 2010 population and housing Census data, the Nandom District has a total adult population (20 years and above) of 23,992 (GSS, 2014). Using this population figure with a 95% confidence interval and 5% allowable margin of error, with a default response distribution of 50%, a total of 380 individuals were sampled as study participants, Based on the estimated adult populations (20 years and above) within the selected communities, a proportion to size approach was used to allocate the required number of participants from each sampled community. A total of 383 individuals from the six communities were enrolled.

A systematic approach was used in selecting the houses for the sample using the chief's palace as a reference point in each of the sampled communities. Every other house was selected until the sample size was exhausted. For each house selected, all households were considered and every adult (≥ 20 years) present and willing to be interviewed was interviewed. Anthropometric measurements of respondents (blood pressure, weight and height) were recorded. Table 3.1 gives details of the numbers of individuals interviewed from the 6 sampled communities.

Sub-District	Community	Type	Sample size
Nandom	Goziir	Rural	101
Nandom	Airport	Peri-urban	48
Puffien	Ketuo	Rural	98
Baseble	Baseble	Rural	48
Gengenkpe	Duotang	Rural	23
Ko	Tom Zendaagang	Rural	65
Total			383

Table 3.1: Sampled communities and sampled sizes

In-depth interviews were conducted with community leaders from 3 randomly sampled communities and with some community members from the various communities.

3.4 Exclusion Criteria:

The following two categories of people were excluded from the study in an attempt to be consistent with the study design:

1. Persons below the age of 20 years
2. Persons who were non-residents of the community or Nandom District
3. Pregnant women

3.5 Data collection and management

A team of 8 research assistants were hired to support the data collection process. These assistants were trained on the electronic data collection process using mobile devices, questionnaire administration and the basics of conducting interviews. They were also trained on how to appropriately measure the height and weight of adults using standard procedures, and the use of the Omron M6 digital sphygmomanometer. Efforts were made to ensure that the research assistants gained the capacity and experience necessary for data collection.

Respondents were interviewed in their homes or at locations that both the respondent and the researcher agreed on to be convenient for the exercise. Semi-structured questionnaires were administered to respondents. Questionnaires were built into the KoBoCollect data collection application software (KoboToolbox, 2016) and loaded onto mobile devices for data collection. Data was uploaded to the KoBoCollect cloud-based storage site and downloaded in a Microsoft Excel file for cleaning and analysis.

Qualitative data was collected through key informant interviews with the aid of an interview guide. A total of six (6) key informants from the sampled communities were interviewed. These were mainly opinion leaders including one chief, 2 community health nurses and 3 community champions. The key informants were interviewed on the general perception of people towards health and health seeking behaviours, and their perceptions of hypertension and its risk factors, their knowledge levels and practices they engage in to control or prevent hypertension. Interviews also sought to get an understanding of cultural practices among the people with the goal of identifying practices that may influence perceptions of hypertension and attitudes towards it. The key informant interviews were conducted in both English and dagaara depending on the preference of the respondent and were recorded using a voice recorder (Samsung J5 mobile device voice recorder). Interviews that were conducted in dagaara were translated into English after which all the key informant interview information were grouped into emerging themes.

3.6 Data analysis

The data was first checked for completeness and accuracy in the Excel file. The data was then transferred to STATA version 14 software (STATACorp LLC, 2015) for analysis. Descriptive statistics were computed, including calculation of means, frequencies and proportions. Crude

prevalence of hypertension, and its distribution by age, sex and sub-District were calculated Chi-square analysis was used to test for associations between hypertension status and each of these factors, and logistic regression was used to determine the odds ratios for estimating the risk of hypertension associated with each of the factors.

Study respondents' BMI were classified into four categories using the grouping by the National Heart, Lung and Blood Institute classification: underweight (BMI < 18.50kg/m2), normal (18.50kg/m2-24.99kg/m2), overweight (25kg/m2-29.99kg/m2) and obese (>30kg/m2) (NHLBI and (NIH), 1998). Regression analysis was employed to determine odds ratios for estimating the risk of hypertension associated with the risk factors. Results were considered statistically significant at a p-value less than 0.05.

Qualitative interviews were extracted from the recording device. Interviews were listened to and those that were conducted in Dagara were manually translated into English. The interviews were then listened to again and emerging issues categorised into the various themes based on which the interviews were conducted. These were Health seeking behaviour, Healthcare and Health concerns, Hypertension knowledge and awareness, Diet and other risk factors of hypertension. The key issues identified were used to give context to key issues that came up from the quantitative data collected.

3.7 Ethical considerations

Ethical approval was sought and obtained from the Ensign College of Public Health Institutional Ethical Review Board. Also, institutional approvals were obtained from the Upper West Regional Health Directorate and the Nandom District Health Directorate. For each of the communities visited, courtesy calls were made to the chiefs, heads and opinion leaders. The purposes of these courtesy calls were to: (1) show respect per the demands of

tradition, (2) to inform them about the study, and (3) to seek their approval to conduct the study. The research team was led by a nurse from the Community-based health Planning and Services (CHPS) or community health centre to pay these courtesy calls; the nurses also helped with the mobilisation of community members to partake in the study.

Informed consent was obtained from all respondents who agreed to take part in this study after eligibility screening. This process included an explanation of why the respondent was selected, data collection procedures, maintaining the confidentiality of information collected, and the risks and benefits of participating in the study. Respondents who gave their consent were required to sign or thumbprint an informed consent form before the questionnaire was administered. Interviews were conducted mostly in the local languages but captured in English on the mobile devices.

3.8 Limitations of the study

A comprehensive assessment of blood pressure requires multiple measurements, at least two separate measurements taken one or more weeks apart (NHFA, 2016). Hypertension is diagnosed with a minimum of two averages from three BP readings at a sitting for two visits (FHI 360, 2014). Due to the design of the study, the average of 3 readings taken at a minimum of 3 minutes' intervals at one visit was considered for the diagnosis of hypertension for the purposes of the study however, individuals diagnosed to be hypertensive by the study were referred to the various health facilities for further diagnosis and management where needed.

CHAPTER FOUR

RESULTS

4.1 Demographic Characteristics

Table 4.1: Demographic characteristics of respondents

Characteristics		Male (%)	Female (%)	Total (%)
Age				
	20-29yrs	54 (52.4)	49 (47.6)	103 (26.9)
	30-39yrs	35 (46.1)	41 (53.9)	76 (19.8)
	40-49yrs	26 (41.9)	36 (58.1)	62 (16.2)
	50-59yrs	26 (46.4)	30 (53.6)	56 (14.6)
	60+	29 (33.7)	57 (66.3)	86 (22.5)
BMI				
	Underweight	14 (41.2)	20 (58.8)	34 (8.9)
	Normal	132 (46.6)	134 (50.4)	266 (69.5)
	Overweight	20 (28.6)	50 (71.4)	70 (18.3)
	Obese	4 (30.8)	9 (69.2)	13 (3.4)
Marital Status				
	Single/ Never married	39 (54.9)	32 (45.1)	71 (18.5)
	Co-habiting	3 (60.0)	2 (40.0)	5 (1.3)
	Married	122 (46.2)	142 (53.8)	264 (68.9)
	Divorced	3 (100)	0 (0)	3 (0.8)
	Widowed	3 (7.5)	37 (92.5)	40 (10.4)
Educational Level				
	No Formal Education	54 (34.4)	103 (65.6)	157 (41.0)
	Less than Primary Education	18 (58.1)	13 (41.9)	31 (8.1)
	Primary Education	23 (46.0)	27 (54.0)	50 (13.1)
	JSS/JHS	28 (49.1)	29 (50.9)	57 (14.9)
	SSS/SHS	31 (56.4)	24 (43.6)	55 (14.4)
	Tertiary	16 (50.0	16 (50.0)	32 (8.4)
	No Response	0 (0)	1 (100)	1 (0.3)
Religion				
	Christian	156 (43.6)	202 (56.4)	358 (93.5)
	Muslim	3 (75.0)	1 (25.0)	4 (1.0)
	Traditionalist	11 (52.4)	10 (47.6)	21 (5.5)
Ethnic Group				
	Dagara	167 (44.2)	211 (55.8)	378 (98.7)
	Sisaala	1 (100)	0 (0)	1 (0.3)
	Waala	1 (100)	0 (0)	1 (0.3)
	Other	1 (33.3)	2 (66.7)	3 (0.8)

