UNIVERSITY FOR DEVELOPMENT STUDIES

ASSESSING THE KNOWLEDGE, AWARENES, ATTITUDES AND PERCEPTIONS OF HYPERTENSION AMONG ADULTS (19 - 60 YEARS) IN THE SUNYANI MUNICIPALITY, BRONG AHAFO REGION, GHANA

JOSHUA NYARKO

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BY

JOSHUA NYARKO (BSc. PUBLIC HEALTH)

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THESIS SUBMITTED TO THE DEPARTMENT OF PUBLIC HEALTH SCHOOL OF MEDICINE AND HEALTH SCIENCES, UNIVERSITY FOR DEVELOPMENT STUDIES, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN COMMUNITY HEALTH AND DEVELOPMENT

OCTOBER, 2018

DECLARATION

Student's Declaration

I hereby declare that this dissertation is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere:

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

Name: ……...……

Supervisors' Declaration

I hereby declare that the preparation and presentation of the dissertation was supervised in accordance with the guidelines on supervision of dissertation laid down by the University for Development Studies.

Supervisor's Signature:…… Date:……

Name: ……...……..…..

Head of Department's Signature..…….…… Date:……..……

Name: ……...……

ABSTRACT

The study investigated the knowledge, awareness, attitudes and perception of hypertension among adults (19-60 years). The study was conducted in the Sunyani Municipality, Brong Ahafo Region, Ghana. A descriptive cross section research survey design with a multi-stage comprising cluster sampling, systematic sampling, and purposive sampling techniques was used with a sample size of 343 respondents. The following are the major findings; out of 343 respondents 78 were hypertensive. Prevalence for the entire study respondent was 22.7%. There were 221 females and 53 of them were hypertensive. The prevalence for the female respondent was 24.0%. There were 122 males and 25 of them were hypertensive. So the prevalence of the male respondent was 20.5%. The findings of this study showed that hypertension is highly prevalent among adults (19-60 years). Out of the 343 respondent, (62.1%) of them in the present study had heard of hypertension with majority (70.5%) being males. Most of the respondents did not know their current blood pressure status. It was shown that there was significant association between awareness of hypertension and demographic profile (no formal education ($p<0.0001$; $x^2 = 22.52$), tertiary education ($p<0.0001$; $x^2 = 19.3$), cigarette smoking ($p = 0.0414$; $x^2 = 4.16$), shisha smoking ($p = 0.0009$; $x^2 = 11$) and exercise ($p < 0.0001$; $x^2 = 36.09$). Furthermore, the finding suggests that individuals who had no form of formal education ($p<0.0001$; $x^2 = 22.52$) are more likely to become hypertensive than those who are educated. This may be attributed to the fact that persons who are educated stand the chance of being enlightened on hypertension and therefore adopt healthy lifestyles to avoid the condition. The study found a significant ($p<0.0500$) association between the perception that changing lifestyle (such as low salt intake, quit smoking and engaging in exercise) lowers hypertension. Finally, it was shown that there was a higher proportion between the perception that hypertension is an avoidable part of aging and socio-demographic characteristics.

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Last and not the least are my colleagues Peter Paul and Daniel Owusu for their support towards the achievement of this study.

DEDICATION

To my family and friends

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ABBREVIATIONS AND ACRONYMS

ACE	Angiotensin-Converting Enzyme
ADRB1	Adrenergic receptor
BP	Blood pressure
BMI	Body Mass Index
BTT	Benefit-based Tailored Treatment
CDC	Centre for Disease Control
CHF	Congestive Heart Failure
CKD	Chronic Kidney Disease
CTP11B2	Mineralocorticoid Receptor, Chimeric
CVDs	Cardio-Vascular Diseases
DALYS	Disability Adjusted Life Years
DBP	Diastolic Blood Pressure
ENaC	Epithelial Sodium Channel
ESRD	End-Stage Renal Disease
GFR	Glomerular Filtration Rate
GHS	Ghana Health Service
GNA	Ghana News Agency
GSS	Ghana Statistical Service
GWAS	Genome-Wide Association Studies
GYTS	Global Youth Tobacco Survey

HP	Hypertension
HTN	Hypertension
JHS	Junior High School
JNC-7	Joint National Committee
LVH	Left Ventricular hypertrophy
MHD	Municipal Health Directorate
NaCl	Sodium Chloride
NCDs	Non-communicable Diseases
OPD	Out Patient Department
QA	Quality Assurance
SBP	Systolic Blood Pressure
SPSS	Statistical package for Social Sciences Version 22.0
UK	United Kingdom
US	United States
US$	United States Dollar
WHO	World Health Organization
WHR	Waist Hip Ratio

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The incidence and prevalence of hypertension is a challenge for public health bodies all over the world (Jones & Hall, 2014). Hypertension is the leading and most important modifiable risk factor for coronary heart disease, congestive heart failure, stroke, renal diseases and retinopathy. Hypertension is cardiovascular disorder affecting approximately one billion people globally and accounts for approximately 7.1 million deaths annually (Brundtland, 2013). Until recently, hypertension has been given low priority in Africa. The condition is now being widely reported in many parts of Africa and is the most common cause of cardiovascular disease on the continent (Brundtland, 2013). Studies conducted in Africa as reported by Addo *et al.* (2013) revealed prevalence ranging from 7.5% in Sudan to as high as 37.7% in Tanzania.

According to statistical reports from medical education and the Ministry of Health, the prevalence rate of hypertension in Iran is 45% (27% for 69 years and 42% for 70 years). The prevalence rate of arterial hypertension in Isfahan is 17.5% (18.6% for women and 16.4% for men). Among them, 46.2% of patients are informed of their condition, while 33.9% are on treatment and 12% have controlled hypertension (Pour *et al*., 2004). In early study, the prevalence in Tehran and Isfahan is estimated at about 18% (Khosravi *et al.,* 2006).

Hypertension is defined as the level of blood pressure (BP) at which detection and treatments do more good than harm. The current definition of hypertension is a systolic BP 140 mm Hg or diastolic BP 90 mm Hg or both (Joint, 2013).

Hypertension is classified into primary hypertension, which accounts for the majority of adulthood hypertension with no identifiable cause, although there are usually recognisable risk factors; and secondary hypertension, which accounts for the majority of childhood hypertension (Haslett *et al.*, 2013). Some of the known risk factors for primary hypertension like age, heredity, and gender are non-modifiable. However, the majority of the other risk factors like tobacco use, alcohol use, unhealthy diet, physical inactivity, overweight and obesity can be effectively prevented (WHO, 2013).

Over the past decade, Ghana, especially the urban areas have witnessed major socioeconomic development leading to significant changes in its standard of living and lifestyle. The transformation of the society has also resulted in changes in dietary habits and related social practices, many of which are not necessarily healthy ones. This has been compounded by a lack of exercise among large segments of the society. These factors and others have contributed to the emergence of degenerative diseases of adult life such as obesity, diabetes mellitus and hypertension. These have essentially replaced communicable diseases as the principal causes for morbidity and mortality (WHO, 2013).

In the Brong Ahafo Region, hypertension is estimated to affect 20%-26% of the population above 35 years of age (Addo et al., 2013). They estimated its prevalence among adults to range from 4% to 15%. However, a nationwide study by the Ghana Demographic and Health Survey (2014) using a blood pressure (BP) of 140/90 as the definition of hypertension estimated that among adults aged 30-50 years, the prevalence of hypertension was 26.1%. Male subjects had a higher prevalence of hypertension 28.6%, while for females the prevalence was significantly lower at 23.9 %

Hypertension which was considered to be nonexistent or extremely rare in most communities, particularly in rural is now emerging as a public health problem affecting both the young and the age in society (WHO, 2012). With a sharp increase of 1,895 cases in 2008 in the Sunyani Municipality (Annual Report of Sunyani Municipal Health Directorate, 2015), the problem cannot be left unattended. There is therefore, the need to investigate the prevalence of hypertension and its contributing factors in Sunyani Municipality, hence this study.

1.2 Statement of the Problem

The problem of hypertension remains an area of public health focus globally (WHO, 2013). It is estimated that globally, 25 million or one half of all deaths and most of the physical disabilities are attributable to non-communicable diseases (NCDs), and this is still on the increase year after year. The highest rated among them is hypertension. WHO (2013) estimated that in 2000, hypertension and mental disorders caused 59% of deaths and 46% of the global burden of disease.

According to the GNA (2015), available statistics indicate that hypertension cases are on the increase in the Sunyani Municipality with women being the worst affected. Dr. David A. Opare, Municipal Director of Health Services who disclosed this at an end of year meeting said the disease, which had increased by 54% continued to be among the top ten out-patient cases reported at health facilities in the municipality. He said out of the 4,982 cases recorded in 2006, women contributed 3,015, adding, the figures far exceeded that of 2005 in which 2,697 cases were recorded for both males and females.

Recently, hypertension has gained popularity in the Sunyani Municipality due to its overwhelming burden in the Region. According to the 2014 Annual Report of Sunyani Municipal Health Directorate, 'hypertension had increased compared to the previous years and is a source of worry for the municipality'. There is therefore the likelihood of future increase on hypertension burden in the municipality if no intervention is implemented. The annual health reports also present that hypertension cases show an increase trend with time. In 2003, 793 cases of hypertension were recorded in the municipality. This increased to 1,259 cases in 2004, 1,713 in 2005, with a slight decrease to 1,701 in 2006, 1,698 in 2007 with a sharp increase to 1,895 in 2008. The data available for hypertension cases for only persons aged 30-50 years indicated that in 2010, 589 cases were recorded, in 2011, 716 cases were recorded, in 2012, 682, and in 2013, 1,023 (Annual Report of Municipal Health Directorate, 2013).

This same hypertension accounted for 2.1%, 2.8%, 4% and 2.1% of cases of morbidity in 2004, 2005, 2006 and 2007 respectively, as well as 2.9 % of causes of institutional admission in both 2004 and 2005. Among the top-10 causes of institutional death in the municipality, Cardio-Vascular Diseases (CVDs) mainly hypertension, diabetes and stroke ranked first in 2004 representing 11.3% of total causes of deaths in that year and 2.9 % in 2005, ranking 7th. In 2006 and 2007, CVD still accounted for 8.94 % and 7.4 % of causes of death respectively (Annual Report of Sunyani Municipal Health Directorate, 2013). The picture of hypertension in the municipality from the previous years to date makes this study so critical for the documentation of the distribution of risk factors among the urban population.

In assessing the factors that contribute to the problem, hypertension has been associated with various factors, including age, sex, family history, alcohol

consumption, smoking, obesity, dietary intake, level of education, and occupation, among others (Olatunbosun *et al*., 2012). Agyemang (2012) identified the following as major factors contributing to hypertension in the Ashanti Region of Ghana: (i) Sedentary lifestyles such as smoking, drinking, physical inactivity among individuals are strong risk factors for developing hypertension;(ii) Low consumption of fresh fruits and vegetables and their nutrient biomarkers are associated with increased risk of hypertension;(iii) Poor dietary/nutritional behaviours contribute to increased risk of hypertension; (iv) Socio-economic factors are key determinants of hypertension; (v) Hypertension and their risk factors are equally associated with males and females; and (vi) Advanced age is a risk factor for developing hypertension.

The increase in hypertension in the Sunyani Municipality is likely to cause coronary heart disease and loss of lives. It is against this background that the study is conducted to investigate the prevalence of hypertension and its contributing factors in the Sunyani Municipality and to make appropriate recommendations to address those factors if any.

1.3 Significance of the Study

This study will be of much benefit to the Municipal Health Directorate and all the major stakeholders in the health sector. The results will reveal the factors associated with hypertension in the municipality and how best they can be addressed.

The study will be of more importance to the Ministry of Health as well as the Ghana Health Services and other policy planners who aimed at reducing the prevalence of hypertension in Ghana.

This research is for academic purposes hence will be significant to the researchers as a source of academic requirement and experience that will help in future works as a public health professional. Besides, the study also serves as a source of information for future researchers since it better documented for literature review.

1.4 Conceptual Framework

The conceptual framework represents the main study variables which serve as the backbone on which the entire study rests. The conceptual framework outlines the various risk factors of hypertension as well as the indicators of hypertension among individuals. The framework indicates the prevalence of hypertension, consequences, and the distribution. The study, therefore, based on four core variables namely; knowledge, awareness, attitude and perception of hypertension, prevalence of hypertension, consequences of hypertension, and the distribution of hypertension as shown in Figure 1.1 below.

