

## THESIS ABSTRACT

Master of Public Health

Adventist University of Africa

School of Postgraduate Studies

**TITLE: PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG WOMEN AGED 25 YEARS OR OLDER IN KPONE-KATAMANSO DISTRICT, GHANA**

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Hypertension in Ghana is a common problem of enormous public and fiscal consequence because of its high occurrence and the severity of its complications. Population-based studies estimate the prevalence of hypertension in Ghana at 19% to 48% (Bosu, 2010). This study's main objective was to determine the prevalence of hypertension and its associated risk factors among women aged 25 years or older in Kpone-Katamanso District, to determine socio-demographic characteristics and lifestyle factors associated with prevalence of hypertension, and determine co-morbidities and family related factors associated with prevalence of hypertension. In addition, assess the knowledge on cause, prevention and treatment of hypertension among the target population.

This study employed across sectional study design. A total population of 216 consenting participants aged 25 years or older from four communities in Kpone Katamanso District were involved in the study.

Data were collected from the study population by household visits using a pre-designed semi-structured questionnaire after taking their consent. The data were entered in SPSS version 20.0. to be presented in tables, and analyzed using Chi-square and binary logistic regression. The significance threshold was set at 0.05.

A total of 73 out of 216 participants were hypertensive, giving the overall prevalence of 33.8%. Its prevalence increased with age (from 13.3% to 56.4%,  $p < 0.000$ ). Among hypertensive participants, the mean SBP reading was  $145.75 \pm 14.13$  mmHg and the mean DBP reading was  $93.70 \pm 9.50$  mmHg whereas the non-hypertensive participants, the mean systolic blood pressure reading was  $114.76 \pm 9.13$  mmHg and the mean diastolic blood pressure reading was  $72.73 \pm 7.24$  mmHg. Forty-six (21.3%) of the subject were previously diagnosed of hypertension (aware of hypertension status).

The Binary logistic regression analysis showed that age 65 and above 8.788 [3.829-92.188:  $p < 0.000$ ), obesity 5.513 [2.013-15.098:  $p < 0.001$ ]) and family history of hypertension 72.132 [19.43-267.613:  $p < 0.000$ ] were found to be significantly associated with hypertension.

The study established that the prevalence of hypertension was high and its associated risk factors included age, obesity and family history of hypertension. Women with a very high risk of developing hypertension like high systolic blood pressure, marked obesity, or a strong familial history of hypertension should undertake blood pressure screening regularly for early detection and prompt treatment.

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PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG  
WOMEN AGED 25 YEARS OR OLDER IN KPONE-KATAMANSO DISTRICT,  
GHANA

A thesis

presented in partial fulfillment  
of the requirements for the degree  
Master of Public Health

by

Kwabena Acheampong

April 2017



PREVALENCE OF HYPERTENSION AND ITS RISK FACTORS AMONG  
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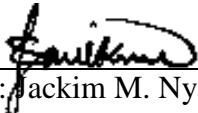
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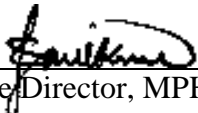
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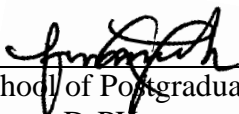
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This work is dedicated to my beautiful wife Vera Acheampong and wonderful sons

Othniel Akwasi Nkrumah Acheampong and Joel Kwabena Amponsah Gyan

## TABLE OF CONTENTS

|  |      |
|--|------|
| LIST OF TABLES -----                         | viii |
| LIST OF ABBREVIATIONS -----                  | ix   |
| ACKNOWLEDGEMENTS -----                       | x    |
| CHAPTER                                      |      |
| 1. INTRODUCTION -----                        | 1    |
| Background of the Study -----                | 1    |
| Statement of the Problem -----               | 2    |
| Objectives -----                             | 3    |
| Broad Objective -----                        | 3    |
| Specific Objectives -----                    | 3    |
| Significance of the Study -----              | 4    |
| Conceptual Framework -----                   | 4    |
| Scope and Limitation of the Study -----      | 6    |
| Operational Definitions -----                | 7    |
| 2. REVIEW OF LITERATURE -----                | 8    |
| Definition of Noncommunicable Diseases ----- | 8    |
| Overview of Cardiovascular Diseases -----    | 8    |
| Prevalence of Hypertension in Ghana -----    | 9    |
| Causes of Secondary Hypertension -----       | 9    |
| Consequences of Hypertension -----           | 10   |
| Hypertensive Complications -----             | 11   |
| Risk Factors of Hypertension -----           | 11   |
| Age -----                                    | 13   |
| Marital Status -----                         | 13   |
| Level of Education -----                     | 14   |
| Employment Status -----                      | 14   |
| Religion -----                               | 14   |
| Smoking -----                                | 15   |
| Alcohol Consumption -----                    | 15   |
| High Salt Intake -----                       | 16   |
| Fast and Fried Rice -----                    | 17   |
| Fruit and Vegetable Intake -----             | 17   |
| Inadequate Physical Activity -----           | 18   |

|  |    |
|--|----|
| Obesity -----  | 18 |
| Parity and Hypertension -----  | 19 |
| Previous Pregnancy Induced Hypertension -----  | 20 |
| Family History of Hypertension -----   | 20 |
| Knowledge of Hypertension -----  | 21 |
| <br>   |    |
| 3. METHODOLOGY -----   | 23 |
| <br>   |    |
| Study Design -----   | 23 |
| Area of Study -----  | 23 |
| Population and Sampling Procedure -----  | 24 |
| Study Population -----   | 24 |
| Settlement Distribution -----  | 25 |
| Sample Size -----  | 25 |
| Sampling Method -----  | 25 |
| Inclusion and Exclusion Criteria -----   | 27 |
| Instruments of Data Collection and Procedures -----  | 27 |
| Data Processing -----  | 28 |
| Method of Data Analysis -----  | 28 |
| Research Ethics -----  | 29 |
| <br>   |    |
| 4. PRESENTATION AND DISCUSSION OF RESULTS -----  | 30 |
| <br>   |    |
| Results -----  | 30 |
| Background Information or Socio-demographic Characteristics -----  | 30 |
| Description of Dependent Variable and Its Distribution -----   | 32 |
| Prevalence of Hypertension -----   | 32 |
| Description of Mean Blood Pressure (Systolic and Diastolic Blood Pressure<br>by Age Group) -----                     | 33 |
| Distribution of Blood Pressure -----   | 33 |
| Physical Measurements -----  | 33 |
| Description of Participants' Knowledge on Hypertension -----   | 34 |
| Participants' Knowledge on Causes of Hypertension -----  | 35 |
| Knowledge on Prevention of Hypertension -----  | 36 |
| Knowledge on Treatment of Hypertension -----   | 37 |
| Chi-square Test of Independent Variable and Its Distribution, and Analysis<br>of Association with Hypertension ----- | 37 |
| Socio-demographic Factors -----  | 37 |
| Behavioural or Lifestyle Related Factors -----   | 39 |
| Co-morbidity and Family-related Factor -----   | 41 |
| Inferential Statistics -----   | 42 |
| Logistic Regression Analysis for Hypertension with All the Independent<br>Variables -----                            | 43 |
| Risk Factors Analysis for Hypertension -----   | 43 |
| Discussion of Result -----   | 46 |
| Prevalence of Hypertension -----   | 46 |
| Knowledge of Hypertension -----  | 46 |
| Causes of Hypertension -----   | 46 |
| Prevention of Hypertension -----   | 47 |
| Treatment of Hypertension -----  | 48 |

|  |        |
|--|--------|
| Prevalence of Hypertension with Sociodemographic Characteristics ----- | 48     |
| Age and hypertension -----   | 48     |
| Marital status and hypertension -----                                  | 49     |
| Level of education and hypertension -----                              | 49     |
| Religion and hypertension -----  | 50     |
| Behavioural Risk Factors and Hypertension -----                        | 51     |
| Smoking and alcohol -----  | 51     |
| High salt intake -----   | 52     |
| Fast and fried rice -----  | 52     |
| Fruit and vegetable intake -----                                       | 53     |
| Physical inactivity -----  | 54     |
| Co-morbidities and Family Related -----                                | 55     |
| Factors and Hypertension -----   | 55     |
| Prevalence of hypertension with BMI -----                              | 55     |
| Parity and hypertension -----  | 56     |
| Previous pregnancy induced hypertension -----                          | 56     |
| Family history of hypertension -----                                   | 57     |
| <br>5. SUMMARY, CONCLUSION AND RECOMMENDATION -----                    | <br>58 |
| Summary -----  | 58     |
| Conclusion -----   | 58     |
| Recommendations -----  | 59     |
| Suggestions for Future Research -----                                  | 59     |
| <br>APPENDICES -----   | <br>60 |
| A. QUESTIONNAIRE -----   | 61     |
| B. DISTRICT MAP -----  | 66     |
| C. LETTER OF CONSENT -----   | 67     |
| <br>REFERENCES -----   | <br>68 |

## LIST OF TABLES

|   |    |
|---|----|
| 1. Stages of sampling selection .....   | 26 |
| 2. Distribution of study group according to socio-demographic characteristics .....         | 31 |
| 3. Distribution of prevalence of hypertension among the study population .....              | 32 |
| 4. Distribution of mean systolic and diastolic blood pressure reading .....                 | 32 |
| 5. Distribution of mean systolic and diastolic blood pressure by age group .....            | 33 |
| 6. Physical measurements of the study population (N=216) .....                              | 34 |
| 7. Distribution on mean body mass index and weight by age group among .....                 | 34 |
| 8. The differences in knowledge amongst the undiagnosed and diagnosed<br>hypertension ..... | 35 |
| 9. Respondents' knowledge on the causes of hypertension.....                                | 36 |
| 10. Measures of prevention of hypertension among study participants.....                    | 36 |
| 11. Knowledge of respondents about treatment of hypertension.....                           | 37 |
| 12. Percentage distribution of blood pressure and socio-demographic .....                   | 38 |
| 13. Percentage distribution of Blood Pressure and Lifestyle related factors .....           | 40 |
| 14. Percentage distribution of Blood Pressure and Co-morbidity factors and.....             | 42 |
| 15. Association between prevalence hypertension and risk factors by binary .....            | 44 |

## LIST OF ABBREVIATIONS

|      |  |
|------|--|
| BMI  | Body Mass Index                            |
| BP   | Blood pressure                             |
| CDC  | Centers for Disease Control and Prevention |
| C.I  | Confidence interval                        |
| Cm   | Centimeter                                 |
| CVD  | Cardiovascular disease                     |
| DBP  | Diastolic Blood Pressure                   |
| GHS  | Ghana Health Service                       |
| GSS  | Ghana Statistical Service                  |
| HTN  | Hypertension                               |
| JNC  | Joint National Committee                   |
| Kg   | Kilogram                                   |
| KKD  | Kpone –Katamanso district                  |
| MOH  | Ministry of Health                         |
| NCD  | Non communicable diseases                  |
| mmHg | millimeter of mercury                      |
| SBP  | Systolic Blood Pressure                    |
| SD   | Standard Deviation                         |
| WHO  | World Health Organization                  |

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## CHAPTER I

### INTRODUCTION

#### **Background of the Study**

Hypertension in Ghana is a common problem of enormous public and fiscal consequence because of its high occurrence and the severity of its complications. Hypertension has been recognized as the best and traditional risk factor for cardiovascular diseases (Allagoa, Mukoro, Kotingo, Ala, Ambaiowei, Asalagha, Enu, & Daprim, 2014). Even though, mostly preventable and changeable, unrestrained hypertension has been accounted to terribly affect the global population's health causing cerebrovascular accident and cardiac diseases (Adebolu, & Naidoo, 2014; Williams, 2009).

Hypertension troubles more than a quarter of the world's grown-up population, and this percentage is likely to reach 29% by 2025 (Cappuccio, Kerry, Adeyemo, Luke, Amoah, Bovet, & Cooper, 2008; Dalal, Beunza, Volmink, Adebamowo, Bajunirwe, Njelekela, & Holmes, 2011). The raise in its prevalence will occur largely in developing countries (Iris, Lorenzo, José, Aralia, Irma, & Isela, 2013).

Hypertension accounts for greater than 12.8% of the total deaths and 3.7% of the disability adjusted life years worldwide (WHO, 2013c; Awosan *et al.*, 2014). In spite of being an extremely treatable condition, research has shown that hypertension remains poorly controlled. Hypertension, also known as high blood pressure (BP), affects millions of people.

Hypertension is defined as having a blood pressure reading of more than 140/90 mmHg over a number of weeks. Along with major cardiovascular risk factors, hypertension groups with obesity, dyslipidemia, and glucose intolerance, which in turn link with unrestrained blood pressure (BP), further increasing total risk (Kaur, 2014).

Women often have multiple concurrent risk factors, central obesity, elevated total cholesterol, high density lipoprotein, and higher systolic BP, which independently predict cardiovascular events (Geraci, 2013). Data are inadequate on specific sex driven treatment considerations, but several information proposes treatments that may show differential benefit.

Secondary hypertension and problems related to menopause add to the difficulties of treating hypertensive women; as a result, it is imperative to appreciate sex-specific factors that influence risk and blood pressure control in hypertensive women and to apply this understanding to treatment and prevention (Abramson & Melvin, 2014; Geraci et al., 2013).