Data presented are frequencies and proportions

A total of 383 adults aged 20 years and above were interviewed. Females constituted about 56% of the total population interviewed. Mean age of respondents was 44 years with a greater number (26%) within the 20-29-year group (table 4.1). About 41% of respondents had no formal education, of which 66% were women (table 4.1). The majority of respondents 69.5% were within the normal weight category. 18.3% of respondents were overweight and just about 3.4% of respondents were obese. Just about 8% of the study population had less than primary education (respondents who had started primary school but did not complete the primary education level). On marital status, 68% of respondents were married and 18% were single and never married. Over 90% of respondents were Christians and just about 1% were Muslims. Respondents' occupations varied. The predominant occupations included farming, carpentry, hairdressing, masonry, nursing and cloth weaving. Farmers were the largest group of people interviewed (data not shown)

4.2 Prevalence of hypertension

Table 4.2: Prevalence of hypertension and prehypertension

	Hypertension	Pre-hypertension
Characteristics	**Frequency (%)**	**Frequency (%)**
Overall prevalence	147 (38.4)	122 (31.9)
Sex		
Male	75 (44.1)	72 (42.4)
Female	72 (33.8)	50 (23.5)
Age		
20-29yrs	19 (18.5)	41 (39.8)
30-39yrs	24 (31.6)	24 (31.5)
40-49yrs	22 (35.5)	20 (32.3)
50-59yrs	27 (48.2)	17 (30.4)
60+	55 (64.0)	20 (23.3)
Community		
Duotang	6 (26.1)	10 (43.9)
Ketuo	40 (40.8)	30 (30.6)
Nandom Goziir	41 (40.6)	32 (31.6)
Nandom Airport	15 (31.3)	15 (31.3)
Tom Zendaagang	24 (36.9)	25 (38.5)
Baseble	21 (43.8)	10 (20.8)

Data presented are frequencies and proportions

We found an overall crude hypertension prevalence of 38.4% and an overall crude prevalence of pre-hypertension of 31.9% among the sampled adult population within the Nandom District (Table 3). The prevalence of hypertension varies considerably among sex and age groups. The prevalence among men was higher (19.56%) than that among women (18.8%). We found the prevalence of hypertension increases with age. The age group 70 and above had the highest prevalence (65.22%) whilst the prevalence among the younger age group 20-29yrs was 18.45%. However, the prevalence of pre-hypertension among the various age groups was found to be the inverse of the prevalence of hypertension. Pre-hypertension prevalence was found to be highest among persons in the 20-29 years' age group.

Among the various communities, hypertension prevalence was highest in Baseble (43.8%) a rural community Ketuo and Goziir all had prevalence above 40% while the only peri-urban community Nandom Airport, had a prevalence of 31.3%, making it the community with the fifth highest prevalence.

4.3 Hypertension risk factors

Table 4.3: Hypertension risk factors

Risk Factor		Hypertensive n (%)	Not Hypertensive n (%)	Total n (%)	p
BMI					0.7
	Underweight	13(38.2)	21 (61.8)	32 (8.9)	
	Normal	100(37.6)	166 (62.4)	266 (69.5)	
	Overweight	27 (38.6)	43 (61.4)	70 (18.3)	
	Obese	7 (53.9)	6 (46.2)	13 (3.4)	
Smoking					0.16
	Currently Smokes	11 (42.3)	15 (57.7)	26 (6.8)	
	Previously Smoked	8 (61.5)	5 (38.5)	13 (3.4)	
	Never Smoked	128 (37.2)	216 (62.8)	344 (89.8)	
Alcohol intake					0.02
	Yes	108 (40.5)	225 (59.5)	333 (87.0)	
	No	14 (28.6)	35 (71.4)	49 (12.8)	
	No Response	0 (0)	1 (100)	1 (0.3)	
Family History of Hypertension					0.02
	Yes	66 (45.8)	78 (54.2)	144 (37.6)	
	No	74 (32.2)	156 (67.8)	239 (62.4)	
Age					0.000
	20-29yrs	19 (18.4)	84 (81.6)	103 (26.9)	
	30-39yrs	24 (31.6)	52 (68.4)	76 (19.8)	
	40-49yrs	22 (35.5)	40 (64.5)	62 (16.2)	
	50-59yrs	27 (48.2)	29 (51.8)	56 (14.6)	
	60+	55 (64.0)	31 (36.0)	86 (22.9)	
Sex					0.04
	Male	75 (44.1)	95 (55.9)	170 (44.4)	
	Female	72 (33.8)	141 (66.2)	213 (55.6)	

Data presented are frequencies, proportions and p-values

Six potential risk factors for hypertension were investigated, these were Body Mass Index (BMI), smoking, alcohol intake, family history of hypertension, age, and sex.

4.3.1 BMI

Hypertension prevalence was 53.9% among the obese population whilst the prevalence among those who are underweight, normal and overweight were 38.2, 37.6 and 38.6 respectively. The association between the prevalence and BMI was however not statistically significant (p=0.7) (See Table 4.3).

4.3.2 Smoking

The study results also showed that just about 6.8% of the population currently smokes and 3.7% used to smoke. Prevalence of hypertension among those who currently smoke was 42.3%, while that of those who previously smoke was 61.5% and for those who never smoked the prevalence is 37.2. Chi-square test for association revealed that the association between persons who smoke (currently or previously) and their hypertension status is not significant (p=0.16) (see Table 4.3).

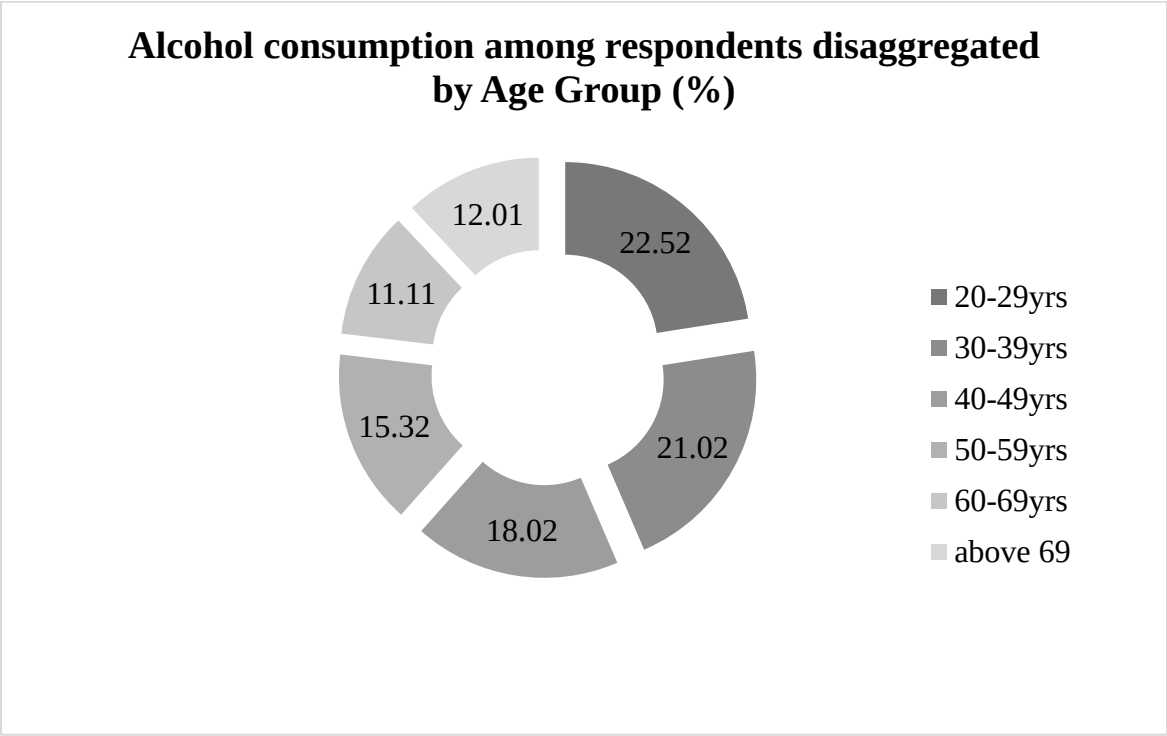
4.3.3 Alcohol

Alcohol consumption was found to be key hypertension risk factor among adults in the District. A total of 87% of respondents were found to consume one alcoholic beverage or the other. The crude prevalence of hypertension among alcohol consumers was estimated to be 40.5%. Alcohol was found to have a significant positive association with hypertension (p=0.011). (table 4.3)