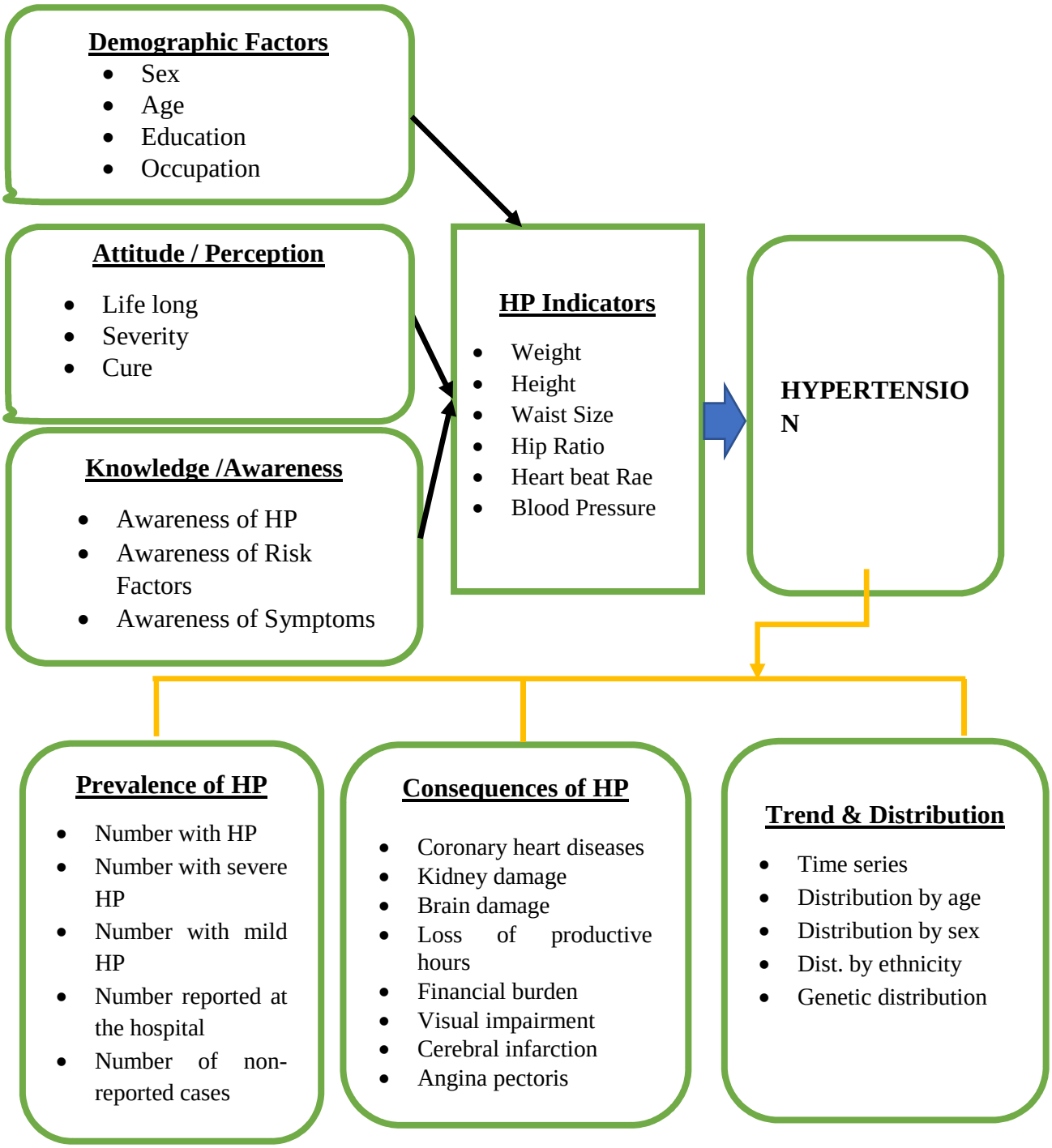

Figure 1. 1: Conceptual Framework of the Study Showing an Overview of knowledge, awareness, attitudes and perception of hypertension among adults (19-60 years) (Author's Construct, 2017)

Explanation of Conceptual Framework

There are several contributing factors associated with hypertension among persons aged 30-54 years. Hypertension is influence by demographic (age, sex, education and occupation), physical factors, environmental factors, and knowledge on the risk factors and prevention of the condition. In a study conducted, Abed & Abu-Haddaf (2013) applied multiple logistic analysis on the data that they collected through questionnaire based survey to predict the hypertension's risk factors for residents of Gaza strip, Palestine. They inferred that hypertension was strongly linked with physical inactivity, education, obesity, low income and family history of high blood pressure.

Demographic Factors: The demographic factors such as age, sex, education and occupation are reported as risk factors that influence hypertension among individual. The sex of respondents is measured in terms of sex organ, age is measured at last birthday, highest educational level is measured in terms qualification while the main work of respondents defines the occupation. Educational status is also linked with the knowledge of the individuals regarding hypertension.

Knowledge/Awareness of HP: Individuals with a higher educational status will have greater knowledge on the risk factors of hypertension which will influence them to adopt preventive measures. Adequate knowledge on the various physical and environmental risk factors will all influence them to develop more favorable attitudes towards the adoption of hypertension free measures. The environmental factors that are associated with hypertension include risky lifestyles such as frequency of smoking, number of times of smoking per day, frequent alcohol consumption, and vegetable intake per daily, meat taken containing fat, type of physical activities

perform, level of quantity of salt taken per meal, among others. Lack of awareness and practice of physical activity among individual is associated with hypertension. This include such as depression, lack of exercise, and type of exercise (jogging, gym, riding and walking), and the rate of exercising.

Prevalence of HP: the prevalence in the study is defined as the number of people within the study sample who have hypertension. It includes those reported to any health facility and those who do not report to any health facility. The prevalence also includes those with severe and mild hypertension.

Consequences of HP: the consequence of hypertension is defined as the various health and economic burden that occurred as a result of the condition. Hypertension can lead to health complications and diseases such as coronary heart diseases (stroke, heart failure, peripheral vascular disease, angina pectoris etc.), renal impairment, retinal hemorrhage and visual impairment, kidney damage, brain damage, and cerebral infarction. It also has economic consequences which include cost of treatment, loss of productive time in seeking treatment, low productivity at work, and family burden.

Trend and Distribution of HP: the trend in the study depicts the occurrence of hypertension in the Sunyani municipality for a particular length of time (2011-2016) whereas the distribution of HP looks at the spread of the condition among individuals with respect of sex orientation, age, ethnicity, and family history.

In summary, the various demographic (age, sex, education and occupation), physical factors, environmental factors, and knowledge factors have the potential to trigger hypertension indicators such as overweight, height, waist size, rate of heart beat, and blood pressure. These indicators further influence hypertension among individuals. People awareness of the risk factors of hypertension could contribute to health

practices and lifestyles that can minimize the occurrence of hypertension. However, hypertension when it occurs, could lead to both health and economic consequences

1.5 Justification of the Study

Hypertension remains an area of high public health concern to the health services providers. Until recently, hypertension was not given much attention as the disease was noted to be confined to the wealthy people. With the current increase in trend of the disease among all the different social categories of people, attention has begun to rise about major determinants of the diseases and risk factors for hypertension (Olatunbosun *et al*., 2013). However, much have not been done in the area of research in the Brong Ahafo Region of Ghana to determine the state of hypertension with particular emphasis on knowledge/awareness, prevalence, consequences and the distribution.

Also, in a study of two urban communities and one urban community in Ghana, hypertension prevalence was 28.4% (Amoah, 2013). The annual municipal health report continues to show hypertension ranking among the top 10 diseases over the past five years, indicating that contrary to what is believed, hypertension does not only occur in urban areas (Annual Report of Sunyani Municipal Health Directorate, 2013). With the rapid increase in the number of hypertension cases in recent annual reports of the Ghana Health Service (GHS), there is the need for a current research to be conducted to examine the recent trend and distribution of the condition among adults.

Last but more importantly, in the Sunyani Municipality, hypertension is ranked 4th among the first ten leading causes of deaths (Annual Report of Sunyani Municipal Health Directorate, 2016). This and others necessitate this study into assessing the

level of awareness/knowledge, determinants, prevalence, consequences and the distribution of the disease such that tentative interventions can be put in place at a minimum cost before the situation gets out of control. In order to take effective prevention measures, identification of the risk factors is an essential prerequisite. Little is known about the prevalence of the risk factor coupled with little data available on the dietary habits, physical activity and other life-style associated factors in urban centres in the municipality.

1.6 Research Question

1. What is the level of knowledge of hypertension among adults (19-60 years) in the Sunyani Municipality?
2. What is the level of awareness of hypertension among adults (19-60 years) in the Sunyani Municipality?
3. What is the level of attitude and perception related to hypertension in the Sunyani Municipality?

1. 7 Research Objectives

1.7.1 Main Objective

The main objective is to assess the knowledge and attitudes of hypertension among adults (19-60 years) in the Sunyani Municipality, Brong Ahafo Region, Ghana.

1.7.2 Specific objectives

The specific objectives are to:

1. Assess the level of knowledge of hypertension among adults (19-60 years) in the Sunyani municipality
2. Assess the level of awareness of hypertension among adults (19-60 years) in the Sunyani Municipality.
3. Assess the level of attitudes and perceptions related to hypertension in the Sunyani Municipality.

1.8 Organisation of the Study

The study is organised into six chapters. The chapter one presents the overview of the general introduction to the study. It covers the general background, statement of the problem, justification of the study, research questions, general and specific objectives of the study, significance of the study, scope of the study, and organisation of chapters. The chapter two deals with the review of existing literature on the subject matter mainly, theoretical and empirical evidence. The chapter three considers the methodology of the study. It consists of sections such as profile of the study area, study design and type, study population, sampling techniques and sample size, data collection techniques and tools, measurement procedures, data handling and analysis, ethical consideration, and limitations of the study. The chapter four presents a detailed outcome of the research results and findings. The chapter five deals with discussion of the results. It is organised around the specific objectives of the study. Finally, the chapter six of the study draws the conclusion and recommendations based on findings.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The literature review was based on previous works done by others on factors contributing to hypertension. This was done by considering the level of awareness/knowledge on hypertension, determinants of hypertension, and trend and distribution of hypertension.

2.1 Overview of Hypertension

Worldwide prevalence of hypertension exceeds 1.3 billion in 2016. The global hypertension is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS. Globally, the overall prevalence of hypertension in adults aged 25 and over was around 44% in 2016. The proportion of the world's population with high blood pressure, or uncontrolled hypertension, fell modestly between 1980 and 2008. However, because of population growth and ageing, the number of people with uncontrolled hypertension rose from 600 million in 1980 to nearly 1.4 billion in 2016 (WHO, 2017).

High blood pressure has become a major problem in many developing countries experiencing an epidemiological transition from communicable to non-communicable chronic diseases (WHO, 1993). The development of hypertension and other cardiovascular diseases in these countries is associated with the aging of the population. Urbanization and socio-economic changes favor, among other things, sedentary habits, obesity, alcohol consumption and salt consumption (Omran, 1971;

Akinkugbe, 1987). The cost-effective use of health services to combat these emerging chronic diseases is particularly needed in developing countries, as resources are limited and must generally be shared with the burden of persistent communicable diseases. In this context, hypertension is an important area of intervention because it is common and can be controlled by non-pharmacological lifestyle factors and pharmacological treatment. Pharmacological treatment of hypertension has been shown to be effective in reducing BP and subsequent cardiovascular events (Collins *et al.*, 1990), although BP levels may be significantly higher in treated patients than in truly normotensive patients. Lifestyle measures to lower BP include reduced alcohol consumption, reduced consumption of sodium chloride, increased physical activity, and over-control (Cutler, 1993; Stevens *et al.*, 1993). Lifestyle interventions also have the potential to reduce the need for BP in non-hypersensitive people. In addition, lifestyle interventions help control other concomitant cardiovascular risk factors that are not related to hypertension, such as smoking, high cholesterol or diabetes, hence the importance of multifactorial approach effective risk reduction in hypertensives (WHO, 1996; Strasser, 1992). Several models have been proposed for health behaviors and sustained behavioral changes (Becker, 1974; Prochaska, & DiClemente, 1986). Although they may differ in content and point of view, behavioral change models emphasize the importance of assessing individuals' perceptions, attitudes, beliefs and expectations as a crucial means of understanding observed behaviors and guiding behavioral changes. An adequate assessment and understanding of KAP factors is particularly useful in the area of chronic diseases such as hypertension, for which prevention and control require the adoption of healthy lifestyles throughout life.

The literature shows that pharmacists in Jos have a low prevalence of hypertension. Although knowledge about hypertension was appropriate, the awareness of hypertension was very low. Hypertension was significantly associated with married respondents and patients with insufficient hypertension. The prevalence of hypertension among pharmacists in Jos was low relative to the national prevalence in Nigeria (Whitworth, 2003, Ogah *et al*., 2012) and the prevalence of hypertension in other Glenn workers' health studies, (Glenn, 2013; Aguirre, *et al.*, 1999) the majority had pre-hypertension. The prevalence of pre-hypertension with risk factors for overweight hypertension, such as: Low level of physical activity, obesity and alcohol consumption at our participants indicate that BP intervention programs are necessary for pharmacists and should focus on regular monitoring of BP. The JNC-7 director (Chobanian *et al*., 2003) recommends screening annual lifestyle changes, such as increased exercise levels, reduced alcohol consumption, weight reduction strategies and changes in food should be part of the lifestyle control measures BP among pharmacists.

Hypertension is recorded as a major type of cardiovascular disease which affects one billion people worldwide and claims the life of seven million (American Heart Association, 2006). It accounts for 13% of global mortality (Khatib, 2005) with 25% prevalence in Nigeria (Danbauchi *et al*., 2007). A current trend in management is lifestyle modification (Simeon & Zieve, 2008).

Across the WHO regions, the prevalence of hypertension was highest in Africa, where it was 46% for both sexes combined in 2016. Both men and women have high rates of hypertension in the Africa region, with prevalence rates over 40%. The lowest prevalence of raised hypertension was in the WHO Region of the Americas at 35% for both sexes in 2016. Men in this region had higher prevalence than women (39%

for men and 32% for women). In all WHO regions, men have slightly higher prevalence of hypertension than women. This difference was only statistically significant in the Americas and Europe (WHO, 2017).

In Ghana, the prevalence of hypertension among urban population is pegged at 54.6 % against rural prevalence of 19.3%. In Ghana, hypertension was rated fourth among the first ten causes of admission in 2015 and 2016 with 33,154 cases recorded (GHS, 2017). The disease affects nearly one out of every five Ghanaian adults. This statistic was contained in a review of population-based studies on hypertension in Ghana by a team of researchers (Okertchiri, 2016).

The prevalence of hypertension was higher in urban than rural areas in studies that covered both types of area and increased with increasing age. They also found out that hypertension is associated with high blood pressure included increasing body mass index, increased salt consumption, family history of hypertension and excessive alcohol intake. The levels of hypertension detection, treatment and control were generally low (control rates ranged from 1.7 % to 12.7 %)," the research showed (Okertchiri, 2016). The research concluded that an increased burden of hypertension should be expected in Ghana as life expectancy increases with rapid urbanization. Prevention and control of hypertension in Ghana is, thus, imperative and any delays in instituting preventive measures would most likely pose a greater challenge on the already overburdened health system," the findings concluded (Okertchiri, 2016).