### **Statement of the Problem**

Cardiovascular disease is the most frequent cause of death (Sitar-tăut, Zdrengea, & Sitar-tăut, 2009) in women in Ghana, and hypertension is a major cause to cardiovascular mortality. The occurrence of hypertension in women is progressively increasing, paralleling the eruptions of obesity and diabetes (Abramson & Melvin, 2014).

Blood pressure control rates among women are sub optimal, even when secondary causes are identified and treated (Geraci and Geraci, 2013). Some information differentiating hypertensive women to age-matched men propose benefits

to sex-specific strategies, but further study is needed to determine best treatments for women throughout their (Abramson *et al.*, 2014;Geraci *et al.*, 2013).

Information on hypertension and its risk factors in population from Kpone – Katamanso district (KKD) is scarce. The annual report from Kpone-Katamanso District health directorate demonstrate that the proportional morbidity of hypertension increased from 3.4% in 2014 to 4% in 2015. But this information on the prevalence of hypertension and its risk factors in KKD is defective due to poor data capture.

The accuracy and representativeness of the routine institutional information is insufficient; there have been no population-based studies in KKD on the level and risk factors of hypertension where KKD is located. Taking into consideration that hypertension is becoming more widespread as urbanization increases, the purpose of the study is to present population based information, on the prevalence of hypertension and their known major risk factors in KKD to provide the much needed reference data to drive hypertension prevention and control strategies in the district.

## **Objectives**

### **Broad Objective**

To determine the prevalence of hypertension and its risk factors among women aged 25 years or older in Kpone-Katamanso District.

### **Specific Objectives**

1. To determine the prevalence of hypertension among women aged 25 years or older.
2. To assess the level of knowledge on causes, prevention and treatment of hypertension among women aged 25years or older.

3. To determine socio-demographic characteristics and lifestyle factors associated with prevalence of hypertension among women aged 25 years or older.
4. To determine co-morbidities and family related factors associated with prevalence of hypertension among women aged 25 years or older.

### **Significance of the Study**

Hypertension have been shown to be positively and constantly linked to the risk for stroke (WHO, 2016) and coronary heart disease (Kapoor, Vyas, Patel, Mehta, Mehta, Modi, & Nair, 2014). This study enabled the women aged 25 years or older to be aware of their blood pressure and to detect the high blood pressure before it gets worse with complications. The data generated from this study can be used to plan appropriate interventions that are required for the control and risk factors modifications in the district.

### **Conceptual Framework**

There are a lot of behavioral or lifestyle risk factors for the development of hypertension (Fig. 1) including: unhealthy diet such as less consumption of fruits and vegetables, high fat and salt diet. Harmful alcohol use, tobacco use and physical inactivity. These behavioral risk factors are highly influenced by people's working circumstances. In addition, there are several other factors that increase risk of hypertension, including obesity. Sociodemographic factors, e.g. education have adverse impact on lifestyle in the development of hypertension. For instance, redundancy or fear of redundancy may have an impact on stress levels that in turn influences high blood pressure.

Finally, the risk of hypertension increases with age due to hardening of blood vessels, although ageing of blood vessels can be prolonged through healthy living, including healthy eating and reducing salt intake in the diet. In some cases there is no known specific cause for hypertension.

Genetic or family related factors may play a role in the development of hypertension. Preeclampsia is hypertension that arises in some women during pregnancy. It typically reconciles after the birth but it can sometimes remain, and women who encounter preeclampsia or pregnancy induced hypertension are more likely to have hypertension in later life.

In addition, hypertension was a dependent variable, age, marital status, level of education, employment status(Yu, Wu, Li, Zhou, Zhao, Ji, & Tong, 2016), religion, smoking status, alcohol use and physical inactivity, obesity, parity, previous pregnancy induced hypertension and family history of hypertension were independent variables and knowledge causes, prevention and treatment of hypertension were intervening variables

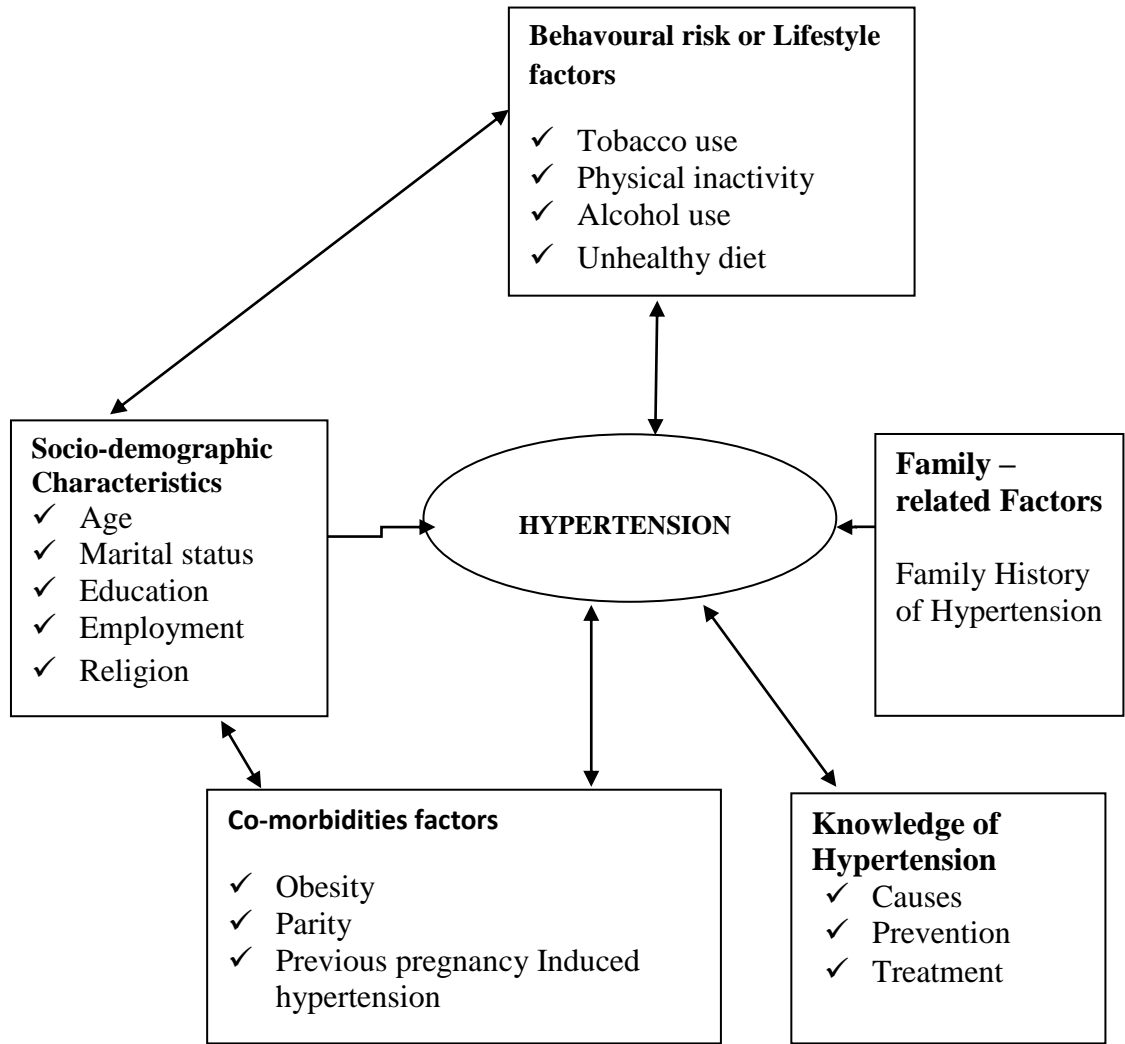


Figure 1. Main factors that contribute to the development of hypertension

### Scope and Limitation of the Study

The study emphasizes on the survey of the level of prevalence of hypertension and its risk factors among women aged 25years or older in Kpone-Katamanso District in Ghana. Precisely, the study covers lifestyle risk factors that are associated with hypertension in the study and other factors such as Sociodemographic characteristics, co-morbidities and family related factors and knowledge of hypertension.

Nevertheless, the current field study was restricted to four selected communities within the district. The researcher limited his study to only women.

Participants of the research were persons who live in rural-urban area in Kpone-Katamanso District and the outcomes of the research were truly reflection of participants understanding.

### **Operational Definitions**

**Hypertension (raised blood pressure)** defined as systolic BP  $\geq 140$ mmHg and/or diastolic BP  $\geq 90$ mmHg (Moreira, Cipullo, Ciorlia, Cesarino, & Vilela-Martin, 2014)

**Modifiable risk factor:** A behavioral risk factor that can be reduced or controlled by intervention, thereby reducing the probability of disease.

**Non-modifiable risk factor:** A risk factor that cannot be reduced or controlled by intervention; for example: age, gender, and family history.

**Noncommunicable disease (NCD):** Chronic conditions that do not result from an (acute) infectious process and hence are “not communicable” or a disease that has a prolonged course, that does not resolve spontaneously, and for which a complete cure is rarely achieved.

**Obesity:** the percentage of the population aged 25years or older having a body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>.

**Risk factor:** “An aspect of personal behavior or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury, or other health condition.

**Parity:** refers to number of live birth of the participants

#### **Knowledge on hypertension**

It refers to the participants knowing and understanding about causes, prevention and treatment of hypertension. The level of knowledge appraisal was structured of yes/no sort of questions.

**“Excess”:** more than or above what is necessary, usual, or specified; extra.

## CHAPTER 2

### REVIEW OF LITERATURE

This chapter outlines the review of existing literature of the subject matter of the study. It focuses on the definition of non communicable, overview of cardiovascular disease, risk factors for cardiovascular disease, prevalence of hypertension in Ghana, causes, consequences and hypertensive complications and risk factors of hypertension.

#### **Definition of Noncommunicable Diseases**

Noncommunicable diseases (NCDs), also known as chronic diseases, are not handed from person to person. They are of long period and generally slow progression. The four (4) main types of noncommunicable diseases are cardiovascular diseases (CVDs), cancers, chronic respiratory diseases and diabetes (WHO, 2015).

#### **Overview of Cardiovascular Diseases**

CVD is a term used to describe a group of diseases that influence the heart or blood vessels. The various diseases that fall under the canopy of cardiovascular disease include coronary artery disease, heart attack, heart failure, high blood pressure and stroke. Hypertension describes high blood pressure levels and often occurs along with atherosclerosis.

Hypertension is a key risk factor for coronary heart disease, stroke, heart failure, peripheral vascular disease, and chronic kidney failure. It also results in end-organ damage and can lead to chronic renal failure, retinal damage of the eye, and

brain atrophy. The number of people, who die from CVDs, mainly from heart disease and stroke, will increase to attain 23.3 million by 2030 (Al-Mawali, 2015). About 9.4 million Deaths each year, or 16.5% of all deaths can be certified to high blood pressure (Nag, & Ghosh, 2013; Gitt, Lautsch, Ferrieres, Kastelein, Drexel, & Horack, 2016).

### **Prevalence of Hypertension in Ghana**

Hypertension has consistently ranked among the top ten causes of outpatient morbidity accounting for 3% to 5% of all new outpatient diseases (MOH, 2012). In the Greater Accra Region, hypertension ranked as the second commonest cause of outpatient morbidity in 2008.

Generally, the proportion of new outpatient diseases due to hypertension is highest in the Region followed by, Eastern and Volta Regions and lowest in the three northern regions (MOH,2012). Population-based studies estimate the prevalence of hypertension at 19% to 48% (Bosu, 2010)

### **Causes of Secondary Hypertension**

Secondary hypertension has a known cause and accounts for five per cent to ten per cent of all hypertension case. (Onyekwere, Ezebuio, & Samuel, 2013).

There are some factors which predispose adults to hypertension. The causes of secondary hypertension in women are the same as that in men, (Geraci *et al.*, 2013), although the relative prevalences vary by age group (Viera, & Neutze, 2010), with a gender preference in a few select causes.

Even though aortic coarctation is more frequent in men, renal artery stenosis resulting from fibromuscular dysplasia is more common among young adult women (Viera, & Neutze, 2010). Hypertension is common in women with collagen diseases

(eg, lupus, systemic sclerosis), which suggests renal involvement by the diseases' autoimmune process (Geraci *et al.*, 2013).

### **Consequences of Hypertension**

The World Health Organization rates hypertension as one of the most important causes of untimely death worldwide. It is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths (World Heart Federation, c2015).

The excessive high pressure on artery walls caused by hypertension can damage blood vessels alongside with organ function. This augments the risk for mounting some dangerous health situations including heart attack, stroke, chronic heart failure, and kidney disease (Kayce, & Bernie, 2015).

Approximately 70% of people who have their first heart assault before have hypertension. About 80% of people who have their first stroke have high blood pressure (CDC, c2015.) Hypertension causes atherosclerosis, which reduces blood flow and oxygen to the heart. This can also cause heart failure or even a heart attack. Heart failure occurs when the heart cannot thrust sufficient blood and oxygen to meet the body's needs.

Heart attacks occur due to the blood supply to the heart being blocked; therefore, the heart does not get the needed oxygen it needs to survive (Kayce *et al.*, 2015). Hypertension can also have damaging effects to the brain, particularly it can cause an aneurysm or stroke. Increased blood pressure may cause blood vessels to deteriorate and protuberance, leading to the formation of an aneurysm (Kayce *et al.*, 2015).

## **Hypertensive Complications**

Sex-related differences have been noted in the frequency of hypertensive complications. There is proof that shows that hypertension, is linked particular to stroke and heart failure, it produces a higher incidence of diastolic dysfunction in women than in men (Geraci,2013).