A further analysis of the population who consume alcohol showed that the most common alcoholic beverage they consume is pito (Locally brewed alcoholic beverage from millet), followed by beer and then spirits (data not shown). The most common combinations of alcoholic beverages were pito and beer, then pito and spirits (data not Shown). A closer look

at the age of alcohol consumers as shown in figure 4.1 below reveals that alcohol consumption is highest among persons in the 20-29 years' category (22.5%) and followed closely by those in the 30-39 years' category (21%).

Figure 4.1: Alcohol consumption among respondents disaggregated by age



Data presented are proportions

About 48% of respondents reported consuming an alcoholic beverage each day of the last 30 days prior to the interview, and 38% reported consuming an alcoholic beverage at least 1-3 times in a week in the last 30 days prior to the interview (data not shown). Also, for respondent who drank alcohol, about 65.9% consumed more than 5 standard alcoholic beverages (For pito, standard alcoholic beverage for this study was defined as one standard calabash which is about 600ml) for men and more than 4 standard alcoholic beverages for women in 1-3 occasions, about 21% in 4-6 occasions in the last 30 days consumed alcohol more than 5

standard alcoholic beverages for men and more than 4 standard alcoholic beverages for women. Only about 8% had not exceeded the specifications in all occasions they consumed alcohol in the last 30 days. The major alcoholic beverage consumed was pito followed by beer and spirits.

4.3.4 Family History of Hypertension

From Table 4.3 about 144 (37.6%) of respondents reported having a family member dead or alive with hypertension. Out of this number, about 45% of such respondents were also found to be hypertensive. A family history of hypertension was also found to be significantly associated with hypertension ($p=0.001$) (see Table 4.3). Respondents who had a family member dead or alive who had or currently has hypertension were more likely to be hypertensive (Table 4.3)

4.3.5 Age

Results from the study showed a strong association between the age of the respondents and their hypertension status. ($p< 0.001$) (table 4.3) Respondents who were 50 years and above were found be more hypertensive than their younger counterparts. Respondents aged 50-59yrs have prevalence of 48.2% and those aged 60+ was 64.0% compared to younger adults aged 20-29yrs (18.2%)

4.3.6 Sex

Respondents' sex was significantly associated with their hypertension status. Men were more likely to be hypertensive than their female counterparts ($p=0.039$) (table 4.3). The prevalence among adult men was 44.1% compared to that of adult women (33.8%)

4.4 Hypertension Knowledge

Study results revealed that 82.8% of respondents have heard about hypertension. Out of the respondents who had ever heard of hypertension, the majority (44%) heard of it from their family and friends and 24% heard it from a facility-based health care provided making that the second highest medium through which respondents last heard of hypertension. Other less prominent sources from which respondents heard of hypertension included the media, community-based health professionals, and from traditional or faith healers (data not shown)

Table 4.4: Hypertension knowledge among respondents

Area	**Percentage of respondents giving right response**	**Comment**
Knowledge on hypertension causes	2.1	Low
Knowledge on hypertension curability	8.9	Low
Knowledge on hypertension complications	67.1	Moderate
Knowledge on how hypertension diagnosed	17.0	Low
Knowledge on hypertension risk factors	67.1	Moderate
Knowledge of hypertension signs and symptoms	79.6	High
Knowledge on lifestyle practices that reduces the of hypertension	65	Moderate

Data presented are proportions

Respondents were questioned on 7 key areas of hypertension: knowledge on its causes, curability, complications, mode of diagnosis, signs and symptoms, lifestyle modification factors, and risk factors.

4.4.1 Causes of hypertension

For purposes of this study, knowledge of hypertension cause was defined as the ability to associate hypertension with the force of blood pushing through the arteries. Only 2.1% of participants rightly identified that high blood pressure (hypertension) was associated with the force of blood pushing through the arteries (figure 4.4). The majority of the respondents had varied misconceptions regarding causes of hypertension. About 15% of the respondents said hypertension was a result of too much blood in the body, and 33% did not know about the cause of hypertension. Other misconceptions regarding causes of high blood pressure identified included the inability of the heart to pump blood through the body, excessive thinking and talking, tension, excessive salt intake, magic (spiritual), alcohol, anger and emotional problems (data not shown).

4.4.2 Hypertension curability

Knowledge on hypertension curability was defined as the ability of the respondent to identify that hypertension has no cure and can only be managed. About 9% of the respondents said hypertension is no cure, whilst over 70% mentioned that hypertension can be cured (figure 4.4).

4.4.3 Hypertension Complications

The ability of a respondent to identify at least one complication of hypertension through their own recall without it being read out was defined as knowledge of hypertension complication. About 67% of respondents could identify at least one complication for hypertension (table

4.4). The most popular hypertension complication identified was heart attack (80.7%), this was followed by stroke which was identified by 40% of respondents, kidney disease, brain damage, memory loss, eye problems and death were the other less popular complications identified (data not shown)

4.4.4 Hypertension diagnosis

Regarding hypertension diagnoses, only 17% of respondents could identify blood pressure measurement as the mode for diagnosing hypertension (Table 4.4). The majority of respondents (60.6%) had the misconception that hypertension is diagnosed through a blood test (data not shown).

4.4.5 Hypertension risk factors

As much as 67.1% of respondents could identify at least one practice that predisposes individuals to hypertension (table 4.4) whilst 27% of respondents could not identify any at all. Excessive alcohol consumption was identified by the majority of respondents (75.5%) as a predisposing factor to hypertension. 62.6% also identified unhealthy diets while stress, lack of physical activity and tobacco use were identified by 43.2%, 40.1% and 32.4% of respondents respectively (data not shown)

4.4.6 Signs and symptoms of hypertension

Knowledge of the signs and symptoms of hypertension was high (Table 4.4). About 80% of respondents said that there are no clear signs and symptoms of hypertension, while about 8% indicated that there were signs and symptoms of the disease. 12% of respondents did not know if hypertension had signs and symptoms.