In the Brong Ahafo Region, hypertension was rated fourth among the first ten causes of admission in 2015 and 2016 with 3,230 cases recorded (GHS, 2017). Hypertension was also rated the seventh cause of mortality within the same period with 588 deaths record with the period. The prevalence of adult hypertension in the region appears to

be increasing and ranges from 19% to 48%. Current reports have identified that, up to 70% of persons identified to have hypertension are not on treatment and only 13% of those with hypertension have their blood pressures well controlled.

According to a survey in Portugal (Macedo *et al*., 2005), the awareness and treatment of hypertension increased between 2003 and 2012 despite a similar prevalence of hypertension. Hypertension increases by 3.8 times. Other studies have shown improved treatment and control of hypertension for decades (Kastarinen et al., 2009; Guo *et al*., 2012; Gao *et al*., 2013). In particular, the proportion of hypertensive patients undergoing controlled treatment almost doubled between 2003 and 2012. This progress may be related to increased use of antihypertensive drugs, new therapeutic approaches and overall improvement in blood pressure in patients and of the health system.

In the past decade, several campaigns have been launched in Portugal to alert the public to the importance of high blood pressure as the cause of the disease. In addition, it is generally believed that access to primary care has improved significantly in recent years. In terms of treatment, a study indicated that patients with adequate control of hypertension were more often treated with a combination of antihypertensive drugs (65% are fixed combinations) than those with an uncontrolled BP. In addition, this is consistent with other studies that have described a combination of more frequent drug combinations with a progressive increase in adequate control of hypertension.

Once again, it is in good agreement with the European directives, Mancia *et al*., (2013) and American (Chobanian *et al.*, 2003). Over the last ten years, the control of hypertension in 10 years despite the adverse changes in obesity is improving. It is

important to improve the control of hypertension from 2003 to 2012 which caused Portugal with a significant reduction of systolic and diastolic blood pressure in hypertensive patients in the range of 12.4 / 8.0 mmHg average. The Portuguese population to be reduced by more than 20% reduction in stroke mortality in 10 years (Lewington *et al*., 2002).

2.1.1 Determinants of Hypertension

High Blood Pressure and Age

Blood pressure is considerably lower in children than in adults and increases steadily throughout the first two decades of life. In adults, cross-sectional and longitudinal surveys have shown that systolic and diastolic blood pressure increase progressively with age. For example, in the WHO survey, systolic blood pressure increased by about 0.29 to 0.91 mm Hg per year in men and 0.6–1.31 per year in women. This increase remains stable and possibly declines after age 50 for diastolic but not for systolic blood pressure, leading to a steep increase in pulse pressure; a key risk factor for cardiovascular outcome. These trends have been demonstrated in both genders and most ethnic groups. Similarly, many studies document an increase in hypertension prevalence with age (Hajjar *et al.,* 2013).

In the United States, hypertension prevalence increased from 6.7% in persons within the ages 20 to 39 years to 65.2% in persons 60 years or older. The greatest increase in hypertension prevalence between 1988–1991 (57.9%) and 1999–2000 (65.4%) occurred in individuals who are 60 years or older (Hajjar *et al.,* 2013). On hypertension in the Ashanti Region, West Africa: an opportunity for early prevention of Clinical Hypertension; documented 40% and 29% as a prevalence of both hypertensive and hypertensive respectively with hypertension being more in non-

hypertensive males than non-hypertensive females particularly people aged around 35 years (Addo *et al.,* 2013).

In population-based sample studies of the United States, the mean systolic blood pressure is higher for men than for women during early adulthood, although among older individuals the age-related rate of rise is steeper for women. Consequently, among individuals aged 60 or older, mean systolic blood pressure of women is higher than that of men (Stamler *et al.,* 2013). A family history of hypertension is associated with an increase in the prevalence and incidence of hypertension. Both genetic and environmental factors appear to contribute to this association (Fava *et al.,* 2004). In a nationwide screening program, a family history of hypertension was associated with hypertension prevalence double that in persons with a negative family history, independent of Body Mass Index, gender, and ethnicity (Stamler *et al.,* 2013). In a population-based ascertainment of families in Utah, a family history of hypertension was associated with a 3.5-fold increased risk of hypertension. Young children of parents with hypertension are at increased risk of hypertension, and they show higher levels of systolic blood pressure than those of parents with no hypertension. In a study of 745 subjects followed for 10 years (baseline mean age = 12 years), subjects with a family history of hypertension in one or both biological parents were associated with higher systolic blood pressure, and a higher rate of increase of systolic blood pressure over time (Stamler *et al.,* 2013).

Anthropometric Indexes

Body mass index (BMI) is an important correlate of blood pressure and hypertension prevalence. By the current World Health Organization (WHO, 2016) criteria, a BMI <18.5kg/m^2 is considered underweight, 18.5–24.9 kg/m^2 ideal weight and 25–

29.9kg/m^2 overweight or pre-obese. The obese category is sub-divided into obese class I (30–34.9kg/m^2), obese class II (35–39.9kg/m^2) and obese class III (≥40kg/m^2). A BMI greater than 28kg/m^2 in adults was associated with a three to four-fold greater risk of morbidity due to CVDs than in the general population.

The recent increase in overweight and obesity in the United States both in adults and children may explain, in part, the associated increase in hypertension prevalence over the past decade. In the NHANES-III data, obese men and women had a hypertension prevalence ranging from 49% to 64% with increasing degrees of obesity in men and from 39% to 63% with increasing obesity in women versus 27% in normal-weight men and 23% in normal-weight women. According to Han *et al*. (2014), weight gain is also associated with an increase in hypertension incidence and the age-related rise in systolic blood pressure. In an analysis of four Chicago epidemiological studies, weight gain was associated with an increase in pulse pressure. In the Framingham Heart Study, a 5% weight gain was associated with a 20% to 30% increase in hypertension incidence (Han *et al*., 2014).

Obesity which is defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health is impaired in absolute terms, and its distribution in the body - either around the waist and trunk (abdominal, central or android obesity) or peripherally around the body (gynoid obesity) - has important health implications. A central distribution of body fat is associated with a higher risk of morbidity and mortality than a more peripheral distribution (Kissebah *et al.,* 2016). Measurement of the waist circumference, measured at the midpoint between the lower border of the rib cage and the iliac crest, or the waist: hip ratio (WHR) provide useful indices of abdominal fat accumulation and a better correlation with an increased risk of ill health and mortality than BMI alone (Kissebah *et al*., 2016).

An abdominal girth in excess of 108 cm (40 inches) for men and 98 cm (35 inches) for women or a WHR > 1.0 and 0.85 in men and women, respectively, are the currently accepted indicators of excessive abdominal fat accumulation which correlate with a substantially increased risk of metabolic complications (WHO, 2016). In both national studies, Greater Accra Region had the highest overweight and obesity rates and women constituted a high-risk group.

Nutritional/Dietary Behaviour Measures

Results of observational studies and clinical trials document an association between sodium chloride (NaCl) intake and blood pressure. The effect of NaCl on blood pressure increases with age, with the height of the blood pressure, and in persons with a family history of hypertension. Among population groups, age-related increments of blood pressure and the prevalence of hypertension are related to NaCl intake (Elliott *et al*., 2016).

In societies with high potassium intakes, both mean blood pressure levels and the prevalence of hypertension tend to be lower than in societies with low potassium intakes. Meta-analyses of clinical trials have concluded that oral potassium supplements significantly lower both systolic and diastolic blood pressures (Cappuccio *et al*., 2013). Within and among populations, as with potassium, there is an inverse association between dietary calcium intake and blood pressure, and low calcium intake is associated with an increased prevalence of hypertension (Cutler *et al*., 2013). A study by Maham *et al.* (2013), in India indicates that majority (93.2%) of the subjects (190) incorporated into a study of risk factor profile of non-communicable diseases in an industrial productive had low daily intake of vegetables and fruits.

Sedentary lifestyle

Sedentary life style and low educational attainment have each been linked to the rise in blood pressure with age, low socio-economic status, low occupational class, psycho-social factors such as hostility and time urgency/impatience, job strain, depression (Davidson *et al*., 2014).

Tobacco Smoking

Smoking, which is believed to be the number one major single known cause of non-communicable diseases such as hypertension, is widespread around the world. Estimate of the World Health Organization (WHO) indicates that roughly about 30% of the global adult male populations are smokers (WHO, 2013).

It is estimated that tobacco-related deaths exceed 4 million annually. It has been estimated that by 2030, diarrhoeal diseases and lower respiratory infections will have been surpassed by chronic obstructive airways diseases as causes of mortality (Murray & Lopez 2014). While the prevalence of tobacco use in many industrialized nations is reducing, there is a growing epidemic of smoking in the developing world. In many African countries, there is paucity of data on the epidemiology of tobacco and smoking. Based on the available data however, in African countries, it appears smoking among adults is more common among males and the poor. An estimated 4.8 million deaths case worldwide in 2000 was believed to have occurred due tobacco smoking, particularly occurring in developing countries (Ezzati *et al.*, 2013).

In Ghana specific, little is known about prevalence of smoking. Before the year 2013, no National data was available on prevalence of smoking among adults. The 2013 Ghana Demographic and Health Survey estimated smoking prevalence in men aged 15 to 19 to be only 0.7%. Global Youth Tobacco Survey (GYTS) also documented

smoking prevalence rate of 4.8% among 1,917 Ghanaian school children between the ages of 11-16 years in 2010. Males smoker were more than females (5.3% versus 3.8 %) (Ghana Demographic and Health Survey, 2014).

On smoking patterns in Ghanaian civil servants, changes over three decades, it was revealed high rates of smoking prevalence in men and women. The age-standardised prevalence of cigarette smoking among the 1,015 participants was also high. Among the participants, men with age-standardised prevalence of 7.3% and 0.5% for women were considered to be ex-smokers. The study also obtained an average number of cigarettes smoked per day among the proportion of respondent being current male smokers to be 4.3 sticks. About 82% of men reported smoking 5 or less cigarettes in a day while 18% reported smoking 6 to 10 sticks of cigarettes per day (Ghana Demographic and Health Survey, 2014).

Physical Inactivity

Physical inactivity is known to be a major public health problem of concern in 2010 as physical activity levels of people of all ages tended to decrease. The Centres for Disease Control (CDC, 2014) reported that among the youth in America aged 12 and 13 years, 69% were regularly active. However, the number dropped to 38% for young people between the ages of 18-21 years. A physically inactive child is more likely to become a physically inactive adult, which could lead to chronic diseases including hypertension of lifestyle. Patterns of inactivity, also known as sedentism, begin early in life, making the promotion of physical activity among children imperative. The prevalence of physical inactivity among youth worldwide has increased. In the international level, 67% of young children in Canada did not meet the average physical activity guidelines to achieve optimal growth and development (CDC, 2014).

Among the United Kingdom, London Health Observatory reported that both adults and children in Britain are less active and less fit than previously. The Allied Dunbar National Fitness Survey identified United Kingdom adult population groups who were sedentary as women aged 16-24 years, middle-aged men and people aged 50 years and over. Girls are reported as being physically inactive between age 10 and 15. In the 16-24 years age group, 39% of the males are reported as inactive and 62% of the females are reported as inactive. In some Sub-Saharan countries, prevalence of physical inactivity has been recorded. A study in South Africa report indicates that more than 40% of young people do not participate in regular physical activity. A study found that physical activity was less common among girls than boys and among those with lower income and less education (WHO, 2013).

Environmental Factors

Urbanization is an important factor in the aetiology of obesity, and a major risk factor for hypertension. It accelerates the changes in diet, physical inactivity and increases access to tobacco products and high fat foods which are all risk factors of hypertension. Diet and physical inactivity are modifiable risk factors associated with changes in lifestyle. Diets of the African population tend to differ between rural and urban dwellers. Studies have shown that rural dwellers diets are low in fat and sugar but high in carbohydrates and fibre **(**Steyn *et al*., 2013), while their urban counterparts show high fat and low fibre and carbohydrate intake (Bourne *et al*., 2014) which is typical of a Western diet.

2.2 Knowledge on Hypertension

Hypertension is one of the most common chronic health problems in the world and a major risk factor for mortality and morbidity (Kearney *et al*., 2004**)**. Controlling hypertension by changing lifestyle habits could reduce the cost of health care by reducing the use of pharmacological and invasive cardiovascular treatments. Disease prevention and control should be the primary means of ensuring public health and disease treatment (Connor *et al*., 2005).

For knowledge about risk factors for hypertension, the results of the study showed that more than half of hypertensive patients were aware of this; family history, smoking, and excessive salt intake have increased the risk of high blood pressure. While most of them did not know; aging, overweight, inactivity, stress, alcohol consumption, high cholesterol levels and some medications are associated with an increased risk of hypertension. This may be due to the low level of education of patients and the fact that patients have other concerns than the time to monitor their disease in clinics. The most common risk factors for hypertension in volunteers were excessive salt intake (77.4%), followed by family history (73.4%) and the lowest alcohol consumption (47.6%) **(**Demaio, *et al*., 2013).

Knowledge of hypertension is very essential because it contributes enormously to the prevention and management of the condition and also drug adherence (Saleem *et al*., 2013). A study conducted in 2012 to assess the knowledge level and management practices of hypertension in pregnancy among health care workers in Moshi urban in Tanzania found out that the level of knowledge of hypertension during pregnancy is too low (Liljevik & Lohre, 2012). A recent study by Siddiqua et al. (2017) in Saudi Arabia in 2017 concluded that a significant proportion of hypertensive patients have

good knowledge and attitude towards hypertension but they show moderate levels of practice which can lead to worsening their health condition in time being and resulting in severe complications and damaging of other vital organs also. A descriptive cross - sectional study conducted in China on the topic "health literacy in rural areas of China: hypertension knowledge survey also revealed that, hypertension knowledge levels are alarmingly low in rural areas of China, particularly concerning hypertension complications and medication. The authors also averred that myriad factors contribute to this low hypertension knowledge level, such as the poor health education programs, economic conditions, and cultural factors (Li *et al.*, 2013).