These drifts have been robustly connected with modifications in individual lifestyle such as an increase in tobacco use, extreme alcohol consumption, inadequate physical activity and adoption of unhealthy diets that are high in salt, refined sugar and unhealthy fats (Bosu, 2015) and oils (Steven, Hilda , Samuel , Ademola , Charles, & Isabella, 2013).

. The presence of left ventricular hypertrophy (LVH) is a strong risk factor for cardiovascular events and may carry a greater risk in women than in men with similar degrees of hypertrophy (Geraci *et al.*, 2013). Women are more likely than similar men to develop LVH, but they experience less hypertrophy regression in response to antihypertensive therapy (Bosu, 2015; Geraci *et al.*, 2013).

Atherosclerosis is an arterial disease manifested by a loss of elasticity and hardening of the vessel wall. The plaque, form throughout the arterial wall, reducing the size of the vessel and limiting the blood flow. Over a period of time, atherosclerotic lesions can completely obstruct the lumen by build-up of the plaque material and later contribute to thrombus formation.

## **Risk Factors of Hypertension**

A range of factors augment an individual's risk for developing hypertension. Modifiable Risk factors include overweight or obese, lack of physical activity, tobacco usage, unhealthy diet excessive, and alcohol consumption. Non modifiable risk factors, such as age, race, family history and etc, cannot be controlled. However,

there are risk factors for example diet that can be controlled to decrease a patient's likelihood of developing hypertension (Kayce *et al.*, 2015).

Epidemiological surveys that used the WHO Steps method (Mayosi, 2013) reported the overall prevalence of hypertension in Sub Sahara Africa (SSA) was estimated at 16.2% (95% CI 14.2% to 20.3%) (Mayosi, 2013) with, an estimated number of hypertensive individuals to be 74.7 million (Ogah, Okpechi, Chukwuonye, Akinyemi, Onwubere, Falase, & Sliwa, 2012).

The prevalence of hypertension varies widely from country to country. It is estimated that the number of affected persons will increase by 68% (Mayosi, 2013), (125.5 million) by 2025 (Ogah *et al.*, 2012). Mass migration of rural Africans to urban areas and rapid changes in lifestyle (Mayosi, 2013) and risk factors account for the rising prevalence of hypertension (Ogah *et al.*, 2012).

There is no doubt that hypertension is related to genetic and environmental factors. Obesity has a contributory role. Alcohol consumption is also commonly associated with hypertension. Secondary hypertension is a rare form of high blood pressure and is mostly caused by another medical condition or treatment.

The prevalence of hypertension was higher in urban 54.6% than rural areas 19.3% in studies that covered both types of area and increased with increasing age. (Addo, Agyemang, Smeeth, de-Graft Aikins, Edusei, & Ogedegbe, 2012).

Factors associated with high blood pressure included increasing body mass index (Mayosi, 2013) increased salt consumption (Awuah, Anarfi, Agyemang, Ogedegbe, & Aikins, 2014) family history of hypertension and undue alcohol intake (Addo *et al.*, 2012).

## **Age**

Changes in body structure and function occur with age. Age-related rise of blood pressure is neither an inevitable nor normal biological accompaniment of the age process. Blood pressure rises with age for most people from youth through middle age (Galambos, Fang, Krahn, Johnson, & Lachman, 2015).

As a consequence, by middle age, population average systolic blood pressure are above optimal levels (below 120/80 mmHg). Aging is not only a risk factor to develop hypertension but also a risk factor to cause many diseases. However, aging itself is not a disease.

Effort of exercise and good nutrition can decrease prevalence of hypertension with age and contribute to healthy active expectancy. According to Kaori Mizumoto, cross-sectional studies, as well as prospective observational cohort studies Kumar, Selvaraj, & Nelson,) have constantly confirmed an association between age and blood pressure in most populations with diverse geographical, cultural and socio-economic characteristics (Lwin-Mm-Khin, Oranut, & Chaweewon, 2011).

## **Marital Status**

Marital status and marital transitions have indirect influences on health outcomes including hypertension (Marshall, Nazroo, Feeney, Lee, Vanhoutte, & Pendleton, 2015; Shabir, Sajad, Rafiq, & Ashfaq, 2013). Marital and familial commitment may encourage married women and men to self-regulate their health risk behaviors.

Women who are not in committed relationships have a higher likelihood of engaging in risky health behaviors. Specifically, married people are more likely to quit smoking, more likely to conform to dietary guidelines and less likely to smoke excessively (Shabir *et al.*, 2013).

## **Level of Education**

Increasing research indicates that the incidence and prevalence of hypertension (Van de Poel, O'Donnell, & Van Doorslaer, 2009) is highly associated with social class as best measured by education and occupation.

Few studies have explored the influence of education as a risk factor for elevated blood pressure and the risk of hypertension in the Chinese population. An earlier study conducted in China found no association between education and blood pressure; they were restricted (Van de Poel *et al.*, 2009) to a rural population with low level of education. Consequent studies have reported the important effects of educational attainment on prevalence of hypertension and cardiovascular disease (Van de Poel *et al.*, 2009).

## **Employment Status**

Women form the most vulnerable section of the society. Health and well-being continue to elude millions of women worldwide (Kuralselvi & Ramya, 2009). Modern life style changes has posed tension, anxiety and worry in the non-working women population while hyper activity, workaholism, irritability and psycho metric illness has affected the working class with a rising incidence of hypertension (Kuralselvi *et al.*, 2009).

## **Religion**

There is association between frequent church attendance and lower systolic and diastolic blood pressure (Koenig, 2012 ). Attention has been mounting in the issue of faith and health. Although study is inadequate regarding health outcomes, there is obvious proof (Sullivan, Badwe, Rath, Pramesh, Shanta, & Digumarti, 2014), especially from epidemiological studies, that membership in a religious denomination

and regular involvement in worship services are associated with lower mortality rates and sickness risk (Jeserich, 2014).

Many studies have reported positive effects of religion on cardiovascular disease, nervousness, pain in cancer patients, and hypertension (Chiesa, & Serretti, 2009). A meta-analytic review of this literature found an association of religious involvement and mortality of OR = 1.29 (Hill, & Pargament, 2008), indicating that religious people had, on average, 29% elevated odds of survival during any follow-up period than did less religious people (Hill *et al.*, 2008). This effect is comparable in magnitude to the effect of exercise on coronary heart disease.

### **Smoking**

Smoking is considered one of the main risk factors of hypertension; smoking with high and low nicotine cigarettes are particularly responsible for an increase in high systolic blood pressure, heart rate and myocardial oxygen demand. Several studies have shown that there is an alteration in blood pressure and heart rate associated with those who have stopped smoking tobacco.

Any amount of smoking, even occasional, damages the heart and blood vessels, and chemicals in smoke form plaques within the arteries. Acute exposure to passive smoking determines a gradual increase in blood pressure due to the combined effect of nicotine that acts by endothelial dysfunction and sympathetic stimulation (Ain & Regmi, 2015).

### **Alcohol Consumption**

Several epidemiological data both on clearly healthy people and on patients with a history of cardiovascular events, indicate a consistent risk reduction in cardiovascular events or all-cause death among average alcohol drinkers (Jacobs &

Steyn, 2016), but, on the other hand, the harm of excess and irregular drinking (Costanzo, Di Castelnuovo, Donati, Iacoviello, & de Gaetano, 2011) . If cardiovascular patients are heavy alcohol drinkers they must be strongly advised to withdraw. Showed in recent meta-analyses; if not contraindicated, regular alcohol consumers should not exceed one drink/day for women or up to two drinks/ day for men (Jacobs & Steyn, 2016).

### **High Salt Intake**

Excessive sodium consumption (>2 grams/day, equivalent to 5 g salt/day) and inadequate potassium intake (less than 3.5 grams/day) contribute to high blood pressure ([www.who.int/mediacentre/factsheets/fs393/en/](http://www.who.int/mediacentre/factsheets/fs393/en/)) and enhance the risk of heart disease and stroke (WHO, 2016). The major source of sodium in our diet is salt, even though it can come from sodium glutamate, used as a condiment in many parts of the world (WHO, 2016).

Most people use too much salt on average 9–12 grams per day, or about twice the recommended maximum level of intake (WHO, 2016). The main benefit of lowering salt intake is a matching reduction in high blood pressure (WHO, 2016).

World Health Organisation Member States have agreed to reduce the global population's intake of salt by a near 30% by 2025 (WHO, 2016). Input salt reduction measures will cause a further year of healthy life for a cost that falls below the typical yearly income or gross domestic product per person (WHO, 2016). An estimated 2.5 million deaths could be prevented each year if global salt utilization were condensed to the recommended level (WHO, 2016).

### **Fast and Fried Rice**

Fast and fried food consumption and its effects on cardiovascular disease are still subjects of debate (Fortney). Consumption of fried foods is highly prevalent in the Western dietary pattern.

Though limited studies have documented a positive association between frequency of fried food intake and risk of hypertension, other researchers other researchers have not established such an association (Gadiraju, Patel, Gaziano,& Djoussé, 2015). It is unclear whether intake of fried foods is associated with a higher risk of heart failure (Gadiraju *et al.*, 2015).

### **Fruit and Vegetable Intake**

Fruits and vegetables are important components of a healthy diet. Reduced fruit and vegetable consumption is linked to poor health and increased risk of noncommunicable diseases (NCDs). An estimated 6.7 million deaths worldwide were attributed to inadequate fruit and vegetable consumption in 2010 (WHO, 2014).

Current evidence indicates that fruits and vegetables consumed as part of the daily diet can help reduce the risk of coronary heart disease (WHO, 2014), stroke (WHO, 2014) and certain types of cancer (WHO, 2014).

Fruit and vegetable consumption may reduce the risk of NCDs through the increased availability of various nutrients and their ability to modulate associated risk factors, though exact mechanisms remain unclear. Elevated blood pressure and cholesterol are risk factors for coronary heart disease and stroke, and the potassium provided by fruits and vegetables has been demonstrated to lower blood (WHO, 2014).

Dietary fibre may also help to lower blood pressure (WHO,2014), and together with phytochemicals such as plant sterols, flavonoids and other antioxidants

may be important in modulating cholesterol and other biological processes (WHO,2014) that could reduce the risk of atherosclerosis (thickening of the arteries).

### **Inadequate Physical Activity**

Inadequate physical activity is one of the four common risk factors of NCD burden, together with unhealthy diet, smoking and extreme consumption of alcohol (Kim, Lee, & Lee,2016). Studies have revealed that continued physical activity at moderate to vigorous levels relents many health benefits at all ages, including a lower risk of incident diabetes and hypertension.

Habitual and sufficient levels of physical activity: improve muscular and cardiorespiratory fitness (Fleck & Kraemer, 2014); improve bone and functional health; reduce the risk of hypertension coronary heart disease, stroke and diabetes. (WHO, 2016).The current high of physical inactivity is believed to be partly due to inadequate participation in physical activity leisure time and rise in sedentary behaviour during occupational and domestic activities (WHO, 2013b; Awosan *et al.*,2014).

### **Obesity**

The worldwide prevalence of obesity has nearly double between 1980 and 2014 (Boulangé,Neves, Chilloux,Nicholson, & Dumas, 2016). Overweight and obesity are associated to more deaths worldwide than underweight (WHO. 2016). Among adults, raised BMI is a major risk factor for noncommunicable disease.

The risk for these (Davies, Yudkin, & Atun, 2016) noncommunicable diseases increases, with increases in BMI (Lee, Lee, Go, Oh, Shin, & Kim, 2014). Increasing body mass index and abnormalities in glucose metabolism resulting from estrogen deficiency at menopause may contribute to the increase of the metabolic

syndrome in older women, imparting a higher risk of CVD and hypertension in this population (Nuzzo, 2010; Geraci,2013).

The interaction of menopause, obesity, and salt sensitivity on the development (Geraci *et al.*,2013) of hypertension in women has been investigated extensively (Erdine, Arslan, & Olszanecka, 2012; therefore, an effective therapeutic approach in these patients should spotlight on treating co morbid conditions and risk factors to reduce total cardiovascular risk.

Given the complex pathophysiology of hypertension in menopause, lifestyle modification may play a critical role in effective BP and cardiovascular risk reduction (Geraci *et al.*,2013).

According to WHO(2014) Ghana country assessment report on ageing and health indicates the obesity levels in Ghana increased from 10% in 1993 to 25.3% in 2010 ( Agyei-Mensah & de-Graft Aikins, 2010).

The prevalence of obesity has continued tirelessly in Accra in Ghana. Numerous studies conducted in Ghana have recognized that prevalence of obesity is uppermost in Accra (Dake, Tawiah, & Badasu,2010;Biritwum , Gyapong ,& Mensah, 2005; Amoah, 2003b).

### **Parity and Hypertension**

One potential risk factor that has been understudied is the effect the numbers of pregnancies and birth have on blood pressure readings (Guan, Wu, & Gong, 2013) of women later in life. Pregnancy and child bearing are timed physiological conditions. (Wu, Xu, Shen, Zhang, Song, Yang, & Wu, 2015).

There is evidence that these conditions may have a long-term impact on the health of the women. According to a systematic review of epidemiologic evidence, it

has been shown that having a high number of reproductive events (Wu *et al.*, 2015) increases women's risk of developing cardiovascular disease.

Few studies have reported findings of the association between parity and hypertension development over the lifespan, particularly among Black women.