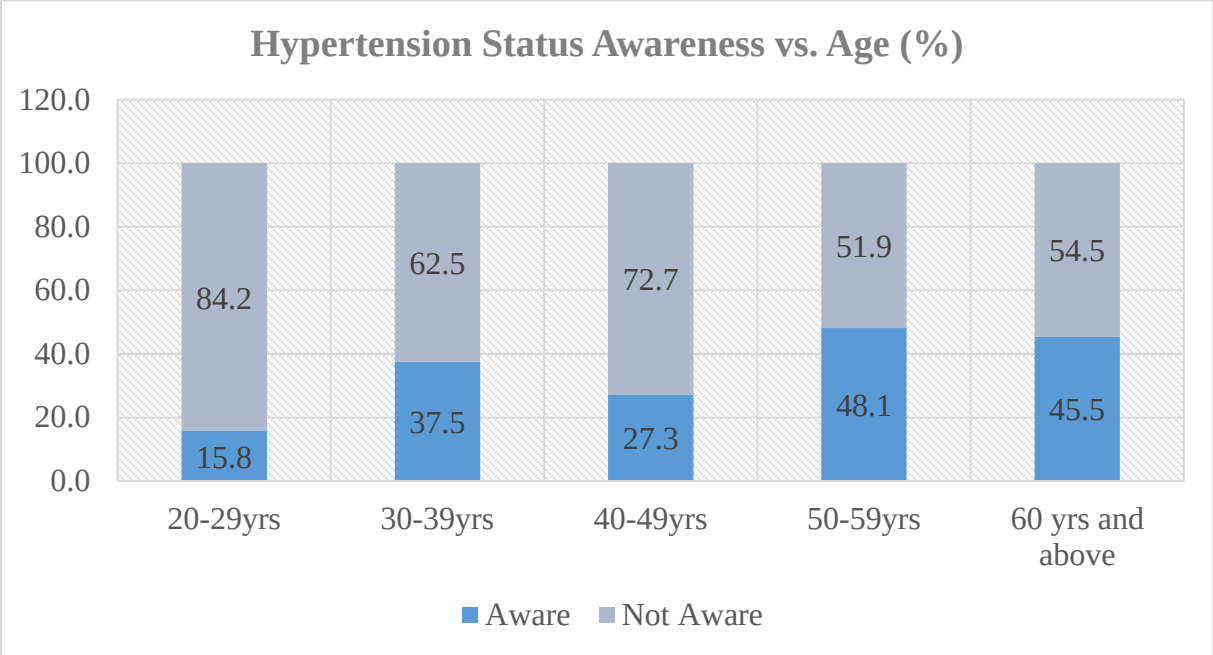
4.4.7 Lifestyle modification for hypertension prevention

About 65% of respondents could identify at least one lifestyle modification practice that can reduce one's risk to hypertension (Table 4.4). Eating fruits and vegetables was most dominant, followed by eating less fat and eating less salt. Other lifestyle modification practices identified were moderate alcohol intake, quitting smoking, weight loss and physical exercise (data not shown).

4.5 Hypertension Awareness

Hypertension awareness for the purposes of this study was defined as respondents self-reporting that they have ever been told by a medical professional that they have hypertension. Results from the study indicated that 38.4% of respondents were hypertensive or had an average systolic blood pressure 140mm Hg and above or average diastolic pressure 90mm Hg and above, or both systolic and diastolic blood pressure 140/90 mm Hg and above. From the total of 147 individuals who were identified as hypertensive, 61.9% (91) were not aware of their status and they had never been medically diagnosed as hypertensive. For respondents who were aware of their hypertension status, about 41% (23) of them were not currently on treatment. Among hypertensive participants who were on treatment, only 42% (14) had reached a treatment goal of average systolic BP of <140mmHg and or a diastolic BP < 90mmHg.

Figure 4.2: Hypertension status awareness and age



Data shows proportions of respondents aware of hypertension status disaggregated by age

Respondents aged 50 years and above were found to be more aware of their hypertension status than their younger counterparts (figure 4.2). There was no significant association between the age of hypertensives and their knowledge of their hypertension status

Table 4.5: Hypertension status awareness and level of education

Educational Level	**Hypertension Status**

	Aware of Hypertension Status (%)n=147	Not Aware of Hypertension Status (%) n=147	Total
No Formal Education	31(46.3)	36 (53.7)	67
Less than Primary Education	2 (15.4)	11 (84.6)	13
Primary Education	11 (45.8)	13 (54.2)	24
JSS/JHS	6 (31.6)	13 (68.4)	19
Secondary/SSS/SHS Education	3 (16.7)	15 (83.3)	18
Tertiary Education	2 (40.0)	3 (60.0)	5
No Response	1 (100)	0	1
Total	56 (38.1)	91 (61.9)	147

Data shows frequencies and proportions

There was an inverse relationship between educational level and respondents' awareness of their hypertension status ($p = 0.014$); the higher the educational level of the respondents, the less likely they were to know of their hypertension status (table 4.5).

4.6 Hypertension and its associated risk factors

Table 4.6: Odds ratios for hypertension risk factors

Hypertension Risk Factor	Odds ratio(OR)	p-value
BMI (ref Normal weight)		
Overweight	1.50	0.188
Obese	3.09	0.084
Alcohol (Ref non-alcohol consumers)	1.39	0.421
Family History (Ref No family history)	1.32	0.247
Age Group (Ref 20-29years)		
30-39yrs	2.20	0.036
40-49yrs	2.88	0.007
50-59yrs	5.08	0.000
60yrs and above	11.10	0.000
Sex (Male, ref. Female)	2.50	0.001

Data shows odds ratios and p-values

Table 4.6 above shows the odds ratios associated with each of the factors examined using hypertension status as the outcome variable from a logistic regression model. The result explains about 13% of the variability in hypertension (Appendix 5 shows details of the logistic regression model). A goodness of fit test on the model yielded a significant result with p-value >0.05 (p=0.2597). Five (5) factors were included in the model, two of which showed significant results. They include the age and sex of the respondents.

Age group of respondent was the lead influencing factor for the hypertension status of respondents. Respondents aged 60years and above were found to be about 11 times more likely of having hypertension compared to those below 20-29years and those aged 50-59years are about 5 times more likely of having hypertension compared to those in 20-29years age group. Those aged 40-49years were about 3 times more likely of having hypertension compared to 20-29years age group whilst those aged 30-39years are about 2 times more likely of having hypertension compared to those aged 20-29years age group.

Men were 2.5 times more likely of having hypertension compared to their female counterparts.

Although the results of BMI, alcohol and family history were not significant, respondents who were overweight were about 3 times more likely of having hypertension compared to those who have normal weight.

Respondents who drink alcohol were about 1.4 times more likely of having hypertension compared to those who do not drink. Similarly, respondents with a family history of hypertension were 1.3 times more likely of having hypertension compared to those who do not have a history of hypertension in their family.

4.7 Attitudes and Practices

Analysis of the information gathered from the six (6) key informant interviews conducted revealed three major running themes that tend to influence attitudes and practices of people within the Nandom district. These themes are:

a. Barriers associated with access to health care services
b. Misconceptions regarding hypertension and

c. Unhealthy lifestyle (especially excessive alcohol drinking)

4.7.1 Access to health care

The people of the Nandom district seek healthcare services as a necessity of illness and they do go to whatever option is easily accessible to them. One community leader mentioned that, people go to the health facility only when they are unwell. However, some people still seek local treatments rather than go to the health facility as mentioned by another key informant. A community health nurse mentioned that because some people believe the local medicines are more potent than orthodox medicines, community members still seek local treatments for health conditions and will only go to the health facility when complications occur. For others, it is the cost of seeking orthodox health care that makes them resort to traditional medicine as was indicated by key informants. Also, mentioned was the belief in witchcraft which tends to influence the health-seeking behaviour of people. Common health problems in the community were malaria, diarrhoea, arthritis and hypertension. Good health to the people of Nandom is the absence of infirmity and the ability to wake up and go about their daily activities. To others, good health is eating good food and keeping a clean environment.

During the study, it was also mentioned that access to health facilities and medications was a problem since most of the communities are far from the main hospital and people generally walk a long distance to get there. The presence of CHPS compounds and health centres in the various sub-districts mitigates this problem a bit but some communities are still far from some of these communities with the health facilities. As mentioned by a community chief, even though there is a health centre in Ketuo, it is still far from the people of Tantuo, Naimwin and Dabaoteng. Also, noted by a community Health nurse, just before

the health facility in Zendaagang is a valley which makes it difficult for people who live on the other side of the community to access health care in the raining season because the tends to fill with water making it difficult to crossover for health care services.