Almas *et al.*, (2012) in their cross sectional study in Karachi in Pakistan entitled, good knowledge about hypertension is linked to better control of hypertension also opined that, Knowledge about hypertension in hypertensive patients is not adequate and is alarmingly poor in patients with uncontrolled hypertension. More emphasis needs to be made on target blood pressure and need for taking antihypertensive for life to patients by physicians (Almas *et al.*, 2012).

A study in Ghana by Lamptey *et al.* (2017) to evaluate community-based hypertension improvement programme also affirmed that respondents were highly aware of hypertension, but with very low level of hypertension treatment and control and this requires in-depth investigation of the bottlenecks to treatment and control.

A cross sectional survey which employed 529 participants by Sanne *et al*., (2012) on the topic hypertension knowledge among patients from an urban clinic also concluded that, there is hypertension knowledge deficits in specific content areas among the urban population. Educational programmes focusing on newly diagnosed

hypertensive patients and aimed at filling targeted knowledge deficits may be a cost-effective approach to increase hypertension knowledge in similar populations.

A descriptive, quantitative and transversal study, performed by Lima *et al* (2015) entitled the patient's knowledge about hypertension: an analysis based on cardiovascular risk attested that people with the highest cardiovascular risk are the ones showing the poorest knowledge about the complications related to hypertension.

Abdullahi & Amzat (2011) also conducted a research on knowledge and perceptions related to hypertension, lifestyle, behaviour modifications and challenges that are facing hypertensive patients, of which the authors enunciated that, there is high poor level of knowledge about hypertension and perceptions toward lifestyle-modification. Patients lacked understanding some points of risk factors, manifestation and lifestyle modifications of hypertension. So educational programmes that can enhance patients' awareness regarding hypertension disease are urgently needed among these patients.

A cross - sectional study on the levels of knowledge, attitude and preventive practices of hypertension among residents aged 18 years and above in Kampung Baru Ixora, Sarikei in Malaysia also showed that 52.5% of the respondents had adequate knowledge, 57.4% had positive attitude and 61.4% of them had good preventive practices of hypertension (Shaikh *et al*., 2012).

A study conducted in Nigeria among staff of the University of Ibadan by Abdullahi & Amzat (2011) also demonstrated that the majority of the respondents had a fair knowledge about the complications of hypertension. However, knowledge about the risk factors and attitude toward hypertension was very poor (Abdullahi & Amzat, 2011). A study on hypertension knowledge, attitude and practice also concluded that

a significant proportion of hypertensive patients have poor knowledge about hypertension (Shaikh *et al*., 2012).

As expected, knowledge of hypertension was appropriate for trained pharmacists. However, it found a small percentage of pharmacists who did not know the guidelines for the treatment of high blood pressure. Knowledge of hypertension was not partial by age, work experience or scope of practice, but by gender. More worrisome was the fact that adequate knowledge of hypertension did not lead to a better attitude towards blood pressure monitoring and awareness, since only a quarter of respondents said they had good blood pressure. Particularly of concern was that pharmacists did not regularly monitor their blood pressure and that about 10% of them never checked their blood pressure. Suboptimal attitude/awareness of hypertension by health professionals has been reported in other studies (Mitwalli *et al*., 2013).

This discovery underscores the need for behavioral intervention and motivation to improve blood pressure monitoring in pharmacists, given the importance of early detection and treatment of high blood pressure. Measurement of BP identifies adults at high risk of cardiovascular disease due to hypertension (U.S. Preventive Services Task Force, 2014).

2.3 Awareness on Hypertension

Globally, from 2000 to 2010, high-income countries saw substantial improvements in hypertension awareness, treatment, and control. While these rates still demonstrate substantial room for improvement, they are far superior to the rates seen in low/middle–income countries where there has been little improvement and perhaps some worsening in the rates of awareness, treatment, and control from 2000 to 2010 (Mills *et al*., 2016).

Awareness of participants on hypertension issues was 44% as against the 50% in the study by Ike et al. (2010). There was a misconception that stroke and hypertension can be caused by gods or enemy, respectively. Attitude to hypertension was negative especially among participants, as majority strongly disagreed with having hypertension in their lifetime and does not affect young people. Apparently these participants will not go for a routine blood pressure check based on their belief. It was also noted that majority of the participants could not differentiate between daily activities and regular exercise as it was strongly agreed that daily activities was same as regular exercises unlike in the study by Ohata et al. (2005) where all participants appreciated a 12-week regular exercise as an intervention. Identified risk factors were in line with Wang et al. (2006) and Omorogiwa et al. (2009) in their studies. Smoking was not identified as a risk factor as in the report by Ricks (2004) and Aghaji (2008) but snuff was enlisted. The unhealthy lifestyles in relation to nutrition include the chewing of kolanut, use of table salt, and alcohol as in the studies by the aforementioned researchers.

The high prevalence of hypertension in the rural Ga district since the study in 1973 could be attributed to transformation of rural areas, which could have resulted in a decrease in physical activity from use of automobile transportation and increased mechanization in agriculture. Parallel, Ghanaians are adopting lifestyles that they perceive to be desirable or modern, changing the types of food, consumed both in rural and urban areas (Mills *et al.*, 2016).

Wilber & Barrow (2013) indicate that only 26% of hypertensives in the study were aware they had high BP. The low levels of awareness may be partly due to poorly developed health services and the relatively low functional literacy rate in rural Ghana. Only 50% of those with previously known hypertension were receiving

antihypertensive treatment, and only 16.7% of them had their BP under control. Community hypertension surveys in various parts of the United States have shown that most people with hypertension are undetected, untreated, or inadequately treated.

In many populations, half of the hypertensives are known to have hypertension, half of the known hypertensives are treated, and half of the treated hypertensives are controlled (Hart, 2013). Low levels of awareness have been described in most studies in Africa. In a recent study from greater Accra, 34% were aware they had high BP, 18% were receiving treatment, and only 4% had their BP controlled (Amoah, 2013). Ghanaian patients often present late with complications of hypertension such as heart failure, stroke, and chronic renal failure (Amoah, 2013). Effective treatment of hypertension could prevent 250,000 deaths each year in sub-Saharan Africa (Hart, 2013).

The prevalence of hypertension increased with age, as has been observed in most studies (Amaoh, 2013). Hypertension prevalence was 60% among respondents 65 years of age, while it was 6% in those 18–24 years. Most of the respondents were in jobs that involved physical activity to varying degrees (73%) and also carried out other activities several times a week. The mean BMI of 21.5 6 2.8 kg/m2 and 23.9 6 5.4 kg/m2 for men and females, respectively, compare to those obtained for men (21.2 and 24.5 kg/m2, respectively) in rural residents of Accra (Amoah, 2013). Overweight and obesity are no longer rare in rural residents (Amoah, 2013) and may be partly responsible for the high prevalence of hypertension in the Ga District. Hypertension prevalence was significantly higher in those who were overweight and obese as well as those involved in less physical activity. The prevalence of hypertension increased as body mass increased from 18% in those with normal body mass to100% in respondents with grade 3 overweight. This finding was consistent with available

literature since increased fat mass is associated with increased risk of hypertension even in lean populations. No significant association was observed between hypertension prevalence and alcohol consumption.

Epidemiologic data have shown a lower risk of coronary death and ischemic stroke in those who drink the equivalent of one to four standard drinks a day in Western societies. Moderate alcohol intake is believed to have some cardiovascular benefits. Evidence from African studies have been inconclusive; some show an association of regular and moderate alcohol intake with hypertension, and others show no association (Olatunbosun *et al.,* 2013). The absence of an association in the present study could possibly be due to lack of accurate ascertainment of alcohol in intake. Smoking rates are relatively low in the rural communities studied, which offers a window of opportunity for smoking prevention. Health promotion efforts should be intensified so that rural persons do not take up smoking with its attendant health problems.

No significant association was observed between family history of hypertension in a first-degree relative and the subsequent development of hypertension. This conclusion may not be valid, considering the high level of hypertension unawareness detected in this study; subjects are unlikely to be aware of hypertension in other family members. Those with a history of diabetes had an increased risk of being hypertensive, although this association was not statistically significant. Having some degree of formal education carried a lower risk of developing hypertension compared to having no education at all, but having more than nine years of education carried a higher risk compared to no education at all (Olatunbosun *et al.,* 2013).

There is a common misconception that people with high blood pressure always experience symptoms. Most people with high blood pressure actually have no

symptoms at all and may not even know they have it. Sometimes high blood pressure can cause symptoms such as headache, shortness of breath, dizziness, chest pain, palpitations of the heart or nose bleeds. If people ignore measuring blood pressure because they think symptoms will alert them to the problem, it can be dangerous because high blood pressure is often a silent killer. Everyone should know his or her blood pressure numbers (WHO, 2013).

According to Shaikh *et al.*, (2011) reported that more than 70% of patients knew that stress, high cholesterol and obesity were the risk factors for hypertension and that 52.7% of them did not know that they were physically active, risk factor for hypertension. In addition, Ali *et al*. (2006) reported that study participants were aware that stress, excessive salt intake and obesity are risk factors for high blood pressure. But there was little awareness about excessive drinking, smoking and a sedentary lifestyle. In the same line, Akter, *et al.* (2014) estimated that in a Hispanic study of the community of hypertension on risk factors, treatment, diagnosis and prognosis indicated that only 28% knew the correct definition of hypertension and 3% of unknown etiology.

In addition, Ali *et al.*, (2006) who reported that the participants in their study were aware that stress, excessive salt intake and obesity as risk factors of hypertension. But there was poor awareness with regards to excessive alcohol intake, smoking and a sedentary lifestyle. In the same line Akter, *et al.* (2014) held that in a community study done on Hispanic subjects regarding knowledge about hypertension on risk factors, treatment, diagnosis and prognosis showed that only 28% knew the correct definition of hypertension and 3% aware that etiology was unknown.

A median (50%) of people with high BP were aware that they were hypertensive and only a small proportion (10%) of hypertensive individuals had a controlled BP. For example, in a similar sample and population, these numbers are lower than those of African Americans from 1991 to 1993 (93% aware, 83% treated and 68% for BP controlled) or Barbados in 1994 (82% aware, 60% treated and controlled at 52%) (Freeman, *et. al*. 1996). However, in the Seychelles, hypertension rates were higher than in several developing countries, for example in rural Zaire in 1986 (31% aware, 13% treated and 3% controlled) or in the Eastern Mediterranean region in 1990 (only about 20% of hypertensives are aware of their condition) (Alwan, 1993), where hypertension was only recently recognized as a major public health problem. Allergic hypertension and hypertension intermediates in Seychelles are not unexpected results, as hypertension has become a major public health problem recently, perhaps because of the rapid epidemiological transition over the past two or three decades. Although a national program for the prevention and control of cardiovascular disease was launched in 1991, achieving these goals may take a long time. Low levels of BP control in the general population are consistent with poor compliance as measured by electronic surveillance: only 28% of newly diagnosed hypertensives achieved a 360-day adherence of at least 85% to one drug per day (Bovet *et. al.*, 1997). Overall, it can be said that the current detection and control rates in Seychelles have been similar to those in western countries for decades and that in the 1970s, as "the rule of the halves" (where half of hypertensives are aware of hypertension, half of aware hypertensives are treated, and half of those treated are controlled). It took 30-40 years to significantly improve the detection and control of hypertension in western countries and rates remain optimal. Rapid improvement in the detection and control of hypertension, which is faster than in western countries, is therefore needed to prevent

or reduce the growing burden of disease associated with increased rates of hypertension in countries in epidemiological transition (Burt *et. al.,* 1995).

2.4 Attitude of Adults towards Hypertension

Oliveria *et al*., (2015) conducted a descriptive survey to understand the current status of hypertension (HTN) knowledge, awareness, and attitudes in a group of hypertensive patients. Our results suggest that patients are knowledgeable about HTN in general, but are less knowledgeable about specific factors related to their condition, and specifically their own level of BP control. The median duration of HTN was 14 years, suggesting that even though these patients have had this condition for a long duration their knowledge is inadequate. Patients were unaware that SBP is important in BP control and reported that physicians did not emphasize the significance of high SBP levels. Further, many patients (41%) did not know their BP value nor could they accurately report whether it was elevated.

Patients were knowledgeable about the meaning of HTN, and the seriousness of the condition to their health. Ninety-six percent knew that lowering BP would improve health and 96% thought that people can do things to lower their high BP. Nearly 70% of patients knew that high BP could lead to congestive heart failure. Almost all patients were aware of their HTN with 91% reporting that a doctor or health care provider had told them that they have HTN.

Improved recognition of the importance of SBP has been identified in recent years as one of the major public health and medical challenges in the prevention and treatment of HTN because of the potential impact on the morbidity and mortality associated with cardiovascular disease and stroke. Patients are generally unaware that SBP is important in HTN and BP control. Sixty-five percent of patients were told their

optimal BP reading while only about half reported that they were specifically told that the top and bottom numbers are important to keep under control. When asked which measure is more important, 41% reported that diastolic is more important, 13% reported that systolic is more important, while 30% reported that both systolic and diastolic are important, and 17% did not know. Thirty-nine percent did not know the normal level for SBP or reported that normal SBP is 140 mm Hg or greater. Conversely, more than 69% of patients identified normal DBP as less than 90 mm Hg. Patients were knowledgeable about the cut point for DBP, with only 8% reporting that 90 mm Hg or greater was normal. These findings suggest the need for education of patients, physicians, and other health care providers related to the importance of elevated SBP and cardiovascular risk.

Many patients did not know their BP level nor could they accurately classify their level as elevated or normal. These findings suggest that patients' perception of their BP level does not reflect their actual readings except for the majority of those with controlled BP. Further, 41% of patients reported that their values were in the normal range, but in fact they were elevated.

The importance of hypertension awareness and knowledge and the potential impact of BP education programs have been reported previously. Patients who were aware that elevated BP levels lead to reductions in life expectancy had a higher compliance level with medication use and follow-up visits than patients without this awareness. Surveys of hypertensive patients in three clinical sites showed that lack of knowledge concerning target SBP level was an independent predictor of poor BP control. Reductions in SBP and DBP and improved medication-use compliance have been achieved through an education program that stressed, in part, “knowing high BP.”