### **Previous Pregnancy Induced Hypertension**

Hypertension complications 5% to 7% of all pregnancies (Marshall, Sandra & Gray, 2008). Striking alterations in both cardiovascular function and volume homeostasis occur during normal pregnancy; knowledge of these normal (Steegers, von Dadelszen, Duvekot, & Pijnenborg, 2010) adaptations is requisite to the early detection and optimal management of preexisting or new-onset disease (Marshall, Sandra, & Cunningham, 2008).

Large increments in cardiac output, accompanied by marked increases in intravascular and extracellular volume, occur rapidly during the first half of pregnancy (Wang, Rana, & Karumanchi, 2009), then plateau or rise more slowly thereafter (Marshall *et al.*, 2008).

### **Family History of Hypertension**

Several studies have established family history of hypertension is associated with an increase in the prevalence and incidence of hypertension (Gyamfi, 2010). It is a recognized risk factor for CVD which represents genetic, environmental and behavioural elements, in addition to the interaction among them (Acheampong, 2011).

As DNA analysis for susceptible genes is not yet necessary, family history can be helpful public health tool for the prevention of diseases as it can reflect genes susceptibility and other risk factors. (Acheampong., 2011).

The American Diabetes Association, including family history in their guidelines has considered family history as a factor to be assessed and made decision about treatment. (Acheampong., 2011).

### **Knowledge of Hypertension**

These non-modifiable risk factors of hypertension cannot be changed but awareness of the risk factors is important for prevention. Preventing these risk factors will have a significant impact in the morbidity rates to acceptable level. Knowledge of hypertension risk factors is essential for an adult to make an informed decision about preventing hypertension.

There are many variables that may impinge on knowledge of hypertension. Literature shows that studies on knowledge of hypertension examined socio-demographic factors of age, race, level of education, parity, gender, income, location, occupation and marital status.

In spite of the extensive known benefit of blood pressure reduction on CVD and stroke risk, many hypertensive patients remain less treated or not treated (Krum, Schlaich, Whitbourn, Sobotka, Sadowski, Bartus, & Abraham, 2009). Gender disparities exist in both blood pressure control and treatment: Women are more expected than men to receive antihypertensive (Abramson *et al.*,2014) medications, but they are less likely to have attained recommended blood pressure targets (Geraci *et al.*,2013).

Non-pharmacologic and pharmacologic treatments are recommended to lower BP in both men and women. Non-pharmacologic interventions addressing associated risk factors, especially those aimed at reducing central obesity (eg, caloric and sodium restriction, low alcohol consumption, regular physical activity) (Abramson *et al.*,2014) may be particularly important attachments for improving blood pressure control and reducing vascular risk in hypertensive women (Zhang, Tuomilehto, & Jousilahti, 2012).

## CHAPTER 3

### METHODOLOGY

This chapter describes the study area, the research design employed, and the sampling techniques utilized. Tools of data collection and methods of data analysis are outlined, as well as a description of the pilot study. The protocol observed to ensure ethical considerations is also stated.

#### **Study Design**

Across-sectional study was used to determine the prevalence of hypertension and its risk factors among women aged 25 years or older in Kpone-Katamanso District, Ghana.

#### **Area of Study**

Ghana is a nation in West Africa. It has a population of 25.9 million from a variety of ethnic and religious groups (World Bank, 2013). Its varied geography includes savannas, forests, springs, cave systems, mountains and natural reserves with a total land area of 230,020 square kilometers.

The study was conducted in northern part of Kpone-Katamanso District. Kpone-Katamanso District located along the coastal part of Tema in the Greater Accra Region. It shares boundaries with Tema to the west, Dangme West to the east, the Gulf of Guinea to the south and Akuapem South to the north (see Appendix B).

The population of Kpone-Katamanso District, according to the 2010 Population and Housing Census, is 109,864 representing 2.7 percent of the region's total population. Males constitute 48.7 percent and females represent 51.3 percent. About 90.4 percent of the population lives in urban localities.

The population of the district is youthful (under 15 years) (34.5%) depicting a broad base population pyramid which tapers off with a small number of elderly persons 60 years and above (3.4%) (GIS, 2010). The topography of district is generally flat and forms part of the coastal plains, ranging from 0m (South) to 35m (North) above sea level.

The soil types in the area are sandy, clay, humus soils and suitable for farming activities. Some portions of the land are very rocky. The district enjoys a dry equatorial climate with a mean annual rainfall ranging between 730mm to 790mm.

The annual average temperatures range from 25°C to 30°C in the major rainy season while in the minor season temperatures range from 27°C to 35°C. The vegetation zones in the district comprise shrub and grassland. The grassland is found in areas like Appolonia, Gbetsile, Santeo and Katamanso where livestock farming is practised.

## **Population and Sampling Procedure**

### **Study Population**

The study population included women aged 25years or older living in rural and urban areas of Kpone-Katamanso District in Greater Accra Region. The proportion of the female population of those aged 25years and older in the district is 25,604(45.4%) (GIS, 2010).

## **Settlement Distribution**

There are 19 towns in the Kpone-Katamanso District with four cluster geographical locations. Each cluster location contains a minimum of three (3) to a maximum of six (6) towns and these are concentrated in the southern and northern part of the District (GIS, 2010).

## **Sample Size**

The sample size is calculated using (Fisher, 1978):

$$N = Z^2 * P (1 - P) / d^2$$

Where N = sample size

Z = score for 95% Confidence Interval which is 1.96

P = prevalence of hypertension (proportion of people with hypertension presume to be 15% or higher).

q=1-p (proportion of people without hypertension)

d = tolerable error set at 5%.

$$N = 195.92$$

Making 10% allowances for losses, it was approximated to 216.

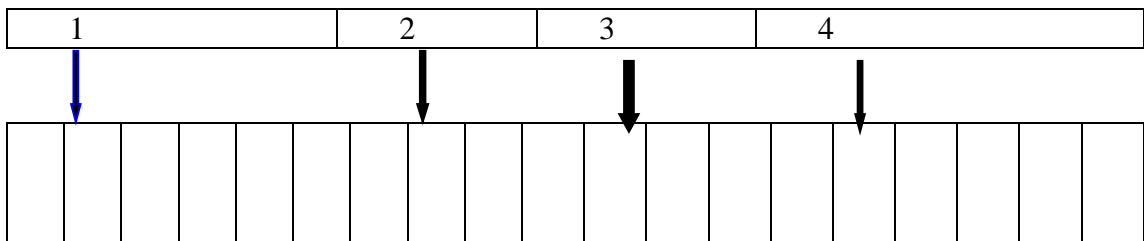
## **Sampling Method**

A multi-stage cluster sampling method was used to draw a sample of 216 participants in the district. The sample was done in four stages. Stage one involved dividing the district into four clusters using the map of the district assembly.

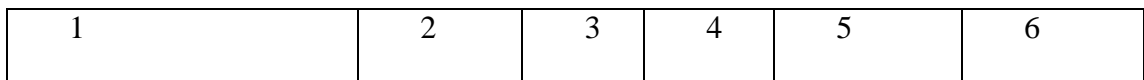
Each cluster ranging from 3 to 6 communities. Stage two involved simple random sampling selection of one cluster from the existing four clusters of the district. Stage three involved random selection of four communities from the cluster selected.

The last stage involved randomly selection of twenty seven households in each cluster each from the four selected communities making a total of one hundred and eight households as shown blow. Two adult age of twenty five years or older and who were the first to be reached in each household constituted the sample participants of the study.

*Table 1. Stages of sampling selection*  
Primary Clusters towns



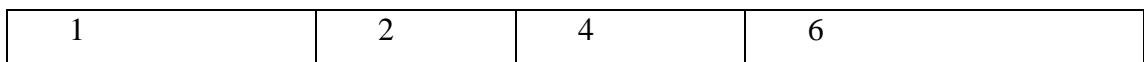
Secondary Clusters towns



Simple random sampling within secondary clusters



Sample towns



## **Inclusion and Exclusion Criteria**

Females aged 25 years or older, were considered eligible for the study regardless of their status of blood pressure, while those aged below 25 years or were pregnant were excluded.

## **Instruments of Data Collection and Procedures**

The method of data collection comprised of personal interview and physical assessment. Data was collected from the study population by household's visits via pre-designed semi-structured questionnaire after taking consent (see Appendix C).

The questionnaire (see Appendix A) included data on sociodemographic characteristics like age, marital status, level of education, employment status and religion, lifestyle factors like smoking, alcohol consumption, extra salt intake, fast and fried rice intake, fruit and fresh vegetables consumption, and physical exercise, co-morbidity factors like obesity, parity, and previous pregnancy induced hypertension, family history hypertension, knowledge on cause, prevention and treatment of hypertension were also included.

Treatments of hypertension were considered as having your blood pressure measured by a health worker, told by a health worker that you have hypertension and currently receiving antihypertensive medication.

Body weight was measured with shoes off to the nearest 0.1kg using bathroom scale; it was validated with standard weight and corrected for zero inaccuracy. Height was measured without shoes to the nearest 0.5cm using stadiometer. Body mass index was calculated from weight measurement and height.

Current smoker was defined as someone who at the time of the survey smoked or used tobacco in any form either daily or seldom and non-smokers comprised individuals who were never smokers and ex-smokers.

Concerning consumption of alcohol, it was defined as current drinkers or who never use alcohol and ex-users. “Extra intake of salt” was considered as anybody who used extra salt when the food had been cooked. “Fruit intake” was measured on the average 1-5 servings in a typical week. “Physical activity” referred to any type of vigorous or moderate exercise for a day for most of the days in a week or month other than routine daily activities.

Hypertension was assessed as per (Moreira *et al.*,2014) definition. The content validity was focused on whether the full content of a conceptual definition was represented in the measure. Reliability for the instruments was pre-tested in a pilot study among 20 women at Oyibi community who meet the inclusion criteria and were not included in the study sample. The needed correction was done based on the observations made during the pre-test.

### **Data Processing**

Average of two systolic and diastolic blood pressure measurements was calculated and was used as variables in the analysis. The body mass index (BMI) was calculated as weight in kilograms divided by the square (Helal, Fick-Brosnahan, Reed-Gitomer & Schrier, 2012) of the height in meters. BMI of participants were categorized as underweight (BMI<18.5), normal weight (BMI <25kg/m<sup>2</sup>), overweight ( $\geq 25$  to 29.9kg/m<sup>2</sup>), and obese (BMI  $\geq 30$ kg/m<sup>2</sup>).

### **Method of Data Analysis**

Data were analyzed using the SPSS programme IBM version 20. Descriptive statistics were calculated for all numerical parameter: height weight, body mass index, systolic blood pressure, diastolic blood pressure, and for non- numeric parameters : age groups marital status, level of education, employment status, religion, tobacco use,

alcohol use, unhealthy diet, physical inactivity, obesity, parity, previous pregnancy induced hypertension and family history of hypertension.

Continuous variables are stated in mean standard deviation. Cross tabulation were done to assess the level of knowledge on hypertension relationship and the criteria for describing level of knowledge on were used for answering the study questions. Chi-square was used to investigate the association between independent variables and prevalence of hypertension.

The data were further analyzed using binary logistic regression methods to evaluate possible risk factors associated with hypertension. Odd ratio (OR) was reported to establish the risk of hypertension and 95% confidence interval (C.I) were estimated. A  $p < 0.05$  was considered as statistically significance.

### **Research Ethics**

Institutional ethical clearance was granted from the District Health Directorate. Using a language well understood by the participants, all the participants were well informed about the study, its objectives and method of data collection.

Participants who agreed to be part of the study gave their consent before being interviewed. Points highlighted were anonymity and confidentiality of the participant data were ensured throughout the study.

## CHAPTER 4

### PRESENTATION AND DISCUSSION OF RESULTS

#### **Results**

This chapter describes the analysis of data followed by a discussion of the research findings. The findings relate to the research questions that guided the study. Data were analyzed to determine the association between prevalence of hypertension and its risk factors.

For the better understanding, the results were divided and presented under following seven heads; background information, description of dependent variable and its distribution, description of distribution of blood pressure by age group and summary of all the physical measurements, description of participants' knowledge on causes, prevention and treatment of hypertension, chi-square test of independent variables and its distribution, analysis of association with hypertension and binary logistic regression analysis for hypertension with all the independent variables and Discussion of result.

#### **Background Information or Socio-demographic Characteristics**

Table 2 presents the distribution of study group according to socio-demographic characteristics of the study population. Results indicate that majority, 60(27.8%) of the participants were aged 25–34 years. The majority 100(46.3%) had no formal education with only few 16(7.4%) reported to had attained tertiary education.

Few of the participants, 12(5.6%) reported to be engaged in government work as their main occupation. Majority 210(97.2%) of the participants were Christians.

*Table 2.* Distribution of study group according to socio-demographic characteristics of participants

| Parameters                | Frequency (%) |
|---------------------------|---------------|
| <b>Age in years</b>       |               |
| 25-34                     | 60(27.8)      |
| 35-44                     | 36(16.7)      |
| 45-54                     | 36(16.7)      |
| 55-64                     | 45(20.8)      |
| 65+                       | 39(18.0)      |
| <b>Marital Status</b>     |               |
| No                        | 63(29.2)      |
| Yes                       | 153(70.8)     |
| <b>Level of Education</b> |               |
| None                      | 100(46.3)     |
| Primary                   | 52(24.1)      |
| Secondary                 | 48(22.2)      |
| Tertiary                  | 16(7.4)       |
| <b>Employment Status</b>  |               |
| House wife                | 131(60.6)     |
| Self Employee             | 60(27.8)      |
| Government Employee       | 12(5.6)       |
| Non Gov. Employee         | 13(6.0)       |
| <b>Religion</b>           |               |
| Islam                     | 6(2.8)        |
| Christianity              | 210(97.2)     |

## Description of Dependent Variable and Its Distribution

**Prevalence of Hypertension.** A total of 73 study participants were classified as being hypertensive, giving a prevalence of hypertension of 33.8% as shown in table 2. Among hypertensive participants, the mean systolic blood pressure reading was 145.75 (Std. Deviation =14.13) and the mean diastolic blood pressure reading was 93.70 (Std. Deviation =9.50); whereas the non-hypertensive participants, the mean systolic blood pressure reading was 114.76 (Std. Deviation =9.13) and the mean diastolic blood pressure reading was 72.73 (Std. Deviation =7.24) as shown in table 3 below.