4.7.2 Misconceptions regarding hypertension

To the people of Nandom, hypertension is too much blood in the body this knowledge is probably influenced by the name that is given to hypertension in the local language “Zeizou baalo” literally translated to mean "too much blood disease" According to key informants (Chief and community opinion leader), people say an excessive headache means you have hypertension. Despite such misconceptions regarding what hypertension is, some people rightly believe taking too much alcohol and smoking are some of the causes of hypertension. While others think that hypertension is caused by witchcraft others think that it is not something within the control of the individual (Community leaders)

4.7.3 Unhealthy lifestyle

Community members explore various means to treat hypertension; while some go for the orthodox treatment, others go for traditional treatments including the sniffing and drinking of herbs. “Some people say that when they drink akpeteshie it reduces their blood pressure” (opinion leader).

“As for the drink, we bath it” This was a response when a key informant was asked if people in his community drink alcohol. Another, a community leader (chief of the community) was asked if alcohol consumption was a major indulgence in his community, his response was that “They kill it”, The above statements depict the intensity or magnitude with which people in the District consume alcohol. The major concern was the recent trend in the use of liquor

(spirits) by young people in the communities. "Recently we went to install a queen mother in one of the communities and I had to cease the opportunity to advise the youth to stop drinking especially the hard liquor" (chief of community)

It is not clear why alcohol consumption is high in the District, but this could be blamed on the fact that it is a way of life and a sign of enjoyment. A community leader (Community Health Nurse) who was asked about his opinion on why people drink a lot, he said "they say after a hard day's work, they drink to relax".

With the reported trend of alcohol use among community members as suggested by key informants, it will be important to conduct further studies to understand the reasons and driving factors for alcohol consumption in the District.

Weight gain is a desired status in the Nandom communities since it is associated with a problem free life. According to the chief of one of the communities, community members do not associate weight gain with disease or ill health. When one is gaining weight in a community, the impression is that everything is going on well for them. "When someone is gaining weight, they say things are good for the person." (community leader).

Although smoking was said to be a rare practice among the people in the community, it was observed to be predominantly practiced among the youth. As lamented by the chief of one of the communities visited, "elders of this community have been trying hard to discourage youth in this community from smoking but they hardly listen"

CHAPTER FIVE

DISCUSSION

5.1 Prevalence of hypertension

Recent studies have shown that hypertension prevalence in Ghana has over the years increased in both rural and urban communities. Prevalence of hypertension as estimated ranges from 19% to 48% (Bosu, 2010). Hypertension prevalence was found to be 32% by Opare et al, in their study of the Akuapim North District, semi-urban District in Ghana; they concluded that hypertension prevalence was high and stressed the need for stakeholders to structure interventions on hypertension to promote healthier lifestyles (Opare *et al.*, 2014). Another study by Guwatudde et al., across four countries (Uganda, Tanzania, Nigeria and South Africa) reported a crude hypertension prevalence of 36.9% and an adjusted prevalence of 25.9% (Guwatudde *et al.,* 2015). Hypertension prevalence estimates for Ghana in recent studies was found to range between 31% to 33.4% (Lamptey *et al.*, 2017). Our study found a hypertension crude prevalence of 38.4% which falls within the range of prevalence estimated by other studies.

There has been a reclassification of hypertension by the Joint National Committee (JNC 7) to include a category called prehypertension which is made up of two previous categories; normal and borderline hypertension (Collier *et al,* 2012); persons who are pre-hypertensive are defined as having an SBP between 120-139mmHg and DBP of 80-89mmHg or both SBP and DBP fall within the specified ranges (Huang *et al.*, 2013, Collier et al, 2012). Recent evidence has it that persons who are pre-hypertensive stand a higher risk of progressing to hypertension.(Huang *et al.*, 2013) Huang et al cited that approximately 90% of individuals

with prehypertension have at least one other cardiovascular risk factor and 68% have at least one significant clinical risk factor for heart disease or stroke (Huang *et al.*, 2013). Guwatudde et al in their study found a crude prevalence of prehypertension to be 29.8% and an overall age-adjusted prevalence of 21.0% (Guwatudde *et al.*, 2015). Our study found a slightly higher crude pre-hypertension prevalence than what was found by Guwatudde et al (2015). Vasan et al as cited by Guwatudde et al (2015) estimated a 30% conversion rate from pre-hypertension state to hypertension every four years (Guwatudde *et al.*, 2015). Prevalence of prehypertension estimated in this study was also found to be highest among persons in the younger age groups with those in the 20-29 years' group having the highest prevalence. With such prevalence of pre-hypertension especially among persons in the younger population, it is possible that the burden of hypertension is going to increase significantly in the coming years if nothing is done to control prehypertension, especially among the youth.

Results from this study showed a strong association between hypertension and age. Another study conducted recently among women in Ghana also revealed that there was a considerable increase in hypertension among women who were advanced in age (Nyarko, 2016). Lloyd-Sherlock et al in their study among older adults also revealed the prevalence of hypertension to be as high as 57.1% with an increasing trend as the age increases (Lloyd-Sherlock *et al.*, 2014). This is an indication that hypertension requires increased attention.

Hypertension prevalence was found to be highest in 2 rural communities in the District. This gives an indication that hypertension is no longer the disease of the rich and affluent as was previously perceived, given that most of our participants are from rural communities. Data has shown that both rural and urban communities need equal attention from the health system when it comes to hypertension.

5.2 Risk factors

Hypertension risk factors have been grouped into two categories i.e. modifiable and non-modifiable risk factors (Ibekwe, 2015). Modifiable risk factors include lifestyle factors such as alcohol consumption, smoking, obesity and diet. Non-modifiable risk factors are those that the individual has no control of and hence cannot influence their effect; these include age, sex and family history of hypertension (Ibekwe, 2015). Our study sought to identify key risk factors especially modifiable risk factors predominant among the people of the District.

Alcohol consumption was the most predominant modifiable risk factor among residents of the District. The majority of respondents in our study consumed alcoholic beverages, with almost half of this number being persons below 40 years of age. High alcohol consumption among persons in younger age groups is a cause of worry, given that studies have shown that chronic alcohol consumption was associated with increased incidence of hypertension (Husain et al.,2014). Our results also confirm the association between hypertension and alcohol consumption; Ibekwe in his study also showed a statistically significant association between hypertension and alcohol consumption ($p < 0.001$) (Ibekwe, 2015). The implications are that if care is not taken, the prevalence of hypertension among the youth could increase drastically. Close to a fifth of respondents aged 20-29 years in our study were hypertensive, The Center for Disease Control and Prevention in the US (CDC) estimated hypertension prevalence among adults during 2011-2014 to be 29% and prevalence was 7% among persons between the ages of 18-39 years. (Yoon et al., 2015). Kayima et al., (3013) also found the prevalence of hypertension among respondents below 30 years to be 9.3% in an Ethiopian population and 48.1% in a Mozambican population.

Interestingly, our study found the proportion of women who took alcohol to be higher than their male counterparts. Contrary to findings in a study conducted between 1997 and 2007 by Wilsnack et al in 35 countries which showed that alcohol consumption was highest among men than women (Wilsnack et al, 2010).

In the Nandom District, obesity was not observed as a major lifestyle challenge since very few of the respondents were obese. However, persons who were overweight accounted for two-fifths of respondents. Studies by Dua Suman et al revealed a significant positive correlation between obesity and both systolic and diastolic blood pressure (Dua *et al.*, 2014). Guwatudde also found a prevalence of hypertension to be higher among persons who were overweight as compared to those who were not (PR= 2.11, 95% CI = 1.56- 2.84) and a much higher prevalence among persons who were obese (PR = 2.11, 95% CI = 1.56 – 2.84) (Guwatudde *et al.*, 2015). With no laid down measures to control overweight, it is possible that the figures for obese persons in the District are likely to increase. This is of much concern, giving that our results indicate that persons who are overweight were more likely to develop hypertension compared to those who are underweight.

Previous research in 4 Sub-Saharan African countries showed about 9.5% of the population currently smokes whilst another 8.2% previously smoked (Guwatudde et al., 2015). They also found that persons who smoked unfiltered tobacco had significantly higher prevalence of hypertension than those who had never smoked with an adjusted PR of 1.7 (1.04 - 2.91) (Guwatudde *et al*., 2015). In our study, smoking was not identified as a key risk factor among community members with less than 10% of the population being smokers, however, the prevalence of hypertension among those who currently smoke as well as those who previously

smoke was much higher (42% and 61.5% respectively) compared to those who never smoked (37.2%).