This research all points to the need to improve hypertension knowledge and awareness in order to increase medication-use compliance and BP control.

An opportunity exists to use patient-reported sources for HTN information in order to disseminate HTN information. In aprevious study, physicians, other health care providers, mass media, and print and video materials were important sources of information as reported by the patients. The mass media have also been identified as a major source of patient information in a study by Kjellgren *et al.*, (2014) and represents an important opportunity to influence patient knowledge, awareness, and attitudes toward HTN control.

2.5 Consequence of Hypertension

Globally, hypertension is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. Hypertension has been shown to be positively and continuously related to the risk for stroke and coronary heart disease. In some age groups, the risk of cardiovascular disease doubles for each increment of 20/10 mmHg of blood pressure, starting as low as 115/75 mmHg. In addition to coronary heart diseases and stroke, complications of hypertension include heart failure, peripheral vascular disease, renal impairment, retinal hemorrhage and visual impairment. Treating systolic blood pressure and diastolic blood pressure until they are less than 140/90 mmHg is associated with a reduction in cardiovascular complications (WHO, 2016).

Long-standing hypertension causes accelerated atherosclerosis, which in turns leads to all of the biological fallout of this disease. Some consequences include: stroke, coronary artery disease, myocardial infarction, aneurysmal and occlusive aortic disease. Long-standing hypertension also causes the heart to remodel and undergo a

process of hypertrophy (left ventricular hypertrophy or LVH). Hypertrophy can lead to diastolic dysfunction, which can lead to congestive heart failure (CHF) since the heart is too stiff to relax properly. The stiffened heart requires elevated filling pressures, and this can worsen the dysfunction. Long-standing hypertension can also cause the heart to dilate and lose its ability to pump during systole (systolic congestive heart failure). Lastly, the kidneys are injured by long-standing hypertension and this is a significant cause of renal failure (Baker, 2015).

Long term high pressure against arterial walls eventually damages and strains them. This may lead to several complications, the most well-known complication being atherosclerosis which describes a buildup of fatty deposits or plaques in the walls lining the arteries. As the walls thicken with the deposits, they calcify and become brittle with a narrow lumen which restricts the flow of blood. Atherosclerosis is responsible for a host of other disease conditions such as stroke and heart attacks. The formation of a blood clot at the site of the plaque may block the artery completely and this leads to ischemia or a lack of blood supply to the heart, a common cause of heart attack (Mandal, 2017).

Once hypertension causes complications, treating these complications entails costly interventions such as cardiac bypass surgery, carotid artery surgery and dialysis, all of which drain individual and government budgets. An estimated 10% of health care spending is directly related to increased blood pressure and its complications, increasing to as much as 25% of health care spending in Eastern Europe and Central Asia (Peberdy, 2016). The African region has the highest prevalence of hypertension among adults aged over 25, implying a massive economic burden for the continent, including the cost of caring for all the complications arising from hypertension such as cerebrovascular disease, ischemic heart disease and congestive heart failure as well

as indirect costs such as the lost productivity of workers struck by stroke, heart failure, and ischemic heart disease. Other costs include the lost savings and assets that are foregone when families must meet catastrophic healthcare expenditures, such as those associated with rehabilitation following stroke, or dialysis following renal failure (Van-de-Vijver, 2013).

The economic burden of hypertension on individuals, families and the nation has a major consequence (Arredondo & Aviles, 2014). In developing countries, 1 in 3 adults have hypertension, and at least half are unaware they have the disease (Arno & Viol, 2013). In the case of Mexico, according to the latest findings from the National Health Survey (Campos *et al*., 2013), in 2012 there are 22.4 million hypertensive patients, of which only 11.2 million (50%) have a health diagnosis; 8.2 million are under medical treatment, and only 5.7 million have their hypertension under control. The implications of this panorama of hypertension are enormous, not only because of the direct costs (diagnosis and treatment) but also because of the indirect costs (temporary disability, permanent disability, and premature mortality) and the impact of the disease in terms of the productivity and economy of any country (Arredondo *et al*., 2013).

It is estimated that it will cost nearly US$ 1 trillion if current global blood pressure levels persist over a 10-year period, and that if hypertension goes untreated, indirect costs could be as high as US$ 3.6 trillion annually (Peberdy, 2016). Increasing economic growth and development, accompanied by rapid unplanned urbanization in the developing world, can only serve to increase the prevalence of raised blood pressure, and in turn, lead to populations developing major cardiovascular problems. This is because, as is the case with all non-communicable diseases, behavioural factors play a major role in increasing blood pressure and hypertension therefore

serves as a serious warning sign that major lifestyle changes are required (Peberdy, 2016).

In the case of Mexico, (Arredondo *et al.*, 2013), there was a 24% increase in terms of the economic burden of hypertension, comparing 2010 vs. 2012. Taking 2011 as the cutoff, the overall cost for hypertension was US $5,733,350,291. This includes $2,718,280,941 in direct costs and $3,015,069,350 in indirect costs. Healthcare costs for hypertension hit the pockets of patients and their families, so that of every $100 spent on hypertension care in Mexico, $52 comes from patients' pockets and $48 comes from the health institutions. Nearly 80% of deaths due to cardiovascular disease occur in low- and middle-income countries. They are the countries that can least afford the social and economic consequences of ill health. current age standardized mortality rates of low-income countries are higher than those of developed countries (WHO, 2013).

There is a strong relationship between hypertension and Chronic Kidney Disease (CKD).

Hypertension is an important cause of End-Stage Renal Disease (ESRD), contributing to the disease itself or, most commonly, contributing to its progression. On the other hand, hypertension is highly prevalent in CKD patients, playing a role in the high cardiovascular morbidity and mortality of this particular population (Morgado & Pedro, 2014).

Hypertension as a cause of CKD, the relationship between abnormal blood pressure and kidney dysfunction was first established in the 19th century. The prevalence of both, and of the associated burden of cardiovascular morbidity and mortality, has been

dramatically increasing worldwide. Data from several renal databases identifies systemic hypertension as the second most common cause of ESRD, with diabetes mellitus being the first. In the United States (US), hypertension is the leading cause of ESRD in African-American patients. Additionally, for any given cause of CKD, the elevation in systemic blood pressure accelerates the rate at which the glomerular filtration rate (GFR) declines. This is particularly true for patients with proteinuric nephropathies (Morgado & Pedro, 2014).

A Cardio Vascular disease (CVDs) is number one killer disease in Ghana today. Doctors at the Korle Bu Teaching Hospital say almost 70 % of all deaths at the hospital are caused by hypertensive conditions. The disease affects nearly one out of every five Ghanaian adults. A recent report by the Ghana Health Service says more people are becoming hypertensive due to unhealthy lifestyles. Doctors explain that hypertension is a silent killer because many have it for years without realizing it. It silently damages the brain, the heart, the kidneys and the eyes. Commonly referred to as high blood pressure or BP, hypertension is the major cause of strokes, heart attacks, heart failure and chronic renal failure. These and other blood pressure related diseases constitute more than half of all admission cases at Korle Bu (www.Myjoyonline.com, 2017).

The Ghana Health Service (2017) states that hypertension is the second most reported medical condition in the Greater Accra and Brong Ahafo Regions. In 2015, it was the 5th in Greater Accra and 4th Brong Ahafo Regions. The Regional Director of the Ghana Health Service, Madam Irene Agyapong Amarteifio told Joy News' Adisa Lansa that the upsurge in cases is traceable to the poor lifestyles of urban dwellers. From the records from all our OPDs in the public sector in the regions, when

compiled in 2016 it showed that hypertension which used to be the fourth most common, now it is the second.

Hypertension tends to affect the working age group who are supporting often several other people and if people get hypertension and it's not controlled they get stroke and is a huge burden on the health system and the family. Hypertension is a leading cause of deaths in adults. It is one of the major causes of admissions and the main complications are strokes, heart attack, and kidney failure; at Korle-Bu data shows that hypertension was the major cause of admissions and it contributed to about 67% of deaths, most of them through strokes. Hypertension is still a major health care problem. In the urban centres hypertension prevalence is about 30 %. In Kumasi and Accra again it is the leading cause of deaths in adults. But that is not the only cause for concern. Cardiologists say if lifestyles do not improve, hypertensive patients may soon not get the care they require. The number of patients may soon outstrip the doctors. For now, the Cardio Centre at Korle Bu is restricting itself to four surgeries a week instead of two or four a day due to lack of medical personnel. The centre has had its fair share of the brain drain (www.Myjoyonline.com, 2017).

2.6 Epidemiological Trend and Distribution of Hypertension

In United States, estimates of hypertension (generally defined as systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg, or taking antihypertensive medications) prevalence in the United States varies somehow. A study conducted with a total population of 15,739, aged between 45–64 years, revealed a prevalence rate of 35% in the years 2007–2009. A similar study by the Woman's Health Initiative in U.S in the years between 1993 and 1997 of a total population of 90,755 women aged 50–79 years also revealed a prevalence rate of

hypertension of 37.8%. In the Behavioural Risk Factor Surveillance System (BRFSS) in U.S, self-reported hypertension prevalence increased from 21.2% in 2011 to 25.7% in 2012 (Ahluwalia *et al.*, 1997).

In developing countries, the trend is for a rapid increase in hypertension prevalence, and in developed countries, the previous trend of a decrease in hypertension prevalence is actually reversing. Generally, the worldwide burden of hypertension in 2000 was estimated to be 972 million persons or 26.4% of the adult world population, with 333 million in developed and 639 million in developing countries. It has been estimated that by 2025, 1.56 billion individuals will have hypertension, an increase of 60% from 2010 (Morgado & Pedro, 2014).

Chronic diseases have a longer history in Ghana than is usually thought especially hypertension. Data gathered from Korle-Bu hospital showed a steady increase of hypertension and cardiovascular diseases. Hospital-based and community-based studies conducted since the 1950s provide important information on prevalence and morbidity trends for hypertension.

In the 1970s, the World Health Organisation (WHO) sponsored research in Mamprobi on Cardiovascular Disease (CVD) recorded hypertension prevalence of 13% in the community. A non-communicable disease survey conducted in 2008 recorded a national prevalence of 27.8% for hypertension. Studies conducted after the national survey show higher prevalence rates across different groups in different regions: 28.7% in Kumasi in the Ashanti Region; 32% prevalence in Bawku/Zebilla in the Upper East Region; 36.9% in Keta-Dzelukope in the Volta Region; and 47.8% among a cohort of women in Accra (Amoah, 2013). Reported facility cases of hypertension increased by 67 per cent, from 58,677 in 2005 to 97,980 in 2006 (Amoah, 2013). In

2007, national out-patient hypertension cases totaled 250,000. During the same period, major causes of death have shifted from solely communicable diseases to a combination of communicable and chronic non-communicable diseases.

2.6.1 Worldwide Distribution of Hypertension

Overall, approximately 20% of the world's adults are estimated to have hypertension, when hypertension is defined as BP in excess of 140/90 mm Hg. The prevalence dramatically increases in patients older than 60 years: In many countries, 50% of individuals in this age group have hypertension. Worldwide, approximately 1 billion people have hypertension, contributing to more than 7.1 million deaths per year. National health surveys in various countries have shown a high prevalence of poor control of hypertension. These studies have reported that prevalence of hypertension is 22% in Canada, of which 16% is controlled; it is 26.3% in Egypt, of which 8% is controlled; and it is 13.6% in China, of which 3% is controlled (Dreisbach, 2014).

2.6.2 Age Distribution of Hypertension

A progressive rise in BP with increasing age is observed. Age-related hypertension appears to be predominantly systolic rather than diastolic. The SBP rises into the eighth or ninth decade, whereas the DBP remains constant or declines after age 40 years. Previous study reported that the prevalence of hypertension grows significantly with increasing age in all sex and race groups. The age-specific prevalence was 3.3% in white men (aged 18-29 y); this rate increased to 13.2% in the group aged 30-39 years. The prevalence further increased to 22% in the group aged 40-49 years, to 37.5% in the group aged 50-59 years, and to 51% in the group aged 60-74 years. In another study, the incidence of hypertension appeared to increase approximately 5% for each 10-year interval of age (WHO, 2016).

2.6.3 Sex Distribution of Hypertension

The age-adjusted prevalence of hypertension was 34%, 25.4%, and 23.2% for men and 31%, 21%, and 21.6% for women among blacks, whites, and Mexican Americans, respectively. Previous study reported that prevalence of hypertension was 12% for white men and 5% for white women aged 18-49 years. However, the age-related BP rise for women exceeds that of men. The prevalence of hypertension was reported at 50% for white men and 55% for white women aged 70 years or older (Dreisbach, 2014).

The prevalence of hypertension (screening BP ≥160/95 mm Hg or taking medication) was 43.9% and 32.8% for men and women, aged 35 to 64, after adjusting for age to the world population. Based on the same methods of age standardization and BP detection, these values are higher than those of several industrialized countries participating in the WHO MONICA project (eg. Switzerland: 18.1% and 14.0%; Scotland, 32.0% and 25.4% but not Finland, 45.3% and 37.6%). 45.3% and 37.6%) or in the US NHANES II study (white population, 28.0% and 24.6%, but in the black population 39.0% and 47.3%) (Drizd *et al*., 1986). The prevalence of hypertension is also higher in Seychelles than in many developing countries (eg. Tanzania, 13.7% and 14.5 or China, 24.6% and 21.5%). High blood pressure levels have been reported in some urban areas (eg, 23% and 27% in a Zulu urban setting of South Africa or 35% and 23% in Sao Paulo). The high prevalence of hypertension in Seychelles is consistent with a particularly high incidence of stroke in the country (WHO, 1996).