*Table 3.* Distribution of prevalence of hypertension among the study population

| Parameters           | Normal (%) | Hypertension (%) | Total (%) |
|----------------------|------------|------------------|-----------|
| Undiagnosed          | 108(63.5)  | 62(36.5)         | 170(78.7) |
| Diagnosed            | 35(76.1)   | 11(23.9)         | 46(21.3)  |
| Overall Hypertension | 143(66.2)  | 73(33.8)         | 216(100)  |

*Table 4.* Distribution of mean systolic and diastolic blood pressure reading

| Hypertension | Number | Mean SBP +SD   | Mean DBP+SD  |
|--------------|--------|----------------|--------------|
| Normotension | 143    | 114.76±9.13    | 72.73±7.24   |
| Hypertension | 73     | 145.75±14.13   | 93.70±9.50   |
| Total        | 216    | 125.2315±18.35 | 79.81±12.794 |

## Description of Mean Blood Pressure (Systolic and Diastolic Blood Pressure by Age Group)

**Distribution of Blood Pressure.** Table 5 represents the distribution of mean systolic and diastolic blood pressure by age group among participants. Results indicate that the overall mean systolic blood pressure was (mean± SD) 125.23±18.35mmHg with mean diastolic pressure was 79.81±12.79mmHg. About 66.2% of the participants had normal blood pressure. Both mean systolic blood pressure and diastolic blood pressure increased gradually with age as shown on table 5 below.

*Table 5.* Distribution of mean systolic and diastolic blood pressure by age group among participants

| Age 5 Group | Mean SBP ± SD     | Mean DBP ± SD    |
|-------------|-------------------|------------------|
| 25-34       | 116.1667±13.91154 | 73.6667±10.07879 |
| 35-44       | 124.4444±19.04047 | 80.8333±13.38976 |
| 45-54       | 125.0000±12.98351 | 81.1111±10.89634 |
| 55-64       | 128.4444±17.5724  | 82.2222±12.41130 |
| 65+         | 136.4103±22.06297 | 84.3590±15.00787 |
| Total       | 125.2315±18.34912 | 79.8148±12.79400 |

## Physical Measurements

The mean values of physical measurements are shown in Table 5. The results indicate that the average weight 72.49kg, height was 160.38cm, BMI was 28.11Kg/m<sup>2</sup>, systolic blood pressure (SBP) was 125.23mmHg and diastolic pressure (DPB) was 79.81mmHg.

*Table 6. Physical measurements of the study population (N=216)*

| Variables               | Minimum | Maximum | Mean   | SD    |
|-------------------------|---------|---------|--------|-------|
| Weight(Kg)              | 39.00   | 117.00  | 72.49  | 17.58 |
| Height(cm)              | 141.00  | 174.00  | 160.38 | 5.54  |
| BMI(Kg/m <sup>2</sup> ) | 16.40   | 45.10   | 28.11  | 6.42  |
| SBP(mmHg)               | 90.00   | 180.00  | 125.23 | 18.35 |
| DBP(mmHg)               | 50.00   | 120.00  | 79.81  | 12.79 |

*Table 7. Distribution on mean body mass index and weight by age group among participants*

| Age 5 Group | Mean BMI (Kg/m <sup>2</sup> ) ± SD | Weight (Kg) ± SD |
|-------------|------------------------------------|------------------|
| 25-34       | 28.561±6.0981                      | 67.2979±15.07361 |
| 35-44       | 28.097±6.4383                      | 72.3774±17.48101 |
| 45-54       | 29.359±7.2340                      | 75.8936±19.21869 |
| 55-64       | 28.012±6.1395                      | 71.4884±16.90220 |
| 65+         | 30.404±5.7282                      | 80.8462±18.93292 |
| Total       | 28.733±6.4024                      | 72.8796±17.77519 |

### **Description of Participants' Knowledge on Hypertension**

A two – point scale was used for the causes of hypertension scoring, yes or no. A correct answer to each question of the knowledge assessment was given 1 point, no were not given any point. Respondents answered correctly at least 3 points (75%) to question, classify the participants as knowledgeable on the causes of hypertension or less than 3 points (<75%) classify the participants as less knowledgeable on the causes of hypertension.

*Table 8.* The differences in knowledge amongst the undiagnosed and diagnosed hypertension

| Causes of Hypertension       |     | Undiagnosed Hypertension | Diagnosed Hypertension | Total      |
|------------------------------|-----|--------------------------|------------------------|------------|
| Causes by Excess Salt        | No  | 2(50.0%)                 | 2(50.0%)               | 4(100%)    |
|                              | Yes | 168(79.2%)               | 44(20.8%)              | 212(100%)  |
| Causes by Excess Alcohol     | No  | 34(81.0%)                | 8(19.0%)               | 42(100.0%) |
|                              | Yes | 136(78.2%)               | 38(21.8%)              | 174(100%)  |
| Causes by Excess Weight Gain | No  | 7(87.5%)                 | 1(12.5%)               | 8(100%)    |
|                              | Yes | 163(78.4%)               | 45(21.6%)              | 208(100%)  |
| Causes by Smoking            | No  | 40(76.9%)                | 12(23.1%)              | 52(100%)   |
|                              | Yes | 130(79.3%)               | 34(20.7%)              | 164(100%)  |

Table 8 presents the differences in knowledge amongst the undiagnosed and diagnosed hypertension. Results indicate that 2(50%) of undiagnosed hypertension participants disagreed high intake of salt causes hypertension similar to 2(50%) diagnosed hypertension participants.

Eighty-one percent (81.0%) undiagnosed hypertension participants disagreed excess intake of alcohol causes hypertension as compared to 8(19.0%) diagnosed hypertension participants. Seven (87.5%) undiagnosed hypertension participants disagreed as excess weight gain cause's hypertension compared to 1(12.5%) diagnosed hypertension participants and 40(76.9%) undiagnosed hypertension participants disagreed smoking causes hypertension as compare to 12(23.1%) diagnosed hypertension participants.

### **Participants' Knowledge on Causes of Hypertension**

Table 9 presents the respondents' knowledge on the causes of hypertension. Results indicate that 212(98.1%) of participants knew high intake of salt causes hypertension. 174(80.6%) participants knew excess intake of alcohol causes hypertension. 164(75.9%) participants knew smoking cause's hypertension and 208(96.3%) participants knew excess weight gain causes hypertension.

**Table 9. Respondents' knowledge on the causes of hypertension**

| Causes of Hypertension   | Option | Normal     | HTN       | Total      |
|--------------------------|--------|------------|-----------|------------|
| High salt intake         | No     | 4(100.0%)  | 0(0.0%)   | 4(1.9%)    |
|                          | Yes    | 139(65.6%) | 73(34.4%) | 212(98.1%) |
| Excess intake of alcohol | No     | 33(78.6%)  | 9(21.4%)  | 42(19.4%)  |
|                          | Yes    | 110(63.2%) | 64(36.8%) | 174(80.6%) |
| Smoking                  | No     | 33(63.5%)  | 19(36.5%) | 52(24.1%)  |
|                          | Yes    | 110(67.1%) | 54(32.9%) | 164(75.9%) |
| Excess weight gain       | No     | 7(87.5%)   | 1(12.5%)  | 8(3.7%)    |
|                          | Yes    | 136(65.4%) | 72(34.6%) | 208(96.3%) |

### **Knowledge on Prevention of Hypertension**

The table 10 presents results on respondent's knowledge on prevention of hypertension. Results indicate that 79(36.6%) of participants agreed that reduce salt intake is the most effective way of hypertension prevention, 44(20.4%) agreed to physical exercise, 26 (12.0%) agreed to reduce weight and only 14(6.5%) agreed to reduce stress.

**Table 10. Measures of prevention of hypertension among study participants**

| Prevention  | Option                  | Normal (%) | HTN (%)  | Total (%) |
|---|-------------------------|------------|----------|-----------|
| Choose one of the non medical measures being taken for prevention of hypertension | Reduce salt intake      | 53(67.1)   | 26(32.9) | 79(36.6)  |
|   | Stop Smoking            | 7(43.8)    | 9(56.2)  | 16(7.4)   |
|   | Start Physical exercise | 31(70.5)   | 13(29.5) | 44(20.4)  |
|   | Reduce weight           | 20(76.9)   | 6(23.1)  | 26(12.0)  |
|   | Reduce Fat              | 9(52.9)    | 8(47.1)  | 17(7.9)   |
|   | Reduce Stress           | 9(64.3)    | 5(35.7)  | 14(6.5)   |
|   | Reduce alcohol          | 14(70.0)   | 6(30.0)  | 20(9.3)   |

## Knowledge on Treatment of Hypertension

Table 11 presents results on knowledge of respondent about treatment of hypertension among the study participants. Results indicate that 100% of participants had their high blood pressure checked, 21.3% have ever been told by a doctor or health worker that they have hypertension and 19.9% currently receiving antihypertensive medication.

*Table 11. Knowledge of respondents about treatment of hypertension*

| Knowledge on Treatment  | Options | Normal (%) | HTN (%)  | Total (%) |
|---|---------|------------|----------|-----------|
| Have you ever had your <b>blood</b> pressure measured by a doctor or Other health worker? | No      | 0(0.0)     | 0(0.0)   | 0(0.0)    |
|   | Yes     | 143(66.2)  | 73(33.8) | 216(100)  |
| Have you ever been told by a doctor or health worker that You have hypertension?          | No      | 108(63.5)  | 62(36.5) | 170(78.7) |
|   | Yes     | 35(76.1)   | 11(23.9) | 46(21.3)  |
| Are you currently receiving Antihypertensive medication?                                  | No      | 110(63.6)  | 63(36.4) | 173(80.1) |
|   | Yes     | 33(76.7)   | 10(23.3) | 43(19.9)  |

## Chi-square Test of Independent Variable and Its Distribution, and Analysis of Association with Hypertension

**Socio-demographic Factors.** Table 12 presents the percentage of blood pressure and socio-demographic characteristics of the study population. Results indicate that hypertension (56.4%) was higher among the aged 65+. One hundred fifty-three (70.8%) participants were married and 52(34.0%) of these were hypertensive. 152(70.4%) of the study participants had their education on primary school and 55(71.06%) of these were hypertensive.

Non-government employee constituted 13(6.0%) and majority 7(53.8%) were hypertensive. 210(97.2%) of the participants were Christians and 72(34.3%) were hypertensive.

*Table 12.* Percentage distribution of blood pressure and socio-demographic characteristics of the study population

| Parameters   | Normal n (%) | HTN n (%) | Total     |
|--|--------------|-----------|-----------|
| <b>Age Chi-Square= 21.006, P&lt;0.000</b>            |              |           |           |
| 25-34  | 52(86.7)     | 8(13.3)   | 60(27.8)  |
| 35-44  | 24(66.7)     | 12(33.3)  | 36(16.7)  |
| 45-54  | 23(63.9)     | 13(36.1)  | 36(16.7)  |
| 55-64  | 27(60.0)     | 18(40.0)  | 45(20.8)  |
| 65+  | 17(43.6)     | 22(56.4)  | 39(18.1)  |
| <b>Marital Status Chi-Square= 0.009, P=0.926</b>     |              |           |           |
| No   | 42(66.7)     | 21(33.3)  | 63(29.2)  |
| Yes  | 101(66.0)    | 52(34.0)  | 153(70.8) |
| <b>Level of Education Chi-Square= 1.487, P=0.685</b> |              |           |           |
| No formal Education                                  | 63(63.0)     | 37(37.0)  | 100(46.3) |
| Primary  | 34(65.4)     | 18(34.6)  | 52(24.1)  |
| Secondary  | 34(70.8)     | 14(29.2)  | 48(22.2)  |
| Tertiary   | 12(75.0)     | 4(25.0)   | 16(7.4)   |
| <b>Employment Status Chi-Square= 4.307, P=0.230</b>  |              |           |           |
| House wife   | 90(68.2)     | 42(31.8)  | 132(61.1) |
| Self Employee  | 37(62.7)     | 22(36.7)  | 60(27.8)  |
| Non Gov. Employee                                    | 6(46.2)      | 7(53.8)   | 13(6.0)   |
| Government Employee                                  | 10(83.3)     | 2(16.7)   | 12(5.6)   |
| <b>Religion Chi-Square= 0.809, P=0.368</b>           |              |           |           |
| Islam  | 5(83.3)      | 1(16.7)   | 6(2.8)    |
| Christianity   | 138(65.7)    | 72(34.3)  | 210(97.2) |

**Behavioural or Lifestyle Related Factors.** Table 12 presents results on the percentage distribution of blood pressure and lifestyle related factors among the study participants. Results indicate 7(3.2%) of participants, to have smoked and 4(57.1%) were hypertensive. Sixty (27.8%) reported to have used alcohol before and 25(41.7%) were hypertensive.