5.3 Knowledge and awareness about hypertension

Adequate knowledge of hypertension among hypertensives will invariably affect treatment outcomes. Likewise, adequate knowledge of hypertension among community members will tend to influence lifestyle choices and improve efforts towards hypertension prevention and control. Adequate knowledge of hypertension has been identified as one of the key driving factors for hypertension control (Abd El-Hay *et al.*, 2015). Hypertension knowledge, in general, was found to be relatively high among respondents, even though knowledge on specific aspects of hypertension was found to be poor. Mlunde in her study found that 66% of respondents had ever heard of hypertension even though few know of its risk factors (Mlunde, 2010). Knowledge was found to be averaging 50%-70% in 3 out of the 7 subject areas (complications of hypertension, lifestyle modification factors and hypertension risk factors) and high (>70%) in one area (presence of signs and symptoms of hypertension). Opare et al found that even though 90% of respondents were aware of their hypertension status, knowledge on hypertension, including knowledge of any three correct facts about hypertension was found to be very low (Opare *et al.*, 2014). Knowledge was low (<50%) on curability of hypertension. This could be blamed for the high level of non-compliance to treatment among hypertensives in the District, with more than two-fifths of hypertensives who were aware of their status not being on any treatment. Poor adherence, according to the WHO, is the most important cause of uncontrolled blood pressure; it is estimated that 50–70% of people do not take their antihypertensive medication as prescribed (Hashmi *et al.*, 2007). Results from a study cited by Anowie and Darkwa, reveals that 1 out of 5 hypertensives had

a misconception that taking hypertension medications could cure high BP and nothing could be done to prevent hypertension (Anowie and Darkwa, 2016).

Knowledge regarding mode of diagnosis was also very low, with less than a fifth of respondents knowing the right mode for diagnosing hypertension. Too much blood in the body was the predominant response of the cause of hypertension; this is probably the reason why hypertension is referred to as "excess blood disease" in the local parlance.

Hypertension awareness among respondents was found to be low. Less than half of respondents who were hypertensive knew of their hypertension status. This could generally be associated with the fear of the unknown as indicated by one community Health Nurse. According to her, there are community members who just fear to have their blood pressure checked for fear that they would be diagnosed hypertensive. For others, it was the fear of being asked to stop eating some foods. Lamptey et al, also found hypertension awareness of 46% with just about 1.3% of hypertensives under control (Lamptey *et al.,* 2017). Kayima et al revealed an awareness rate of 71% among hypertensive patients in North Africa; West and Central Africa seemed to have the lowest levels of awareness of hypertension status (Kayima *et al.*, 2013). Treatment rate of hypertension in the same study ranged from 5% in rural Nigeria to 91% in urban North Africa; however, control rates were uniformly low and did not exceed 45% (Kayima *et al.*, 2013).

5.4 Attitude and Practices towards hypertension

Even though the general health seeking behaviour of the people of Nandom District can be described as positive, there are some instances where community members still have negative health seeking behaviour.

Excessive alcohol consumption in the Nandom District was confirmed by key informant interviews, especially on alcohol consumption among the youth. With the reported trend of alcohol use among community members as suggested by key informants, it will be important to conduct further studies to understand the reasons and driving factors for alcohol consumption in the District.

Attitude and practices of community members towards hypertension could be described as both negative and positive. While others considered hypertension as a serious condition, others also have a somehow nonchalant attitude towards hypertension. Taking herbal medications such as Moringa is the preferred option to taking orthodox medications prescribed by the doctor. One of the key misconceptions of hypertension is the belief that hypertension is caused by witchcraft.

Such beliefs and misconceptions regarding hypertension influences the behaviours and practices of the people. They also influence people's adherence to antihypertensive treatment and influences people's acceptance for screening interventions.

Results from this study show that the people have a fair knowledge of hypertension, its risk factors and complications, however, this knowledge does not translate into a healthy lifestyle. They are found indulging in behaviours that put them at a high risk of developing hypertension. One can possibly infer that people do not attach much importance to hypertension and as such are unwilling to adjust their lifestyles. Anowie and Darkwa, (2016), cited Nisbet et al (2008) that in order for behaviour to change, people must feel personally vulnerable, to threats, view the possible consequences as severe and see that taking action is likely to either prevent or reduce the risk at an acceptable cost. It could also be that people

generally lack the motivation to adopt healthier lifestyles. Persons must feel competent to effect and maintain a new behaviour (Anowie and Darkwa., 2016)

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Conclusions

Hypertension is undoubtedly a key public health issue in the Nandom District. Results from this study suggest that hypertension is not only in the urban communities but also in the rural communities as in the case of Nandom District

Even though knowledge on some subject areas of hypertension i.e. knowledge on risk factors and hypertension complications was found to be high, knowledge was found to be low in other subject areas such as the curability of hypertension.

Alcohol was found to be a key modifiable risk factor for hypertension in the District. Alcohol consumption in the public and among the youth particularly was a major concern for key stakeholders interviewed. Results from the study showed a high proportion of alcohol consumers among respondents.

Even though obesity is low in the District, overweight is rather very high and if care is not taken the figure for obesity will also increase in no time. After all the persons, currently obese were once upon a time overweight

Smoking was not identified as a major risk factor among community members even though prevalence for hypertension among current smokers and previous smokers was much higher than the prevalence among non-smokers.

Results from the study further revealed a rather large proportion of hypertensives who have never been medically diagnosed and thus were oblivious of their hypertension status.

The study also saw that there seemed to exist among community members an attitude that suggests that they did not accord hypertension the needed importance even though they have a fair knowledge of its risk factors and complications.

6.2 Recommendations

Hypertension is a key public health issue, and in the Nandom District, there is the need for strong public interventions to deal with the issues of high hypertension prevalence in the District. In the Nandom District and the country at large, there should be public health education in all aspects of hypertension in general with emphasis on the treatability of hypertension and the need for compliance to antihypertension medication. The Ghana health service can collaborate with Non-governmental organisations (NGOs) and civil society organisations (CSOs) to conduct such health education activities.

There is the need for public health intervention on alcohol consumption in the District. Targeted interventions for the youth are recommended to decrease alcohol consumption among the youth and mitigate the escalation of the prevalence of health conditions such as hypertension and liver cirrhosis among the youthful population.

Public intervention on weight reduction is recommended. Community members should be educated on the consequences of excess weight, to enable them to associate excess weight gain with the disease. They should be educated on the need to cut down on fat intake, especially pork, which usually compliments pito on special days like Sundays.

Increasing service and opportunity for early diagnosis of hypertension as well as an effective referral system are recommended. Hypertension screening, especially for older

persons, can be integrated into the routine activities of the Community Health Nurses during home visit. This will afford for the early diagnosis and management of hypertension

The research department of the GHSs should consider further qualitative study into the social-cultural factors that influence the lifestyle choice such as high alcohol consumption among community members.

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Appendices

Appendix 1: Study questionnaire

Knowledge, Attitudes and Practices towards hypertension among Adults in the Nandom District of the Upper West Region

Questionnaire

Date of Interview……..

Community…….

Respondent Code…….

Administrator Code…….

Informed Consent Obtained……..