A study previously reviewed that high BP was independently associated with men, older adults, blacks and a high body mass index. High blood pressure tended to be associated with high alcohol consumption and low physical activity. These results are

not unexpected because these factors have been shown to be related to hypertension in other populations. Seychelles has not been clearly linked to socio-economic status. In some developed and developing countries, an inverse correlation between socioeconomic status and hypertension has been observed, while in developing countries a direct relationship has been established at an earlier stage of the epidemiological transition (WHO, 1996).

2.6.4 Race or Ethnicity Distribution

Black individuals have a higher prevalence and incidence of hypertension than white persons. The prevalence of hypertension has been reported to be increased by 50% in blacks. Most studies in the United Kingdom and the United States report not only a higher prevalence but also a lower awareness of hypertension in black people than in white people. Mortality from hypertension in African-Caribbean–born people is 3.5 times the national rate; similar data have been published for African American citizens (Lind & Chiu, 2013). The prevalence and incidence of hypertension in Mexican Americans are similar to or lower than those in non-Hispanic whites. NHANES III reported an age-adjusted prevalence of hypertension at 20.6% in Mexican Americans and 23.3% in non-Hispanic whites. In general, Mexican Americans and Native Americans have lower BP control rates than non-Hispanic white persons and black individuals (Lind & Chiu, 2013).

To understand ethnic influence, an understanding of the renin-angiotensin system (RAS) is essential. Renin secretion is suppressed when the kidney detects that the amount of sodium excretion is increased; thus, this is a clue to the excess sodium in the circulation. Black people tend to develop hypertension at an earlier age and have lower renin activity; target organ damage also differs in black people from that in

white people. In addition, black people have a poorer response to treatment with angiotensin converting enzyme (ACE) inhibitors compared with white people; the evidence for beta-blockers being less effective in black people is also clear. However, diuretics are more effective at a young age in black people. In comparative assessments of black people and Asians, strokes are more common in black people, but coronary heart disease is more common in Asians. Both groups have a higher incidence of chronic renal failure than white people, but this is more due to hypertension in black people and diabetes in Asians (Lind & Chiu, 2013).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The methodology deliberates on how the research objectives are achieved. It introduces the study design and type. The chapter further stated clearly how data was collected to meet research objectives, the instruments that were used to collect the data, the sampling techniques that were employed, data analysis method, ethical considerations associated with the study as well as the limitations.

3.1 Study Setting

Sunyani Municipality is one of the twenty-seven (27) administrative districts in the Brong Ahafo Region of Ghana. It lies between Latitudes 70 20'N and 70 05'N and Longitudes 20 30'W and 20 10'W and shares boundaries with Wenchi District to the North, Dormaa District to the West, Asutifi District to the South and Tano North District to the East. There are effective economic and social interactions with the neighbouring districts which promote resource flow among these districts. The municipality has a total land area of 829.3 square kilometres (320.1square miles). Sunyani also serves as the regional capital for Brong Ahafo. One-third of the total land area is not inhabited or cultivated. The municipality is divided into twenty (20) large communities namely; Sunyani, Abesim, New Dormaa, Atronie, Kotokrom, Yawhimakrom, Asuakwa, Kuffour Camp, Atuahenekrom, Benu Nkwanta, Nwawansua, Liberation Barracks, Nkrankese, Kontorkrom (Adomako), Yeboahkrom (Shed), Kurosua, Nsagobesa No.2, Nwowasu, Abesim-Nkran No.1, and Kurasua No.1. Sunyani experiences double rainfall pattern. The main rainy season is between

March and September with the minor from October to December. This offers two farming seasons in a year which supports higher agricultural production in the municipality. Sunyani municipality enjoys food security throughout the year as a result of the zone in which it is located. The supply of starchy stables and cereals in the market is satisfactory.

In the year 2010, the population of the Sunyani municipality was 123,224 people with a growth rate of 3.8 percent (GSS, 2010). The population in the municipality is generally concentrated in the four largest localities (Sunyani, Abesim, Fiapre and New Dormaa) which hold about 74.3 percent of the population, with only 25.7 percent distributed among the other settlements. Sunyani, the municipal capital accommodates about 60 percent of the total population.

The, GSS (2010) criterion indicated that persons aged 15 years and above and have completed basic school (Primary, JHS or Middle school level) are literates, about 76 percent of the population of the municipality are illiterates. The municipality can therefore, be said to be highly illiterate when compared to the national average of 53.3 percent. Agricultural activities (including crop farming, animal husbandry and others) constitute the highest intake of workers in the municipality forming 45.9 percent, followed by Industry (carpentry, bricks and block laying, timber related industries, construction workers etc),14.7 percent. Service and Administration (Government workers, financial institutions, communication workers, hairdressers, seamstresses etc), constitute 9.6 percent, professional and technical (Engineers, consultants etc.), 9 percent, commerce 8.6 percent and whereas others such as head potters, truck pushers, mining form 1.4 percent (GSS, 2010).

3.2 Study Design

A cross-sectional survey design was adopted for the study. Quantitative data method of data collection was employed through the use of structured questionnaire. The study also made use of secondary data from the municipal health directorate to determine the trend and distribution of hypertension in the municipality. The cross-sectional survey design was employed because it helps the researcher to solicit the needed information to arrive at a tangible conclusion. This research was conducted in four urban communities (Sunyani area1, Bakoniaba, Penkwase, and Estate) in the Sunyani Municipality with a sample of three hundred and forty-three (343) adults (19+), selected through a household survey.

3.3 Sample Size

A total of 343 respondents (19+ years) comprised with 86 each from three different communities and 85 from the fourth community were selected for the study, as a result of small population within that community.

The sample size was determined using the Cochran's (1977) formula for calculating sample size when population size is fi

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Thus;

Where; n = sample size, n_0 = sample size derived from equation, N = Population, and 1= Constant.

Thus, using the Brong Ahafo Region's hypertension prevalence (3,230) as the population, at 95% confidence level and 5% precision (e), the sample size derived from equation (n_0) is 384.

Cochran (1977) developed a formula to calculate a representative sample for proportions as

$$n_0 = z^2 q p / e^2$$

where, n_0 is the sample size, z is the selected critical value of desired confidence level , p is the estimated proportion of an attribute that is present in the population, q= 1-p and e is the desired level of precision. For example, suppose we want to calculate a sample size of a large population whose degree of variability is not known. Assuming the maximum variability, which is equal to 50% (p =0.5) and taking 95% confidence level with ±5% precision,

then p = 0.5 and hence q =1-0.5 = 0.5; e = 0.05; z =1.96.

So, $n_{0=}$ $(1.96)^2(0.5)\ (0.5)/\ (0.05)^2$ = 384.16 =384

Therefore, n = $\frac{n0}{1+\frac{(n0-1)}{N}}$

n = $\frac{384}{1+\frac{(384-1)}{3230}}$ = 343.3 ≈ 343

3.4 Population

The study accessible population comprised adults with or without indications of risk for hypertension in urban communities within the Sunyani Municipality. The target population was persons above 19 years in both sexes as at the time of the study and who had been residing in the community for a period of more than three months. The total population of persons above 19 years per the 2010 Population and Housing

Census is 29,490. It is assumed that people above 19 years stood at risk of hypertension. The hypertension prevalence in Brong Ahafo is 3,230. Exclusion criteria include persons below 20 years, physical disability, mental disability and the presence of communication barriers, those who agreed to participate only in Step 1 and those who refused to participate in the study.

3.5 Sample and Sampling Techniques

A multi-stage sampling comprising stratified sampling, systematic sampling, and purposive techniques were used in selecting the household respondents for the study. Proceeding to the selection of respondents for the study, the municipality is divided into four zones called clusters. In each cluster, systematic sampling technique was used to select the various houses where persons within the target age group were contacted to respond to the questionnaire. In using the systematic sampling technique, every 5^{th} house, starting from the entering point of each community was selected and one respondent was purposively selected in each household for the study based on inclusive criteria. The interval (5^{th}) was used because there are 1715 households in all the four selected communities. Therefore, using an interval of 5, gives a sample size of 343. This was done until the required number of respondents from each cluster was attained. In all, 86 houses were contacted and 85 from the fourth community were selected for the study, as a result of the small population within that community.

3.6 Data Collection Method

The data for the study was collected using a variety of methods. First, quantitative data was collected using structured questionnaire in order to achieve specific objective1, 2 and 3 which deal with knowledge, awareness, attitude and perception related to hypertension respectively. Primary data was collected with reference to WHO STEPS approach for non-communicable diseases assessment with particular emphasis on steps 1 and 2. These steps were used to determine the hypertension status of the respondents.

STEP 1: was used to capture information related to nutritional habit, sedentary lifestyle, socio-demographic characteristics and many others with the use of questionnaire.

STEP 2: was also used to capture information on weight, height, blood pressure level and BMI. These were carried out with the use of instruments such as digital weighing scale, tape measurement and digital blood pressure monitor.

The information gathered from using these steps enabled the researcher to determine the BMI of the respondents and also their hypertension status.

Data collection was assisted by trained enumerators and health professionals who helped to carry out the study.

3.7 Measurement procedures

Pulse Rate and Blood Pressure Measurements

The pulse rate and resting blood pressure was recorded using a calibrated, digital blood pressure monitor.

Procedure:

a. The respondent was made to sit for at least five minutes prior to testing.

b. His/her right arm was bare and resting at an angle of 45 degrees on a table with palm up.

c. A cuff of appropriate size was wrapped firmly around the wrist.

d. The start button was then pressed and the cuff inflated.

e. Once maximum inflation was reached, the cuff automatically deflated and both the resting blood pressure and the resting pulse rate were recorded.

f. Both pulse readings and resting blood pressure were taken three times within about 5 minutes for the validity and authenticity of the information obtained.

Weight

Weight was measured using a scale (Electronic weighing scale).

Procedure:

a. The respondents were asked to remove all excess clothing and made to stand upright on the scale on bare footed

b. The weight of the respondent was recorded in kilograms to the nearest whole number.

Height

A tape measure was used to measure the overall height of the respondents.

Procedure:

a. Tape measure was taped against a wall with tape measure 20 cm above ground level.
b. The respondent was made to remove his/her shoes, stand feet together and arms at the sides and made to stand with heels, buttocks and upper back against the wall in a complete upright position.
c. The measurement from the 20th cm level to the highest point on the head was measured.
d. The overall height was recorded/obtained by adding 20cm to the remaining height obtained above the bench mark level, all in centimetres.
e. The height was then expressed in metres.
f. The height in metres was then squared. BMI was calculated from this expression using the following formula: Body weight (kg)/height (m) ^{2}.

Waist-to-Hip Ratio (WHR)

With abdomen relaxed, a horizontal measurement was taken at the level of the narrowest part of the torso just below the twelfth rib using a tape measure. The respondent was made to stand upright while taking the measurement of the waist. While the respondent stood erect and in upright position, a horizontal measurement was taken at the level of maximum circumference of the hips/buttocks.

Procedure:

a. The respondent was made to stand with feet together and the arms were at the sides.

b. The waist and hip circumference were measured, all in centimetres

c. The tape was wrapped horizontally around the entire circumference of the waist and on the hip at different times

d. Measurement was repeated for three times in each case for consistency.

e. Scores were recorded to the nearest centimetres

f. The waist-hip ratio was determined.

3.8 Data Analysis and Processing

Data collected was edited to exclude errors, re-organised, coded and processed for efficient analysis. Access to the data was limited to the researcher and the supervisor at the initial stage of the research till completion. Data was analysed with Statistical package for Social Sciences (SPSS) Version 22.0 and Microsoft Excel 2016. Data was analysed for frequency distribution, proportion and percentages for quantitative variables, mean ± SD, correlations and rates. Results were calculated based on 95% Confidence level and 5% significance level (alpha (a) = 0.05). Results were presented in tables, charts and interpretations of findings were made as possible.

3.9 Quality Control

To ensure the reliability of the instrument, pre-testing of the questionnaire was done by administering to 10 residents at Sunyani Area 2, so as to allow the researcher to identify errors in the instrument. The pre-tested respondents possess similar

characteristics as the sampled subjects. The questionnaire was also given to the supervisor for improvement in order to ensure its validity. A day training session was organised for all the research assistants who assisted the researcher with the data collected. All the research assistants were taken through the data collection instruments for them to familiarize themselves with the instruments.

3.10 Ethical Consideration

Ethical approval for the study was first obtained from the University for Development Studies. Ethical approval for conduct of the study was also obtained from the Sunyani Municipal Health Directorate. Informed consent was obtained from community heads and chiefs, household heads, community opinion leaders and the participants of the study. The aim and the processes of the research were fully explained to the participants and their informed consent was obtained for participation.

Participants were informed about the instruments to enable them understand the procedures and give their full approval. The importance of the study was made known to the participants as well as any possible risk that may be involved. Participation was made voluntarily rather than imposition, thus, individuals were given the right to or not to take part in the study. Only consenting individuals were chosen to respond to the questionnaire and other measurements taken. Although the data were handled by the researcher and supervisor, confidentiality was guaranteed as respondents were dealt with individually. All information provided to the interviewers by participants was strictly confidential.

CHAPTER FOUR

RESULTS

4.0 Introduction

This chapter covers the results presentation and analysis.

4.1: Sociodemographic characteristics of the study population

Table 4.1 describes the distribution of sociodemographic characteristics of the study population stratified by gender. As shown from the table, there were more respondents (36.7%) in the age category 20-29 compared to other age categories, whiles the age category 50-59 has the least number of respondents (4.7%). Majority of the respondents were Christians (67.1%), of Akan ethnicity (62.4%) and resided in the urban areas (60.3%). Most of the respondents were unmarried, comprising 37.6% singles, 14.6% divorcees and 6.7% each of widows and cohabitants. Majority had some form of formal education (84.8%), and had some form of employment (self-employed, 28.6% and employed, 25.3%) with most (83.4%) earning a monthly income of GH¢1000 or less.

When the respondents were stratified based on gender, there were significantly more females (42.5%) with the 20-29years age bracket than males (26.2%) whiles there were more males within the 40-49years (27%) and 50-59 years (10.7%) than females. The proportions of respondents who are Christians, Fantes, married, had attained secondary education, employed and earned incomes > GH¢ 2000 were higher among male respondents whiles that for respondents who are Ewes, single, had no education, were unemployed and earned incomes < GH¢ 500 were higher among females.