Majority, 161(74.5%) of the participants reported to have used extra salt in their diet and 56(34.8%) were hypertensive. 68(31.5%) of the participants reported to have consumed fast and fried rice and 18(26.5%) were hypertensive. 64(29.6%) of the participants reported to have consumed fresh vegetables daily and 22(34.4%) were hypertensive. 30(13.9%) of the participants reported to have consumed 1-5serving of fruit in a week and 5(46.7%) were hypertensive. 69(31.9%) reported to have performed regular physical exercise and 24(94.7) were hypertensive.

Table 13. Percentage distribution of Blood Pressure and Lifestyle related factors among the study participants

| Parameters   | Normal (%) | Hypertensive (%) | Total (%) |
|--|------------|------------------|-----------|
| <b>Smoking Status</b> Chi-Square = $X^2=1.762$ , P=0.184           |            |                  |           |
| No   | 140(67.0)  | 69(33.0)         | 209(96.8) |
| Yes  | 3(42.9)    | 4(57.1)          | 7(3.2)    |
| <b>Alcohol status</b> Chi-Square = $X^2=2.300$ , p= 0.129          |            |                  |           |
| No   | 108(69.2)  | 48(30.8)         | 156(72.2) |
| Yes  | 35(58.3)   | 25(41.7)         | 60(27.8)  |
| <b>Extra salt intake</b> Chi-Square = $X^2 =0.275$ , P=0.600       |            |                  |           |
| No   | 38(69.1)   | 17(30.9)         | 55(25.5)  |
| Yes  | 105(65.2)  | 56(34.8)         | 161(74.5) |
| <b>Fast &amp; Fried Rice</b> Chi-Square = $X^2 =2.380$ , P=0.123   |            |                  |           |
| No   | 93(62.8)   | 55(37.2)         | 148(68.5) |
| Yes  | 50(73.5)   | 18(26.5)         | 68(31.5)  |
| <b>Fresh Vegetables intake</b> Chi-Square = $X^2 =1.242$ , P=0.743 |            |                  |           |
| Do not Consume or use  | 73(66.4)   | 37(33.6)         | 110(50.9) |
| Consume or use daily   | 42(65.6)   | 22(34.4)         | 64(29.6)  |
| Consume or use weekly  | 15(60.0)   | 10(40.0)         | 25(11.6)  |
| Consume or use monthly   | 13(76.5)   | 4(23.5)          | 17 (7.9)  |
| <b>Fruit Intake in a Week</b> Chi-Square = $X^2 =4.994$ , p=0.172  |            |                  |           |
| No fruit   | 118(63.4)  | 68(36.6)         | 186(86.1) |
| 1-2 servings   | 10(76.9)   | 3(23.1)          | 13(6.0)   |
| 3-4 servings   | 8(88.9)    | 1(11.1)          | 9(4.2)    |
| ≥ 5 servings   | 7(87.5)    | 1(12.5)          | 8(3.7)    |
| <b>Physical Exercise</b> Chi-Square = $X^2 =1.273$ , P=0.736       |            |                  |           |
| Never or less than once a month                                    | 98(66.7)   | 49(33.3)         | 147(68.1) |
| 1 or 2 times a   | 22(59.5)   | 15(40.5)         | 37(17.1)  |
| 1 time a week  | 17(70.8)   | 7(29.2)          | 24(11.1)  |
| 2 or more time in a week   | 6(75.0)    | 2(25.0)          | 8(3.7)    |

**Co-morbidity and Family-related Factor.** Table 13 presents results on the percentage distribution of blood pressure and co-morbidity factors and family-related factor among the study participants. Results indicate 73(33.8%) of participants were obese and 42(57.5%) were hypertensive. 17(7.9%) reported to have given birth to 5 or more children and 10(58.8%) were hypertensive.

Few of the participants, 5(2.3%) reported to have had previous pregnancy hypertension and 2(40.0%) were hypertensive. Majority, 104(48.1%) of the participants reported to have had family history of hypertension and 67(64.4%) were hypertensive.

*Table 14.* Percentage distribution of Blood Pressure and Co-morbidity factors and Family –related factor among the study participants

| Parameters  | Normal (%) | Hypertensive (%) | Total (%) |
|---|------------|------------------|-----------|
| <b>BMI</b> Chi-Square = $X^2 = 28.644$ , $P < 0.000$                            |            |                  |           |
| Underweight   | 4(100)     | 0(0.0)           | 4(1.9)    |
| Normal  | 57(78.1)   | 16(21.9)         | 73(33.8)  |
| Overweight  | 51(77.3)   | 15(22.7)         | 66(30.6)  |
| Obesity   | 31(42.5)   | 42(57.5)         | 73(33.8)  |
| <b>Parity</b> Chi-Square = $X^2 = 10.822$ , $p = 0.055$                         |            |                  |           |
| No Child  | 3(100.0)   | 0(0.0)           | 3(1.4)    |
| 1 Child   | 28(77.8)   | 8(22.2)          | 36(16.7)  |
| 2 Children  | 44(69.8)   | 19(30.2%)        | 63(29.2)  |
| 3 Children  | 46(66.7)   | 23(33.3)         | 69(31.9)  |
| 4 Children  | 15(53.6)   | 13(46.4)         | 28(13.0)  |
| ≥5 children   | 7(41.2)    | 10(58.8)         | 17(7.9)   |
| <b>Previous Pregnancy Hypertension</b> Chi-Square = $X^2 = 0.088$ , $P = 0.764$ |            |                  |           |
| No  | 140(66.4)  | 71(33.6)         | 211(97.7) |
| Yes   | 3(60.0)    | 2(40.0)          | 5(2.3)    |
| <b>Family History of Hypertension</b> Chi-Square = $X^2 = 84.085$ , $P = 0.000$ |            |                  |           |
| No  | 106(94.6)  | 6(5.4)           | 112(51.9) |
| Yes   | 37(35.6)   | 67(64.4)         | 104(48.1) |

### **Inferential Statistics**

As seen in table 9, significant association was found between prevalence of hypertension and age ( $p < 0.000$ ). The parameters marital status, education status, employment status and religion presented no significant association ( $p = 0.926$ ,  $p = 0.685$ ,  $p = 0.230$  and  $p = 0.368$  respectively).

As shown in table 10, smoking status, alcohol status, extra salt intake, fast and fried rice, fresh vegetable intake, fruit intake in a week and physical exercise were

presented with no significant associations ( $p=0.184$ ,  $p=0.129$ ,  $p=0.600$ ,  $p=0.123$ ,  $p=0.743$ ,  $p=0.172$  and  $p=0.736$  respectively). As shown in table 11, the factors found to be associated with prevalence hypertension were BMI, and family history of hypertension. Results indicate that there were significant associations between hypertension and BMI ( $p<0.000$ ), family history of hypertension ( $p<0.000$ ). Parity and previous history of hypertension presented no significant differences ( $p=0.055$  and  $p=0.764$  respectively).

### **Logistic Regression Analysis for Hypertension with All the Independent Variables**

**Risk Factors Analysis for Hypertension.** The results of binary logistic regression analysis, including the odds ratio for each of the socio-demographic factors, behaviour or lifestyle related factors and co-morbidity and family related factors are presented in table 12. Significant risk factors were related to age 65+, BMI and family history of hypertension. Other factors like marital status, level of education, employment status, religion, smoking, alcohol use, extra salt intake, fast & fried rice, fresh vegetables intake, fruit intake, physical exercise, parity and previous pregnancy of hypertension were also analysed but no significant associations were found.

**Table 15.** Association between prevalence hypertension and risk factors by binary logistic regression analysis

| Parameters                              | Odd ratio [95% CI]     | p-value |
|---|------------------------|---------|
| Age (years )                            |                        |         |
| 25-34                                   | 1.0                    | -       |
| 35-44                                   | 1.821 [0.415-7.985]    | 0.427   |
| 45-54                                   | 3.304 [0.785-13.911]   | 0.103   |
| 55-64                                   | 3.878 [0.941-15.983]   | 0.061   |
| 65+                                     | 18.788 [3.829-92.188]  | 0.000   |
| Marital Status                          | 1.054 [0.381-2.918]    | 0.919   |
| Education                               | 0.898 [0.554-1.456]    | 0.662   |
| Employment Status                       | 1.385 [0.785-2.441]    | 0.261   |
| Religion                                | 2.540 [0.039-163.805]  | 0.661   |
| Smoking Status                          | 2.709 [0.175-41.970]   | 0.476   |
| Alcohol Status                          | 2.795 [0.950-8.228]    | 0.062   |
| Extra Salt Intake                       | 1.897 [0.664-5.416]    | 0.232   |
| Fast & Fried Rice                       | 0.887 [0.300-2.625]    | 0.829   |
| Fresh Vegetables Intake                 | 0.750 [0.448-1.255]    | 0.273   |
| Fruit Intake in a Week                  | 0.731 [0.324-1.649]    | 0.450   |
| Physical Inactivity                     | 0.848 [0.483-1.492]    | 0.568   |
| BMI,kg/m <sup>2</sup> (<30, ≥30)        | 5.513 [2.013-15.098]   | 0.001   |
| Parity                                  | 1.563 [0.984-2.483]    | 0.059   |
| Previous Pregnancy Induced Hypertension | 1.220 [0.088-16.959]   | 0.882   |
| Family History of Hypertension          | 72.132 [19.43-267.613] | 0.000   |

***Socio-demographic Factors.*** Table 15 shows that participants who were 65 years and above were 18.788 times more likely to be hypertensive than those who were below the age of 65 years. Participants being married were 1.054 times more likely to be hypertensive than those who were not married.

Participants who were educated were 10.2% less likely to be hypertensive compared to those reporting to have never received any formal education. Paid workers were 1.385 times more likely to be hypertensive than those who were unpaid. Participants who were Christians were 2.540 times more likely to have hypertensive than those who were not Christians. (This is because majority, 97.2% of the participants were Christians and that might probably account to this ratio).

***Behavioural or Lifestyle Factors.*** Table 15 shows that participants who smoked were 2.709 more likely to be hypertensive than those who do not smoke. Participants who drink alcohol were 2.795 more likely be hypertensive than those who do not drink.

Participants who added salt to their food on the table were 1.897 more likely be hypertensive than those who do not add salt to their food on the table. Participants who consume fast and fried rice were 11.3% less likely to be hypertensive than those who did not. (This is because most, 27.8% of the participants were age 25-34 years and they might have consumed more of the fast food than the aged and since hypertension is influence by age that might probably accounted to this ratio).

Participants who consume fresh vegetables monthly were 25% less likely to be hypertensive than those who were not. Participants who consume fruit in a week were 26.9% less likely to be hypertensive than those who were not. Participants who exercise within the week were 15.2% less likely to be hypertensive than those who did not exercise.

***Co-morbidity and Family Related Factors.*** Table 12 shows that obese participants were 5.513 times likely to be hypertensive than those who were not obese. Participants who have children were 1.563 times more likely to be hypertensive than those who did not. Participants with previous pregnancy hypertension were 1.220 times more likely to be hypertensive than those who did not. Participants with an immediate family member with hypertension were 72.132 times more likely to be hypertensive than those who did not.

## **Discussion of Result**

### **Prevalence of Hypertension**

This study identified hypertension as a major health problem among women in Kpone Katamanso District. Seventy-three (33.8%) of the participants are found to be hypertensive. The study populations have demonstrated a high prevalence of hypertension. The prevalence is 23.9% and 36.5% for diagnosed and undiagnosed, respectively. These figures are higher compared with the 21.5 % prevalence among the female general population of Ghana (WHO, 2014) and lower than the 35.0% .

Parallel results were reported on prevalence among female adults from a semi urban district in Ghana in earlier studies (Opare *et al.*, 2014). The higher prevalence may be due to the marked obesity and lack of physical exercise which are more common in women (Marwiro, 2010). Although there was a high percentage of a diagnosed hypertensive participant, the majority 33(76.7%) had their blood pressure well controlled.

### **Knowledge of Hypertension**

**Causes of Hypertension.** Majority of the participants (98.1%) have learned that high salt intake causes hypertension. About 96.3% have educated that excessive

weight gain causes hypertension. Approximately 81% have learned about the negative effect of alcohol consumption hypertension. Moreso 75.9% have learned about risks of smoking on hypertension.

The findings revealed that the diagnosed hypertensive participants possessed high level of knowledge regarding the causes of hypertension. The finding is, however not astonishing. This is because participants might have been listening to radio and television programmes where hypertension is being discussed.

**Prevention of Hypertension.** The fact that participants had a sufficient knowledge on hypertension prevention is very positive and it is a sign that they are having more access to information, either by their own idea, or mass media, or even due to a better performance of healthcare expert in the area (Rev. Latino-Am, Mayckel , Annelita, & Sonia, 2014).

The majority of identified non-medical measures being taken for prevention of hypertension was mentioned in participants own choice. Option given to participants to choose primary preventive measures from a list showed high level of knowledge on the possible non-medical measures of hypertension.

It has been recommended that prevention plans applied early in life, offer the greatest long-standing potential for eschewing the signs that lead to hypertension and for dropping the overall yoke of blood pressure-related complications in the community (Addo *et al.*, 2012).

According to table 7, most participants had the knowledge that excessive salt intake, physical exercise and reduced weight can prevent hypertension. However, a few participants noted that smoking cessation, reduction in alcohol intake, fat and stress can prevent hypertension.