Q/N	Question	Response
Q100	Age	_____
Q101	Sex	Male……1

		Female……..2
Q102	Nationality	Ghanaian……..1 Burkinabe…….2 Ivorian…….……3 Other Specify……77 (If Burkinabe, Ivorian or Other, Skip Q103)
Q103	Ethnicity	Dagara……1 Sisaala…….2 Waala……..3 Other, Specify……77
Q104	Marital Status	Single/Never Married…….1 Married…….2 Co-Habiting……..….3 Widow/Widower……4 Divorced……..5
Q105	Occupation	_____
Q106	Highest Level of Formal Education Completed	None formal education ……1 Less than primary education…….2 Primary education …….3 JSS/JHS…….4 Secondary/SSS/SHS education…….5 Tertiary education …….6 Post-graduate education ……...7 Don't know …….88 No response …….……..….99
Q107	Religious Affiliation	Christian……..1

		Muslim……..2 Traditionalist…….3 Other Specify……77
Q108	Household Size	_____
Section 2: Knowledge and Awareness		
Q201	Ever Heard of Hypertension?	No……..0 (If No, Skip Q202,Q203 and Q204) Yes……..1 No Response……..99
Q202	When last did you hear of hypertension	About a week ago……1 About a month ago…….2 About six months ago……3 Over a year ago……..4 Not Applicable……66 Other Specify…….77 Don't Know……88 No Response…….99

Q203	Where did you last hear of hypertension	From family/friends…….1 From a facility-based health care provider……..2 From a community-based health care provider……3 From a traditional or faith healer……4 In the media……..5 (If media Answer Q204, If not Skip Q204) Other (specify)_____.....77
Q204	Which Media format did you last hear of hypertension	Print (newspaper, brochure, billboard)……1 Radio…….2 Television……..3 Internet (online, email)……..4 SMS……..……5 Other (specify) _____.....77
Q205	In your opinion, what does High Blood Pressure (Hypertension) mean	Too much blood in the body……..1 Less blood in the body…….2 Difficulty of blood to reach the heart……3 Other Specify……77 Don't Know…….88

		No Response…….99
Q206	In your opinion, what causes hypertension	Long exposure to the sun……..1 The inability of the heart to pump blood to the body.....2 Less blood in the body…….3 Too much blood in the body……..4 Difficulty of blood to move through the arteries…….5 Other, Specify……..77 Don't Know……88 No Response……..99
Q207	How is hypertension diagnosed	Blood test……1 Blood pressure measurement……..2 Pulse/heart rate measure……3 Other Specify,……77 Don't know……..88 No Response……99
Q208	In your opinion, is hypertension curable	No……1 Yes……..2

		Don't know……..……..88 No response…….……99
Q209	What practices will make someone more likely to get hypertension. *Multiple response allowed.* *Do not read out options*	Excessive alcohol use……1 Tobacco use……..…….2 Lack of physical exercise ……..3 Unhealthy diet (high salt intake)……4 High cholesterol……5 Overweight/obesity…….6 Advanced age……7 Family history of hypertension…….……8 Stress……..9 Other (specify)_____.....77 Don't Know…….88 No Response……99
210	There are always clear signs and symptoms of hypertension	No……0 Yes……1 Don't Know……88

		No Response……..99
211	In your opinion, what are the complications that can result from hypertension *Multiple response allowed.* *Do not read out options*	Stroke……1 Heart attack……2 Kidney disease……...3 Memory loss……4 Brian damage……5 Eye problems……..6 Sexual weakness……7 Other (specify)_____.....77 Don't Know……88 No Response……99
212	In your opinion, What are the lifestyle modifications that can help lower blood pressure *Multiple response allowed.* *Do not read out options*	Regular physical activity……..1 Weight loss……2 Eating more fruits/vegetables……3 Eating less fat……..4 Quit smoking……5 Eat less salt……..6

		Moderate alcohol intake……..7 Reduce stress……8 Other (specify)_____.....77 Don't know……..88 No Response……99
213	Do you know of anyone dead or alive with hypertension	No……..0 Yes……..1 No Response……..99
Section 3: Risk Assessment		
301	Do you consume alcoholic beverages	No…….0 Yes……1 NO Response…….99 (If one or No Response, skip Q302,Q303,Q304 and Q305)
302	What type of alcoholic beverage do you usually consume	Pito……..1 Beer…….2 Spirits……..3 Other locally manufactured Spirits……..4
303	In the last 30 days, how many times did you consume an alcoholic beverage	Every Day……..1 1-3 time a week……2 4-6 times a week…….3 Other Specify……..77 Don't Know……..88 No response……99

304	In the last 30 days how many standard alcoholic beverages did you consume in one occasion	
305	In the last 30 days on how many occasions did you consume (more than 5 for men and 4 for women) alcoholic beverages in a sitting	Number…….
306	Do you currently smoke	No……..0 (If No, Skip Q308,Q309,Q310,Q311) Yes……..1 (If yes, skip Q307) No Response……..99 (If No, Skip Q308,Q309,Q310,Q311)
	Did you previously smoke	No……..0 Yes……..1
307	What substances did you/currently usually smoke	Tobacco……..1 Marijuana……..2 Other Specify……..3
308	How often did you/currently smoke	Daily……1 Less than daily…….2 No Response…….99
309	How many sticks did you/currently smoke in one occasion	Number……1 Don't Know…….88 No Response…….99
312	Do you have a family member dead or alive who	No……..0 Yes……..1

	had or currently has hypertension	Don't Know……88 No Response……..99
313	Have you ever been told by a medical professional that you have hypertension	No……..0 Yes……..1 Don't Know……88 No Response…….99
314	How long ago was this	Less than 6 months ago……..1 More than six months but less than a year…….2 About a year ago……..3 More than a year ago……4 Don't Know……. 88 No Response……..99
315	Are you currently taking any medications for your hypertension	No……..0 Yes……...1
316	Have you ever been told by a medical professional that you have diabetes	
317	How long ago was this	Less than 6 months ago More than six months but less than a year About a year ago More than a year ago
Section 4: Anthropometric Measurements		
401	Weight	Reading 1 …….kg

402	Height	Reading 1 ……cm
403	BMI	……
404.1	BP Reading 1	Systolic……..mmHg Diastolic……mmHg
404.2	BP reading 2	Systolic……..mmHg Diastolic……mmHg
404.3	BP Reading 3	Systolic……..mmHg Diastolic……mmHg
404.4	Average BP Reading	Systolic……..mmHg Diastolic……mmHg

Appendix 2: In-depth interview guide

Knowledge, Attitudes and Practices towards Hypertension among Adults in the Nandom District.

Key Informant Interview Guide

Introduction

Hello good morning/afternoon and thank you for meeting me. My name is Reina Marie-Antoinette Mwinbang Der, a Master's in Public Health (MPH) student from Ensign College of Public Health, Kpong. This interview is being conducted is to assist us in understanding:

- ❖ the health-seeking behaviors of people in Nandom District,
- ❖ the perceptions of hypertension among community members,
- ❖ practices people engage in that have a bearing on hypertension,
- ❖ practices people engage in to manage hypertension,
- ❖ the current state of hypertension in the District, and
- ❖ efforts aimed at controlling hypertension in the District

Purpose

This interview is for a study to understand the current trends of hypertension in the District, provide evidence on the hypertension situation, and to generate information to help support the development of effective ways of controlling hypertension in the District and in Ghana as a whole.

Your participation is important because you are a key stakeholder regarding the health of the people in the District. There are no right or wrong answers to any of the questions. Please feel free to express your ideas, opinions, or experiences.

Procedure

This conversation will be recorded. This is to enable us capture all that you will say here today, so that we do not miss any of the valuable information you will share with us today. We hope this will not be a discomfort to you.

We wish to assure you that whatever you share with us today is confidential. We will not associate any of the statements directly to you by mention of name. You will be required to sign an informed consent form.

Health Seeking Behavior, Health Care and Health Concerns

1. Among the people in the community/District, what is considered as good health?

2. What are the most common disease prevention practices in this community/District?

3. What do you consider as the top ten health issues in this community/District?

4. What are the most common things people do to treat illnesses or diseases?

5. Where do people go (or to whom do people go to) for help with illnesses or diseases?

6. Do you think community beliefs have an influence on where people go or to whom they visit with such illnesses or diseases?

7. What are some of these beliefs?

8. Are there specific times in the year when such problems manifest? What are they?

9. What is the first action people take when they are unwell?

10. What health care options are available in the community/District?

11. Which ones do the people patronize more?

12. With regards to geographical locations, how easy is it for people to access health care services in this community/District?