Table 4. 1: Sociodemographic characteristics of the study population stratified by gender

Variables	Total (n=343)	Male (n=122)	Female (n=221)
Age Distribution of Respondents			
20 -29	126(36.7%)	32(26.2%)	94(42.5%)
30-39	98(28.6%)	32(26.2%)	66(29.9%)
40-49	67(19.5%)	33(27.0%)	34(15.4%)
50-59	16(4.7%)	13(10.7%)	3(1.4%)
≥ 60	36(10.5%)	12(9.9%)	24(10.8%)
Distribution of Religious Background			
Christian	230(67.1%)	91(74.5%)	139(62.9%)
Islam	62(18.1%)	18(14.8%)	44(19.9%)
Traditional	48(14%)	13(10.7%)	35(15.8%)
Others	3(0.8%)	0(0%)	3(1.4%)
Ethnic Distribution			
Akan	214(62.4%)	70(57.4%)	144(65.2%)
Akuapim	18(5.2%)	7(5.7%)	9(4.2%)
Ewe	41(12%)	4(3.3%)	37(16.7%)
Fante	48(14%)	32(26.2%)	16(7.4%)
Ga	10(2.9%)	3(2.5%)	7(3.6%)
Gonja	12(3.5%)	6(4.9%)	6(2.9%)
Place Residence of Respondents			
Rural	136(39.7%)	49(40.2%)	87(39.4%)
Urban	207(60.3%)	73(59.8%)	134(60.6%)
Marital Status of Respondents			
Married	118(34.4%)	51(41.8%)	67(30.3%)
Single	129(37.6%)	38(31.1%)	91(41.2%)
Divorced	50(14.6%)	16(13.1%)	34(15.4%)
Cohabitating	23(6.7%)	3(2.5%)	20(9%)
Widowed	23(6.7%)	14(11.5%)	9(4.1%)

Educational Level			
Primary	43(12.5%)	17(13.8%)	26(11.8%)
JHS	30(8.7%)	14(11.5%)	16(7.2%)
Secondary/Technical/Vocational	97(28.3%)	44(36.1%)	53(24%)
Tertiary	121(35.3%)	44(36.1%)	77(34.8%)
None	52(15.2%)	3(2.5%)	49(22.2%)
Employment Status			
Unemployed	158(46.1%)	46(37.7%)	112(50.7%)
Self Employed	98(28.6%)	32(26.2%)	66(29.9%)
Employed	87(25.3%)	44(36.1%)	43(19.4%)
Income Level			
< GH¢500	145(42.3%)	40(32.8%)	105(47.5%)
GH¢500-<Ghc1000	85(24.8%)	30(24.6%)	55(24.9%)
GH¢1000-<Ghc1500	56(16.3%)	24(19.7%)	32(14.5%)
GH¢1500->Ghc2000	22(6.4%)	10(8.1%)	12(5.4%)
> GH¢2000	35(10.2%)	18(14.8%)	17(7.7%)

Data presented as number (percentage).

4.2: Prevalence of Hypertension among study participants

The prevalence of hypertension among study participants stratified by gender and age are shown in figure 4.1 and figure 4.2 respectively. As shown in figure 4.1, the prevalence of hypertension was found to be 22.7% of which majority (24.0%) were females and 20.5% were males.

In addition, the prevalence increased with increasing age (20-29 years) through to 60 years and above. This was represented by 2.4% for age category 20-29 years, 8.2% for 30-39 years, 38.8% for 40-49 years, 81.3% for 50-59 years and 77.8% for 60 and above years respectively (Figure 4.1)

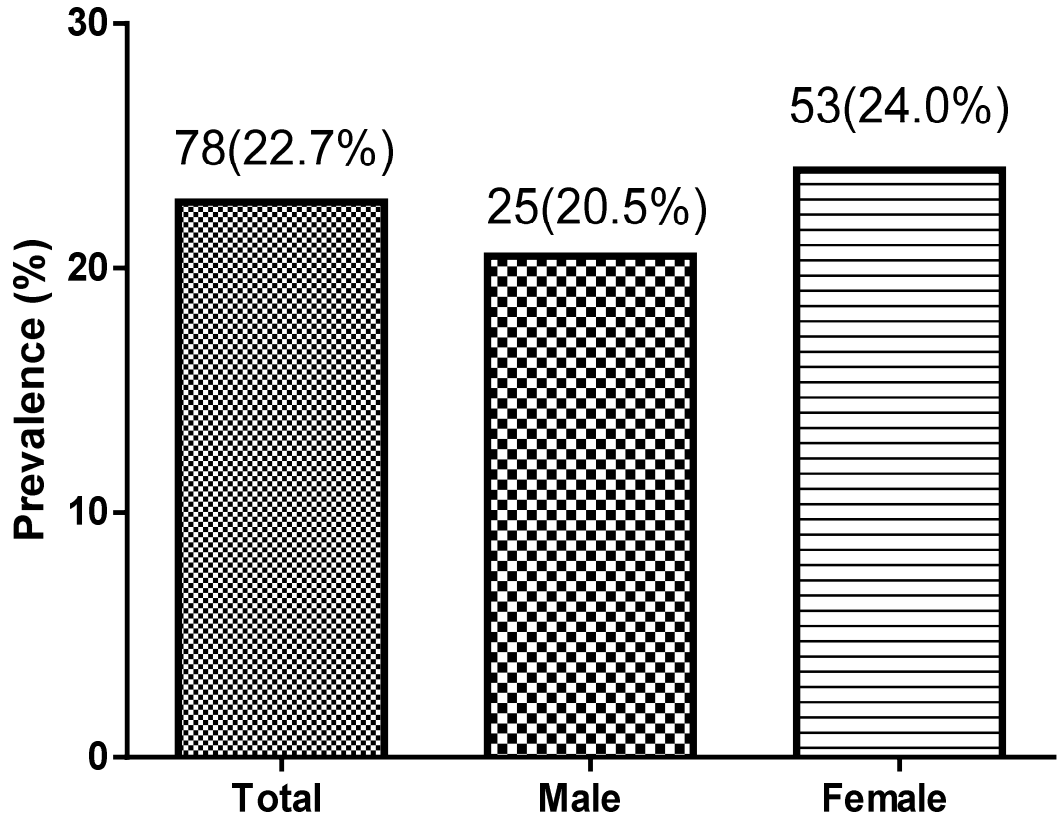

Figure 4. 1: Prevalence of hypertension among study participants stratified by gender

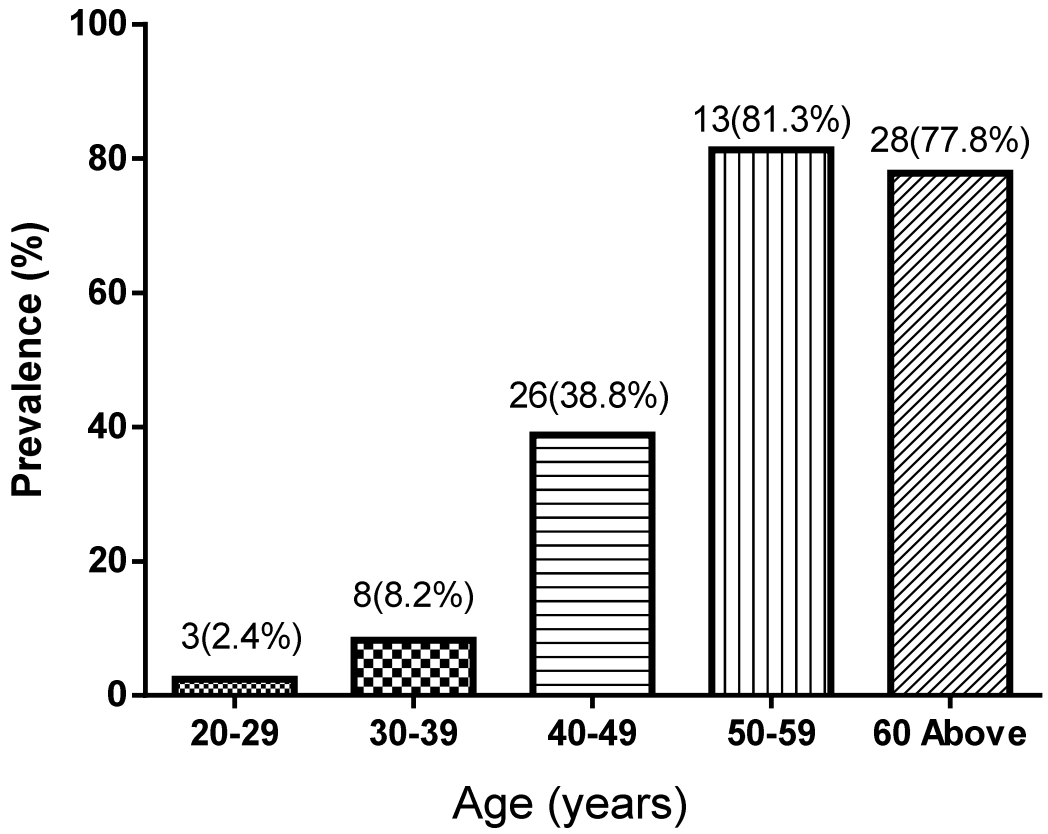

Figure 4. 2: Prevalence of hypertension among study participants stratified by age

4.3 Hypertension Knowledge

Table 4.2 shows respondent's knowledge on hypertension. Out of the 343 respondents, 62.1% had heard of hypertension with majority (70.5%) being males. Although a total of 32.1% responded correctly to hypertension "meaning high blood pressure when stratified by gender. However, 22.4% and 8.5% responded that hypertension means high level of stress/tension and high blood sugar levels respectively.

When asked how dangerous hypertension to health was 38.5% responded was extremely dangerous, 17.2% said it's not dangerous at all while 22.2% answered somewhat dangerous of which females (26.2%) were the majority .

Majority (37.3%) of the respondents acknowledged that lowering high blood pressure improve a person's health of which the females (42.1%) were more. However, 23.9% did not know that lowering high blood pressure improve a person's health of which the males (31.1%) were the majority.

Only 5.0% of the study participants know that in blood pressures measurement, both the top and bottom numbers correspond with systolic blood pressure (SBP) and diastolic blood pressure (DBP) respectively. On knowledge of the average SBP and DBP values, more than 50% responded to ≤140/90 mmHg with majority being males. 23.9% of the respondents responded that both SBP and DBP were more important while 22.7% having no knowledge on which among SBP, DBP or both were more important.

Majority (47.8%) of the respondents acknowledged that people can do things to lower their blood pressure with males (58.2%) being the majority. A total (53.6%) of the respondents responded that, lowering blood pressure even a little bit improves health with 21.6% and 24.8 acknowledging having no idea (Table 4.2).

Table 4. 2: Respondents Knowledge of Hypertension stratified by gender

Variables	Total, n(%)	Male, n(%)	Female, n(%)
Heard of Hypertension			
Yes	213 (62.1%)	86 (70.5%)	127 (57.5%)
No	130 (37.9%)	36 (29.5%)	94 (42.5%)
Hypertension Means			
High blood pressure	110 (32.1%)	49 (40.2%)	61 (27.6%)
High level stress/tension	77 (22.4%)	20 (16.4%)	57 (25.8%)
Nervous Condition	21 (6.1%)	9 (7.4%)	12 (5.4%)
High blood sugar	29 (8.5%)	18 (14.8%)	11 (5.0%)
Don't know	106(30.9%)	26 (21.3%)	80 (36.2%)
Knowledge on how dangerous hypertension is to your health			
Extremely	132(38.5%)	52 (42.6%)	80 (36.2%)
Somewhat	76 (22.2%)	18 (14.8%)	58 (26.2%)
Not At all	59 (17.2%)	26 (21.3%)	33 (14.9%)
Don't know	76 (22.2%)	26 (21.3%)	50 (22.6%)
Lowering High Blood Pressure			
Yes	128 (37.3%)	35 (28.7%)	93 (42.1%)
No	79 (23.0%)	24 (19.7%)	55 (24.9%)
Somewhat	54 (15.7%)	25 (20.5%)	29 (13.1%)
Don't know	82 (23.9%)	38 (31.1%)	44 (19.9%)
Knowledge on the Top Number of BP measurement			
Don't know	326(95.0%)	115(94.3%)	211 (95.5%)
SBP	17 (5.0%)	7 (5.7%)	10 (4.5%)
Knowledge on the Bottom Number of BP measurement			
Don't know	326(95.0%)	115(94.3%)	211 (95.5%)
DBP	17 (5.0%)	7 (5.7%)	10 (4.5%)
Knowledge on Top Number of Normal Blood Pressure			
<140	105 (30.6%)	39 (32.0%)	66 (29.9%)
140	85 (24.8%)	30 (24.6%)	55 (24.9%)
>140	61 (17.8%)	27 (22.1%)	34 (15.4%)
Don't know	92 (26.8%)	26 (21.3%)	66 (29.9%)

Knowledge Bottom Number of Normal Blood Pressure			
<90	174(50.7%)	79 (64.8%)	95 (43.0%)
90	64 (18.7%)	15 (12.3%)	49 (22.2%)
>90	25 (7.3%)	10 (8.2%)	15 (6.8%)
Don't know	80 (23.3%)	18 (14.8%)	62 (28.1%)
Measure(s) is/are more Important			
Top	111(32.4%)	39 (32.0%)	72 (32.6%)
Bottom	72 (21.0%)	27 (22.1%)	45 (20.4%)
Both	82 (23.9%)	39 (32.0%)	43 (19.5%)
Don't know	78 (22.7%)	17 (13.9%)	61 (27.6%)
Knowledge on How to Lower Blood Pressure			
Yes	164(47.8%)	71 (58.2%)	93 (42.1%)
No	75 (21.9%)	12 (9.8%)	63 (28.5%)
Don't know	104(30.3%)	39 (32.0%)	65 (29.4%)
Knowledge on whether Lowering Blood Pressure Improve Health			
Yes	184(53.6%)	61 (50.0%)	123 (55.7%)
No	74 (21.6%)	39 (32.0%)	35 (15.8%)
Don't know	85 (24.8%)	22 (18.0%)	63 (28.5%)

Data presented as number (percentage)

4.4: Knowledge on Risk Factors of Hypertension

Figure 4.3 illustrates the knowledge of respondents on the risk factors associated with hypertension. The findings indicate majority 177(51.6%) of the respondents identified other diseases as the risk factor of hypertension. However, less than 50% of the respondents identified factors such as; excessive alcohol consumption, excessive smoking, poor eating style, physical inactivity, high blood pressure, and age of a person as the risk factors of hypertension.