Hypertension presents a major area of intervention because it is a frequent condition and is agreeable to control through both non medical measures (Almas, Godil, Lalani, Samani, & Khan, 2012) and pharmacological treatment. Lifestyle measures for lowering blood pressure include reduced alcohol intake (Oskay, Onsu, & Topuzoglu, 2010).

**Treatment of Hypertension.** There is a vital difference between knowledge and practice (Rev. Latino-Am *et al*,2014), which means that though knowing what needs to be done; individuals do not proceed according to such knowledge, because while the knowledge is based on reason, the adherence includes a multi factorial method exaggerated by emotional, social, genetic and cultural factors (Rev.Latino-Am *et al*,2014).

However, treatment of hypertension was higher in this study. This is because, participant who were already diagnosed of being hypertensive and on treatment were 21.2% and 19.9% respectively. Based on the facts above exposed, it can be noted that the higher degree of participants' knowledge about hypertension, the greater the self-care and the adherence to treatment.

However, the problem of adherences is more complex, because the access to information about hypertension does not necessarily imply greater adherence to the control measures (Rev.Latino-Am *et al*,2014).

### **Prevalence of Hypertension with Sociodemographic Characteristics**

**Age and hypertension.** Statistical significance association between age and hypertension was found. Association with age and hypertension was seen in most of the studies (Basu & Biswas 2013; Syer *et al.*, 2010; Marwiro, 2010) by different authors.

This study also demonstrates that the prevalence of hypertension increased with age, as documented (Al-Mawali, 2015) by another study (Awosan *et al.*, 2014) while individuals aged 65+ years old were 18.788 times more likely to have hypertension than individuals below age 65 years.

The increasing prevalence of hypertension with age represents the biological effect of increased arterial resistance due to thickening arterial wall that comes with age (Marwiro, 2010). Aging is not only a risk factor to develop hypertension but also a risk factor to cause many diseases.

**Marital status and hypertension.** Being married was found to be positively associated with hypertension in this study but was not significant. Association with married was also seen according to this study (Marwiro, 2010). This suggests that there may be other factors that were not measured in this study such as psycho-social and stress which may need to be explored by another study (Marwiro, 2010).

Another study found that the marital status and marital transitions have indirect influences on health outcomes including hypertension through health risk behaviors and stress, cardiovascular, endocrine, immune, neurosensory, and other physiological mechanisms (Shabir *et al.*, 2013).

**Level of education and hypertension.** Prevalence of hypertension was more among less educated persons as compared to more educated persons, but association of level of education with hypertension was not found ( $P=0.662$ ) in this study, a result which had been reported by others (Saadon and Jasim, 2014).

The reason may be that, the higher prevalence of unhealthy behavior such as smoking, low physical activity, obesity are among individuals with low educational level (Saadon *et al.*, 2014). Also this finding is supported by previous study which found hypertension prevalence decrease with higher education (Doğan *et al.*, 2012).

High prevalence of hypertension in low educated group might be the product of low propensity of these people to pay attention to their health and not being well-versed enough about the stuff to do or not to do for hypertension. (Doğan *et al.*, 2012; Syeret *et al.*, 2010).

In addition, a commonality is that higher level of knowledge about the disease among people with higher education are expected, and this might be related to the ability of educated people to read and understand health educational materials. Employment Status and Hypertension. Statistical significance association between employment and hypertension was not found ( $P=0.261$ ). On the contrary Kannan and Satyamoorthy, (2009) found significant association between occupational status and hypertension but Maill, Kass, Ling & Saurt,(1962) did not find any significant association between occupational status and hypertension.

This study also reported less prevalence of hypertension among government employees as compare to other category. Probably, the level of occupation may materially affect physically activity and other aspect of life in relation to hypertension (Kannan & Satyamoorthy, 2009).

**Religion and hypertension.** Statistical significance association between religion and hypertension was not found ( $P=0.661$ ). Majority (97.2%) of the participants were Christians. This is because religious involvement has been associated with less cigarette smoking, less alcohol use, a lesser amount of depression and faster recuperate from depression, improved coping with stress, greater well-being and greater social support. So, there are reasons why pious religious principles and practices might influence the inception and path of hypertension.

## **Behavioural Risk Factors and Hypertension**

**Smoking and alcohol.** Statistical significance association between smoking/alcohol and hypertension was not found ( $P=0.476$ ;  $p=0.062$ ) respectively. Comparatively low prevalence of current cigarette smoking (3.2%) was recorded than alcohol consumption (27.8%). But high prevalence of alcohol consumption (59.1%) reported in a study among adults from a semi urban district in Ghana: a population based survey (Opare, Hensch, Afari, Hoffmann, Schindler, & Wurapa, 2014). In this study it was recorded that few of the participants were alcoholic, but represented the highest percentage of hypertensive.

Epidemiologic evidence suggests that excessive alcohol consumption is strongly associated with increased risk of hypertension (Kernan *et al.*, 2014; Alexandros, Vikram, & Franz, 2012). The role of regular alcohol intake in the development of cerebrovascular episodes has been examined and the majority of results showed that there is a positive association (Chege, 2016).

Taking smoking as an individual risk factor, it was clearly evident that with the increase in smoking there is an incidence and prevalence of hypertension and the risk of its development (Venkatarman, Kumar, Kumaraswamy, Singh, Pandey, Sharath George, Dahal & Patelvaibhav, 2013). On the other hand, tobacco smoking increases the risk of developing hypertension and cardiovascular illness like stroke (Bosu, 2015) and heart attack (Steven Van de *et al.*, 2013).

These factors are more pronounced during adulthood, and knowledge of the risk factors of hypertension is a significant step in the modification of lifestyle behaviours conducive for optimal cardiovascular health (Adebayo, Rotkangmwa, & Shalkur; Kate, 2012).

**High salt intake.** Statistical significance association between salt intake and hypertension was not found ( $P=0.232$ ). However, majority of the participants (74.5%) claim they consume extra salt during meal time. Excess salt intake has been implicated in hypertension. Several epidemiological, clinical and experimental have linked dietary sodium intake to blood pressure and a reduction in dietary sodium has been recognized to lower blood pressure (Owusu-Afriyie, 2015).

Salt or sodium intake has been directly correlated with average blood pressure levels and prevalence of hypertension in many populations (Shrestha, 2012; Awosan *et al.*, 2014). Salt is added to prepared food by the consumer, as processed food is rare (Steven Van de *et al.*, 2013). Decreased salt intake not only reduces blood pressure but has more positive cardiovascular effects that are self-directed and additive to its effect on blood pressure (Steven Van de *et al.*, 2013).

This explained that if the salt concentration of blood is high, water from the surrounding cells move into the blood vessels to dilute the salt (Kate, 2012). When this happens, the volume of the blood increase with corresponding increase in volume of blood in the heart which (Cecconi, Aya, Geisen, Ebm, Fletcher, Grounds, & Rhodes, 2013) increases the pressure with which blood flows through the blood vessels.

**Fast and fried rice.** A statistical significance association between fast/fried rice and hypertension was not found ( $p=0.829$ ). One third of the participants consume fast and fried rice more often and is negative associated with hypertension. This finding is inconsistent with the result from a study done in Spain where consumption of fried foods was associated with prevalence of hypertension (Taraka, Yash Patel, Michael & Luc, 2015).

Diet and nutrition play a key role in the promotion and maintenance of good health, as they are vital modifiable risk factors for chronic diseases (Gadiraju, Patel, Gaziano, & Djoussé, 2015; Taraka *et al.*, 2015).

Evidence suggests that excessive eating of energy-dense foods high in fat, especially (Fortney)saturated fat, and refined carbohydrates can lead to weight gain (Fortney), obesity pose an increased risk for NCDs.

The association between dietary fats and chronic diseases has been extensively studied with evidence indicating that dietary fats play an important role in the development of cardiovascular diseases (Kumar, Christopher,& Sobarani, 2014; Taraka *et al.*,2015).

**Fruit and vegetable intake.** A statistical significance association between fruit/vegetable intake and hypertension was not found ( $p=0.450$ ;  $p=0.273$ ) respectively. About 13.9% and 41.2% of the participants claim they eat fruits and vegetables regularly.

It is well recognized that high fruit and vegetable consumption is associated with a reduction of blood pressure (Borgi , Muraki , Satija , Willett, Rimm , Forman, 2016 ; Utsugi , Ohkubo , Kikuya , Kurimoto , Sato , Suzuki,& Imai,2008). This is consistent with our study which indicates consumption of fresh vegetables and fruit were 25% and 26.9% respectively less likely to be hypertensive.

Nutritional approaches to regulate blood pressure comprise weight management; reduce alcohol consumption and reducing sodium intake while upholding adequate potassium, magnesium, and calcium intakes.

This approach is effective in decreasing blood pressure and menace of stroke. It has been shown to enhance perceptions of quality of life. Fruit and vegetable consumption is one element of a healthy diet (Steven van de *et al.*,2013). Most of the

benefits of fruits and vegetables come from decrease in cardiovascular disease and risk factors, particularly hypertension (Syer , Xin, Wan Abdul Rahman, Ahmad , Calvin , Zi , & Abdul Rashid 2010).

**Physical inactivity.** Statistical significance association between physical inactivity and hypertension was not found ( $p=0.568$ ). Physical activity has a relationship with high blood pressure (Asfaw, 2012). A meta-analysis of randomized, controlled trials has demonstrated that physical activity may reduce high blood pressure (Asfaw, 2012).

In this study, about one third of the participants reported to be doing some form of physical exercises ranging from brisk walking, jogging, skipping and others. However, only 3.7% of the participants do exercise two or more times in a week. According to WHO, regular and adequate levels of physical activity: improve muscular and cardiorespiratory fitness; improve bone and functional health; reduce the risk of hypertension coronary heart disease, stroke and diabetes. (Adebayo, Rotkangmwa,& Shalkur; WHO, 2016).

Sedentary lifestyle as a risk factor of hypertension elevates blood pressure (Mabry, Koohsari, Bull, & Owen, 2016). Lack of physical fitness especially cardiovascular fitness derived from aerobic exercise is known to be related to elevated blood pressure (Ogah, Okpechi,Chukwuonye,Akinyemi,Onwubere,Falase,&Sliwa,2012).

The function of exercise in the fuel of the natural elastic condition of the arteriole cells and influencing favorable ratios of low density lipoproteins to the high-density variety is critical in the development and progression of hypertension (Ogah *et al.*,2012). Regular exercise lowers blood stimulating metric oxide (Ogah *et al.*, 2012). Sufficient physical activity has been established to have many health-promoting

effects and has a direct, sovereign role in reducing hypertension (Steven van de *et al.*,2013).

However, the amounts of physical activity have been declining as a result of the high rate of urbanization that has been happening across the continent (Gersh , Sliwa , Mayosi , & Yusuf , 2010; Steven van de *et al.*, 2013).

### **Co-morbidities and Family Related Factors and Hypertension**

**Prevalence of hypertension with BMI.** A statistical significance on the association between obesity and hypertension was found ( $p < 0.001$ ). This study, very few participants were in the group of healthy BMI. Only 73 (33.3%) of the participants presented with a healthy BMI, 4(1.9%) were reported underweight, whereas 66(30.6%) were reported as overweight and 73(33.8%) as obese.

This result, overweight (27.8%) and obesity (37.1%) also had been demonstrated in a study done among urban women in Accra, Ghana (Benkeser, Biritwum,&Hill, 2012).This and several other studies, it was found that increasing body weight is a risk factor for development of hypertension. (Doğan *et al.*, 2012; Syer *et al.*, 2010; Ogah, *et al.*, 2012). The relation of hypertension and obesity has been known for many years (Doğan *et al.*, 2012; Erem , Hacıhasanoğlu , Kocak , Değer , & Topbaş, 2009).

The greater the body mass, the more blood is needed to supply oxygen and nutrients to the muscle and other tissues (Mondzinger, 2012). It also increases the number and length of blood vessels and increases the resistance of blood that has to travel longer distances through those vessels (Mondzinger, 2012).

Obesity causes the heart to struggle to supply the excess tissue with blood. Obesity and its complications cause as many as 300 000 premature deaths each year, making it second to cigarette smoking as a cause of death (Mondzinger, 2012).

The Pooled prevalence of overweight and obesity among the participants is 64.4% which is high. This points out an increased tendency of worsening future trends of obesity in Kpone Katamanso district with its relate problems, making it an significant public health issue in the study subjects. Hence exercising and weight loss can reduce blood pressure and help to reduce the risk for heart attack and stroke.

**Parity and hypertension.** Statistical significance association between parity and hypertension was not found ( $p=0.059$ ). Few studies have reported results of the association between parity and hypertension growth over the years, particularly among Black women.

In the present study, the prevalence of hypertension enhanced as the number of parity increased as reported by various studies (Akter , Jesmin , Rahman , Islam , Khatun, 2013; Doğan *et al.*, 2012; Erem *et al.*,2009). One possible risk factor that has been under researched is the consequence of the number of pregnancies and birth has on blood pressure readings of women later in life.

**Previous pregnancy induced hypertension.** Statistical significance association between previous pregnancy induced hypertension and hypertension was not found ( $p=0.882$ ). In this study, majority of the participant had hypertension free during the past pregnancies. A hypertension complication is about 5% to 7% of all pregnancies (Marshall *et al.*, 2008).

Striking alterations in both cardiovascular function and volume homeostasis arise during normal pregnancy; knowledge of these normal adaptations (Stegers,

von Dadelszen, Duvekot, & Pijnenborg, 2010) is requisite to the early detection and optimal management of preexisting or new-onset (Marshall *et al.*,2008).