13. Are there any cultural practices that influences the way people seek health care in this community/District?

Hypertension

1. What do people say high blood pressure or hypertension is?

2. What do people say is the cause of high blood pressure or hypertension?

3. What are some of the things people do to prevent high blood pressure or hypertension?

4. What do people do to treat high blood pressure or hypertension?

5. Which categories of people generally get high blood pressure or hypertension in this community/District?

6. Where do people seek help from most if they have high blood pressure or hypertension?

7. What is the general situation of high blood pressure or hypertension in this community / District? Is high blood pressure or hypertension a key health challenge?

8. Where would you rank high blood pressure or hypertension among the top ten diseases in this community/District?

Diet and Other Hypertension Risk Factors

1. Do people in this community/District smoke?

2. What is the general perception on smoking among adults in this community/District?

3. How realistic is it for people in this community/District to quit smoking?

4. What kinds of foods do people in this community/District usually eat?

5. Do you find people in this community/District performing physical activity? What type of physical activity do they do?

6. Do you think there are barriers within this community/District that prevents people from engaging in regular physical activity?

7. Do you think people in this community/District take a lot of alcohol?

8. Which of the category of people drink more alcohol: men, women, young, or old?

9. What is the perception of people on weight gain in this community/District?

10. Do you think peoples' diets have changed in this community/District?

11. What kind of dietary changes have occurred in the community/District?

Closing

Before we end, I would like to ask you if there is anything else you wanted to or needed to say about high blood pressure or hypertension that you couldn't say or that has just come into your mind.

Is there any other observation, information, experience or opinion that you forgot to tell us?

Thank you all so much for meeting with us this morning/afternoon for the interview. Your time is very much appreciated and your responses have been very helpful. Thank you so much for the information shared with us.

Appendix 3: Informed consent form for cross-sectional study

Title of study: Knowledge, attitudes and practices towards hypertension among adults in the Nandom District

Principal Investigator: Reina Marie-Antoinette Mwinbang Der

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

Email: reinader@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 Reina Marie-Antoinette Mwinbang Der, 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, Attitudes and Practices towards Hypertension among Adults in the Nandom District.

Purpose of Research

Studies have shown that Ghana as is facing an increasing burden of hypertension. The Nandom District is equally affected by this health menace, which has negative implications for both the afflicted and the country as a whole. The situation can be effectively addressed if people are knowledgeable about hypertension and seek early diagnosis or treatment.

This research is being conducted to find out about people's knowledge about hypertension in the Nandom District and their attitudes towards it. This research will also generate information on the burden of hypertension in the District and help stimulate interventions to address the situation.

Study procedure

If you agree to participate in this study, our staff will complete an interview with you in your home or your workplace. The interview will take about one hour of your time, and will involve the administration of a questionnaire. You will be asked some questions regarding your knowledge, attitudes and practices towards hypertension. We will also take your blood

pressure readings. Three blood pressure readings will be taken; firstly on both arms, and then on the arm with the highest reading. Your weight and height measurements will also be taken.

Participant Selection

You are being invited to participate in this research because of your residence in the Nandom District. All adults aged 20 years and above are eligible to participate in this study.

Benefits

If you decide to participate in this research, the direct benefit to you is the evaluation of your hypertension and nutritional status.

Your participation will indirectly benefit your community and other communities in your District by helping us to gain an understanding of the hypertension situation in your District to help implement intervention programmes that can save lives.

Possible Risks and Discomforts

You may experience brief discomfort when your blood pressure measurements are being taken. There are no other 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 Reina Marie-Antoinette Mwinbang Der

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: 0262604266/0204307816

Email: moses.klevor@ucc.edu.gh

E-mail: reinader@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 ERC the phone number: 0245762229 or email address: info@ensign.edu.gh

VOLUNTARY AGREEMENT

The above document describing the benefits, risks and procedures for the research title: Knowledge, attitudes and practices towards hypertension among adults in the Nandom District 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 voice to be recorded and for the recording to be used for research purposes, such as reports and presentations. ____Yes ___No

Participant's name:_____

Signature or mark of participant: _____

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

If volunteers cannot read the form themselves, a witness (not project 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 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 Signature of Person Who Obtained Consent

Appendix 4: Informed consent form for key informant interview

Title of study: Knowledge, attitudes and practices towards hypertension among adults in the Nandom District

Principal Investigator: Reina Marie-Antoinette Mwinbang Der

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

Email: reinader@st.ensign.edu.gh

Co-investigator: Moses 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 Reina Marie-Antoinette Mwinbang Der, 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, Attitudes and Practices towards Hypertension among Adults in the Nandom District.

Purpose of Research

Studies have shown that Ghana as is facing an increasing burden of hypertension. The Nandom District is equally affected by this health menace, which has negative implications for both the afflicted and the country as a whole. The situation can be effectively addressed if people are knowledgeable about hypertension and seek early diagnosis or treatment.

This research is being conducted to find out about people's knowledge about hypertension in the Nandom District and their attitudes towards it. This research will also generate information on the burden of hypertension in the District and help stimulate interventions to address the situation.

Study procedure

If you agree to participate in this study, our staff will complete an interview with you in your home or your workplace. The interview will take about one hour of your time. We will be recording the interview with a digital voice recorder; the purpose is to help us capture all the key information that you will be sharing with us.

Participant Selection

You have been chosen to participate in this research because of your position as a Community leader/Health Director. We believe you can contribute to the understanding of the knowledge, attitudes and practices of the people towards hypertension and local health practices.

Possible Benefits

There will be no direct benefit to you if you decide to participate in this study. Your participation will indirectly benefit your community and other communities in your District by helping us to gain an understanding of the hypertension situation in your District 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. The recorded interviews will be confidential, which means that we will not identify your voice recordings with your name. 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 Reina Marie-Antoinette Mwinbang Der

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: 0262604266/0204307816

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Participant consent

I agree to participate as a volunteer in this study. I give permission for my voice to be recorded and for the recording to be used for research purposes, such as reports and presentations. ____Yes ___No

Participant's name: _____

Signature or mark of participant: _____

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

If volunteers cannot read the form themselves, a witness (not project 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 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 Signature of Person Who Obtained Consent

Appendix 5: Logistic regression for hypertension and associated risk factors

```
. logit hyp3 i.newBMI Smoke i.alcohol2 famhist i.AgeGrp2 sex2, or

note: 2.alcohol2 != 0 predicts success perfectly
      2.alcohol2 dropped and 1 obs not used

Iteration 0:   log likelihood =  -254.0798
Iteration 1:   log likelihood = -221.51085
Iteration 2:   log likelihood = -221.02667
Iteration 3:   log likelihood = -221.02578
Iteration 4:   log likelihood = -221.02578

Logistic regression                             Number of obs     =        382
                                                LR chi2(10)       =      66.11
                                                Prob > chi2       =     0.0000
Log likelihood = -221.02578                     Pseudo R2         =     0.1301
```

hyp3	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf.	Interval]
newBMI						
Overweight	1.499234	.4609242	1.32	0.188	.8206846	2.738815
Obese	3.088631	2.015741	1.73	0.084	.8594966	11.0991
Smoke	.7425793	.2137724	-1.03	0.301	.4223771	1.305525
alcohol2						
No Response	1	(empty)				
Yes	1.38546	.5614176	0.80	0.421	.6261367	3.065623
famhist	1.31684	.3133261	1.16	0.247	.8260376	2.099259
AgeGrp2						
30-39yrs	2.197057	.8235411	2.10	0.036	1.053849	4.580409
40-49yrs	2.882605	1.138155	2.68	0.007	1.329537	6.249852
50-59yrs	5.078845	2.032026	4.06	0.000	2.318476	11.1257
60yrs and above	11.09947	4.296564	6.22	0.000	5.197624	23.70278
sex2	2.497956	.6826112	3.35	0.001	1.462105	4.26767
_cons	.0312824	.0185939	-5.83	0.000	.0097579	.1002867