**Family history of hypertension.** Statistical significance association between family history of hypertension and hypertension was found ( $p < 0.000$ ). This study also showed that, participants with a family history of hypertension, 64.4% were hypertensive. This is consistent with Yadav and colleagues reported prevalence of hypertension of 68.4 % among participants with positive family history for hypertension (Parthaje, Unnikrishnan, Thankappan, Thapar, Fatt, & Oldenburg, 2016).

This stresses the importance of family and genetic factors in susceptibility to hypertension and the need for regular screening in this high risk group (Marwiro, 2010). A family history of hypertension is a risk factor for one developing hypertension. Blood connections tend to have several of the same genes that can influence a person to high blood pressure, heart disease, or stroke.

Relatives may also carve up some of the same behaviors such as diet, physical exercise, and smoking that can influence risk. Individuals with close family members, who either have hypertension or have suffered strokes or heart attacks at a young age, should be subjected to regular blood pressure monitoring (Mondzinger, 2012).

## CHAPTER 5

### SUMMARY, CONCLUSION AND RECOMMENDATION

#### **Summary**

The overall prevalence of hypertension (SBP  $\geq$  140 and DBP  $\geq$ 90) mmHg was 33.80%. Age 65+ years, obesity and family history of hypertension were identified as the major risk factors for hypertension among the population. Prevalence rate of smoking was 3.2%. Extra salt intake was 74.5%. Fast & fried rice was 31.5%.

A high prevalence of low fresh vegetable and low fruit intake was also observed. Participants who ate fresh vegetables per day only were 29.6 % and ate fruit  $\geq$ 1 servings per week were 13.9%. Participants who performed physical exercise  $\geq$ 2 time in a week were 3.7%. Participants with more than four children were 20.9%. Previous pregnancy hypertension was 2.3% and family history of hypertension was 48.1%.

The results of the this study provide useful records on hypertension prevalence and associated risk factors in Kpone-Katamanso District in Greater Accra Region. Majority of the respondents knew about the payback of salt, alcohol, smoking, weight reduction as non-medical measures in the management of hypertension.

#### **Conclusion**

- The study established high prevalence of hypertension and its associated risk factors included age, BMI and family history of hypertension.
- The women had high level of knowledge regarding the risk factors of hypertension

- This study demonstrated high prevalence of unhealthy eating habits and lifestyle; together with high prevalence of obesity and hypertension among the women.

### **Recommendations**

- Women with a very high risk of developing hypertension like high systolic blood pressure, marked obesity, or a strong family history of hypertension should undertake blood pressure screening regularly for early detection and prompt treatment.
- Health education and other intervention to promote healthy eating habits and lifestyle, especially among high risk groups are suggested.
- The high prevalence of hypertension points out the needs to be placed on detection, treatment and control of high blood pressure.
- Preventive efforts targeting behavioural lifestyle changes, at community level, to curtail these risk factors at population and individual level is urgently required.

### **Suggestions for Future Research**

- Further research should be carried out to determine knowledge and attitudes on hypertension among women of childbearing age.
- Knowledge on hypertension, practice and drug adherence among women of childbearing.
- The consequences of the number of pregnancies and birth have on blood pressure readings of women later in life.

## APPENDICES

APPENDIX A  
QUESTIONNAIRE

Serial Number \_\_\_\_\_

QUESTIONNAIRE

*My name is Kwabena Acheampong. I am a master of public health student in Adventist University of Africa, Kenya. I am carrying out a study on prevalence of hypertension among women aged 25years or older in Kpone Katamanso District. This involves asking you a number of questions on the risk factors for hypertension and taking some measurements of your blood pressure, weight and height. All the data collected will be treated with strict confidentiality. The findings will give a better understanding of the hypertension situation among women in Kpone-Katamanso district and also help in finding ways of addressing the hypertension problem in the district.*

**A. SOCIO-DEMOGRAPHIC RISK FACTORS**

|                     |                   |           |
|---------------------|-------------------|-----------|
| 1. How old are you? | Age group (years) | Tick      |
|                     | 25-34             | [       ] |
|                     | 35-44             | [       ] |
|                     | 45-54             | [       ] |
|                     | 55-64             | [       ] |
|                     | 65+               | [       ] |

|                                 |                   |           |
|---------------------------------|-------------------|-----------|
| 2. What is your marital status? | Never married     | [       ] |
|                                 | Currently married | [       ] |
|                                 | Separated         | [       ] |
|                                 | Divorced          | [       ] |
|                                 | Widowed           | [       ] |
|                                 | Cohabiting        | [       ] |

|  |           |           |
|--|-----------|-----------|
| 3. What is the height level of education you attained? | None      | [       ] |
|  | Primary   | [       ] |
|  | Secondary | [       ] |
|  | Tertiary  | [       ] |

|                                    |                         |           |
|------------------------------------|-------------------------|-----------|
| 4. What is your employment status? | Unpaid                  | [       ] |
|                                    | Self employee           | [       ] |
|                                    | Non Government employee | [       ] |
|                                    | Government employee     | [       ] |

|                           |                |           |
|---------------------------|----------------|-----------|
| 5. What is your religion? | Christianity   | [       ] |
|                           | Islam          | [       ] |
|                           | Traditionalist | [       ] |
|                           | Other, Specify |           |

## B. BEHAVIOR RISK OR LIFESTYLE FACTORS

|  |     |           |
|--|-----|-----------|
| 1. Do you currently Smoke any of <b>tobacco products</b> ? | No  | (       ) |
|  | Yes | (       ) |
| 2. Do you currently consume an <b>alcoholic drink</b> ?    | No  | (       ) |
|  | Yes | (       ) |

|   |                      |                       |
|---|----------------------|-----------------------|
| 3. In a typical week, on how servings of <b>Fruits</b> do you eat on one of those days? | No fruit (       )   | 3-4 serving (       ) |
|   | 1-2servings(       ) | ≥5 servings(       )  |
|   | Not sure (       )   | Others (       )      |

| Question  | Do not Consume or use | consume or use daily | Consume or use weekly | Consume or use Monthly |
|---|-----------------------|----------------------|-----------------------|------------------------|
| 4. In a typical week, on how servings of <b>vegetables</b> do you eat on one of those days? |                       |                      |                       |                        |
| 5. How many times do you consume fast or fried Rice in a week?                              |                       |                      |                       |                        |
| 6. How many times do you consume extra salt at the table in a week?                         |                       |                      |                       |                        |

|  |                  |                              |
|--|------------------|------------------------------|
| 7. How many times to you do <b>exercise per week</b> | Never ( )        | Daily ( )                    |
|  | 1 time a week( ) | 2 or more time in a week ( ) |

### C. FAMILY –RELATED FACTORS

|  |         |
|--|---------|
| 1. Is there anyone from your <b>family</b> who suffered or is suffering from hypertension? | Yes [ ] |
|  | No [ ]  |

### D. CO-MORBIDITY FACTORS

|  |         |        |
|--|---------|--------|
| 1. How many <b>children</b> do you have?                     | 0 [ ]   | 3 [ ]  |
|  | 1 [ ]   | 4 [ ]  |
|  | 2 [ ]   | ≥5 [ ] |
| 2. Have you ever have high blood in your previous pregnancy? | Yes [ ] |        |
|  | No [ ]  |        |

## KNOWLEDGE OF HYPERTENSION

These questions are designed to test your knowledge causes, prevention and treatment of hypertension. You may find many of them to be hard. This is ok; just do the best you can.

### E. CAUSES OF HYPERTENSION

| 6. Do you agree that the following causes hypertension? | Causes hypertension      | Yes | No |
|---|--------------------------|-----|----|
|   | Too much salt intake     |     |    |
|   | Excess intake of alcohol |     |    |
|   | Smoking                  |     |    |
|   | Excess weight gain       |     |    |

### F. PREVENTION OF HYPERTENSION

| 7. Choose one of the non medical measures being taken for prevention of hypertension? | Option                  | Tick     |
|---|-------------------------|----------|
|   | Reduce salt intake      | (      ) |
|   | Stop Smoking            |          |
|   | Start Physical exercise |          |
|   | Reduce weight           |          |
|   | Reduce Fat              |          |
|   | Reduce Stress           |          |
|   | Reduce alcohol          |          |
|   | Other (Specify)         |          |

### G. TREATMENT OF HYPERTENSION

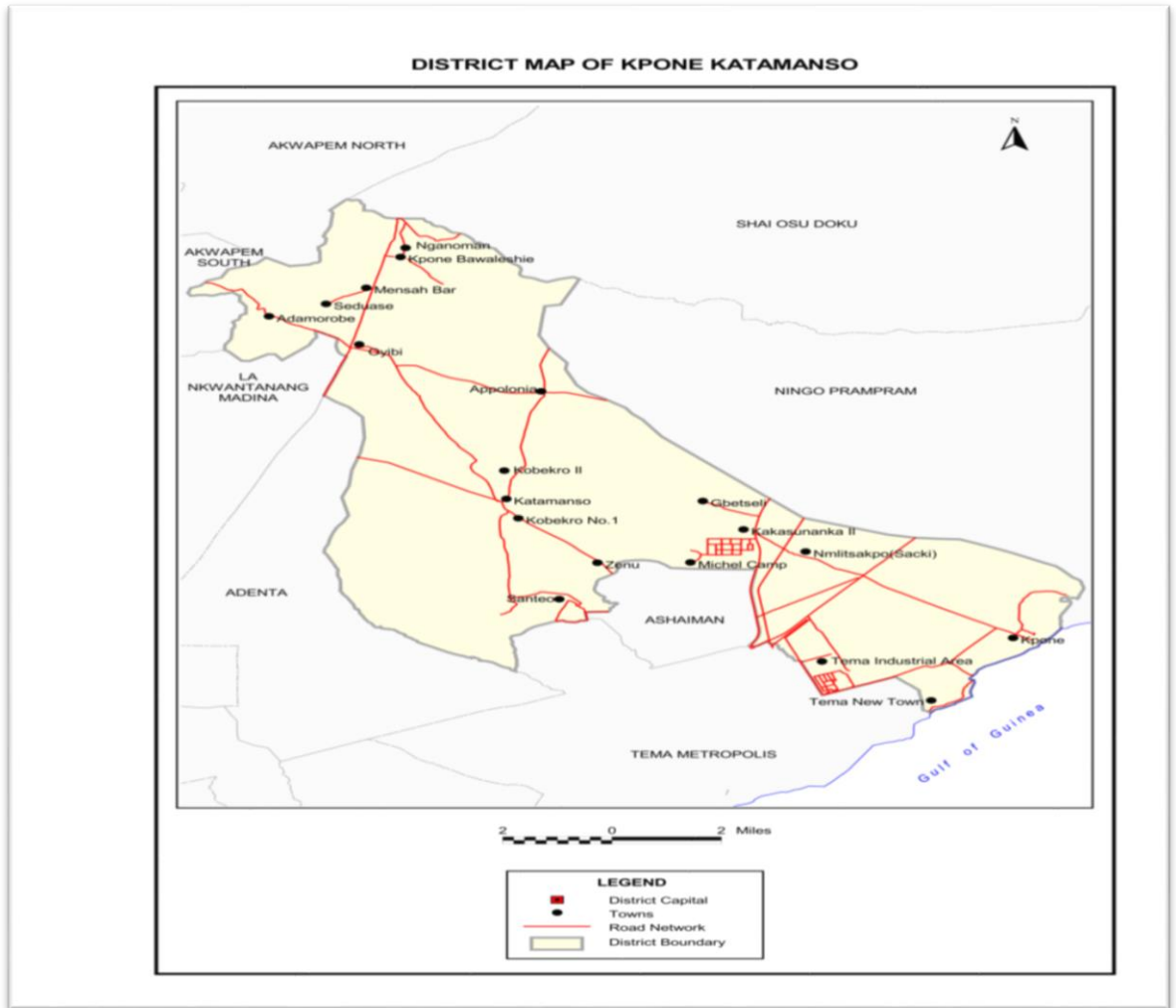
|   | Yes | No |
|---|-----|----|
| Have you ever had your <b>blood pressure measured</b> by a doctor or other health worker? |     |    |
| Have you ever been told by a <b>doctor or health worker</b> that you have hypertension?   |     |    |
| Are you currently receiving <b>antihypertensive</b> medication?                           |     |    |

### H. PHYSICAL MEASUREMENTS

|                          |   |
|--------------------------|---|
| Weight                   | Kg  |
| Height                   | Cm  |
| Systolic blood pressure  | 1 <sup>st</sup> _____ 2 <sup>nd</sup> _____ Average _____ |
| Diastolic blood pressure | 1 <sup>st</sup> _____ 2 <sup>nd</sup> _____ Average _____ |

APPENDIX B

DISTRICT MAP



Source: Ghana Statistical Service,

APPENDIX C  
LETTER OF CONSENT

Dear Participant,

I am a public health student of Adventist University of Africa, Kenya. In doing my master's Thesis, I am carrying out a study on prevalence of hypertension among women aged 25years or older in Kpone Katamanso District.

This involves asking you a number of questions on the risk factors for hypertension and taking some measurements of your blood pressure, weight and height. All the data collected will be treated with strict confidentiality.

The findings will give a better understanding of the hypertension situation among women in Kpone-Katamanso district and also help in finding ways of addressing the hypertension problem in the district.

Thank You

Kwabena Acheampong

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