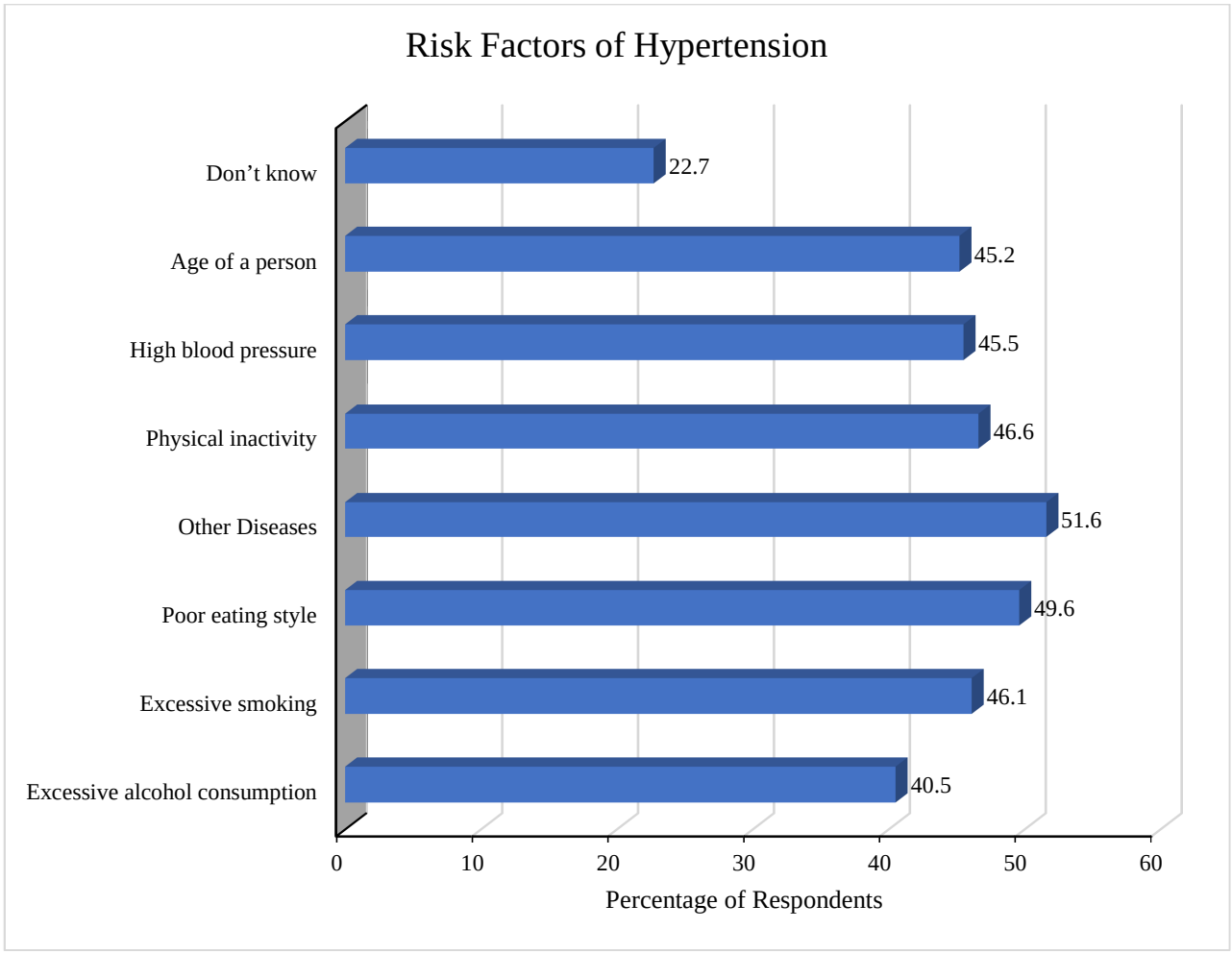

Figure 4. 3: Knowledge on Risk Factors of Hypertension

4.5: Knowledge on Symptoms of Hypertension

Figure 4.4 depicts the knowledge of respondents on the symptoms of hypertension. The results show that the majority of the respondents representing 53.1% and 53.6% identified dizziness and shortness of breath respectively, as the symptoms of hypertension. However, less than 50% of the respondents identified headache, blurred vision, chest pain, high blood pressure and heart attack as the symptoms of hypertension among hypertensives.

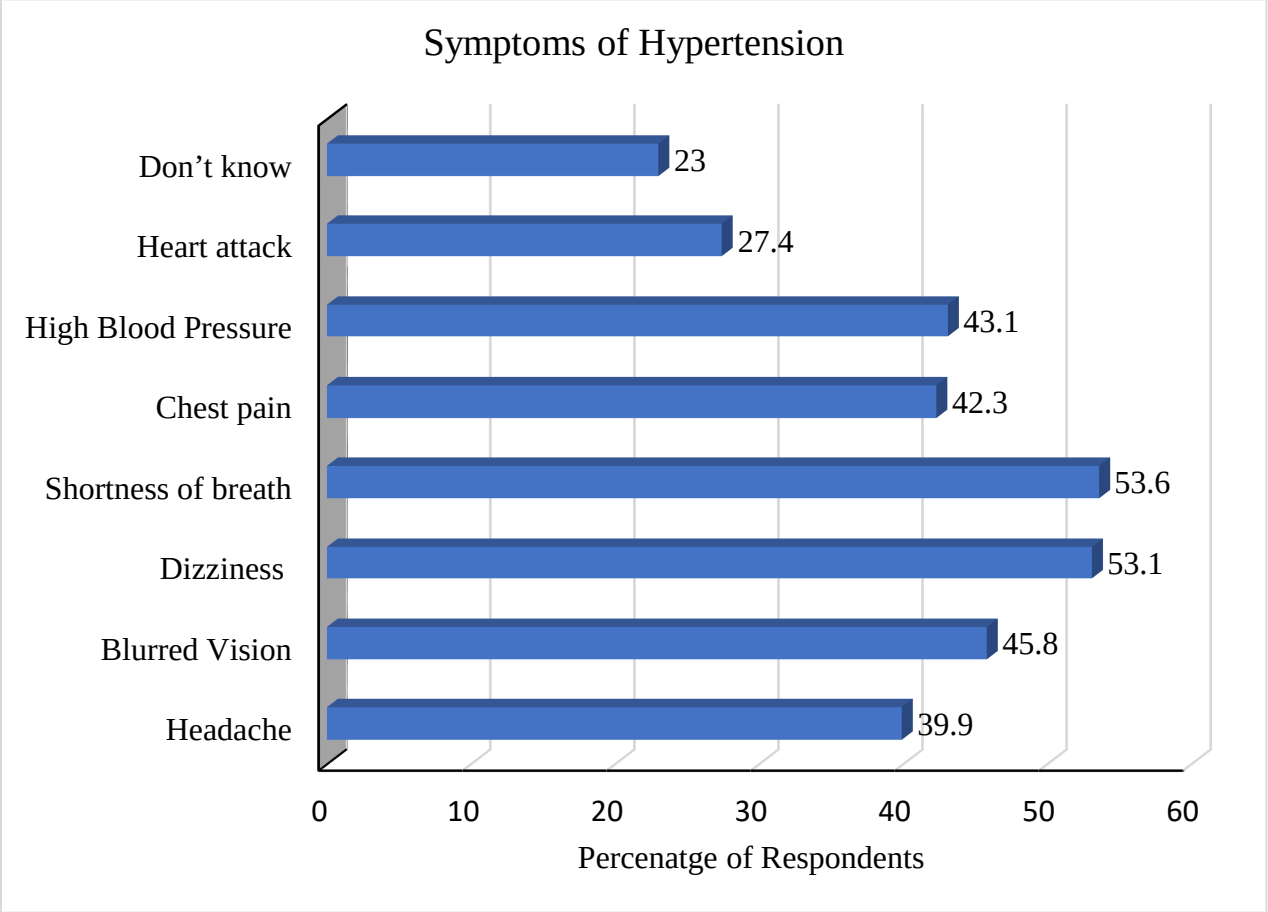

Figure 4. 4: Knowledge on Symptoms of Hypertension

4.6: Association between knowledge on the danger of hypertension and Socio-demographics

As shown in Table 4.4, out of the total 343 participants studied, majority of the females (66.3%) had knowledge on the dangers of hypertension with the male (33.7%) being the least, however, this was not statistically significant (p = 0.3579).

There were significant (p = 0.05) association between dangers of hypertension and religion with Christians (73.4%) being the majority and Islam (14.4%) being the least.

A total of 34.6% of respondents who resides in the rural area had knowledge on dangers of hypertension and 47.4% did not and this was statistically significant

(0.0180). Again, 65.4% of the urban dwellers had knowledge on dangers of hypertension and 52.6% did not.

There was an association (p = 0.0203) between knowledge on dangers of hypertension and no formal education with 11.5% having knowledge on dangers of hypertension and 20.7% did not.

There were significant association (p = 0.0132; p = 0.0002) between knowledge on dangers of hypertension and cigarette and shisha smoking with 20.7% and 8.7% of cigarette and shisha smokers having knowledge on dangers of hypertension and 32.6% and 23.0% did not respectively.

Table 4. 3: Association between knowledge on the danger of hypertension and Socio-demographics Characteristics

Variable	Knowledge on the danger of hypertension			Chi-square	P-value
	Total, n(%)	Knowledge	No Knowledge		
Gender					
Male	122 (35.6%)	70 (33.7%)	52 (38.5%)	0.845	0.3579
Female	221 (64.4%)	138 (66.3%)	83 (61.5%)		
Religion					
Christian	230 (67.1%)	153 (73.6%)	77 (57.0%)	10.110	**0.0015**
Islam	62 (18.1%)	30 (14.4%)	32 (23.7%)	4.762	**0.0291**
Traditional	48 (14.0%)	25 (12.0%)	23 (17.0%)	1.713	0.1906
Others	3 (0.9%)	0 (0.0%)	3 (2.2%)		
Ethnicity					
Akan	214 (62.4%)	132 (63.5%)	82 (60.7%)	0.258	0.6113
Akuapim	18 (5.2%)	3 (1.4%)	15 (11.1%)		
Ewe	41 (12.0%)	30 (14.4%)	11 (8.1%)	3.063	0.0801
Fante	48 (14.0%)	24 (11.5%)	24 (17.8%)	2.648	0.1037
Ga	10 (2.9%)	10 (4.8%)	0 (0.0%)		
Gonja	12 (3.5%)	9 (4.3%)	3 (2.2%)		
Residence					
Rural	136 (39.7%)	72 (34.6%)	64 (47.4%)	5.598	**0.0180**
Urban	207 (60.3%)	136 (65.4%)	71 (52.6%)		
Educational Level					
Primary	43 (12.5%)	29 (13.9%)	14 (10.4%)	0.953	0.3291
JHS	30 (8.7%)	15 (7.2%)	15 (11.1%)	1.560	0.2117
Secondary/technical/voc	97 (28.3%)	60 (28.8%)	37 (27.4%)	0.084	0.7725
Tertiary	121 (35.3%)	80 (38.5%)	41 (30.4%)	2.807	0.0938
None	52 (15.2%)	24 (11.5%)	28 (20.7%)	5.390	**0.0203**
Employment Status					
Unemployed	158 (46.1%)	90 (43.3%)	68 (50.4%)	1.662	0.1974
Self employed	98 (28.6%)	58 (27.9%)	40 (29.6%)	0.122	0.7267
Employed	87 (25.4%)	60 (28.8%)	27 (20.0%)	3.384	0.0658

Income Level					
<Ghc500	145 (42.3%)	82 (39.4%)	63 (46.7%)	1.760	0.1846
Ghc500-<Ghc1000	85 (24.8%)	59 (28.4%)	26 (19.3%)	3.642	0.0563
Ghc1000-<Ghc1500	56 (16.3%)	30 (14.4%)	26 (19.3%)	1.402	0.2365
Ghc1500->Ghc2000	22 (6.4%)	16 (7.7%)	6 (4.4%)	1.439	0.2304
>Ghc2000	35 (10.2%)	21 (10.1%)	14 (10.4%)	0.007	0.9347
Smoke Cigarette					
Yes	87 (25.4%)	43 (20.7%)	44 (32.6%)	6.144	**0.0132**
No	256 (74.6%)	165 (79.3%)	91 (67.4%)		
Smoke Shisha					
Yes	49 (14.3%)	18 (8.7%)	31 (23.0%)	13.690	**0.0002**
No	273 (79.6%)	169 (81.3%)	104 (77.0%)		
Alcohol					
Yes	106 (30.9%)	64 (30.8%)	42 (31.1%)	0.004	0.9466
No	237 (69.1%)	144 (69.2%)	93 (68.9%)		
Exercise					
Yes	202 (58.9%)	126 (60.6%)	76 (56.3%)	0.620	0.4312
No	141 (41.1%)	82 (39.4%)	59 (43.7%)		

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.7: The knowledge of respondents on normal blood pressure range and the socio-demographic characteristics

Table 4.6 illustrates the association between the knowledge of respondents on normal blood pressure range and the socio-demographic characteristics. As shown from the table, the proportions of males and females who had knowledge on the isolated systolic (male, 32.0% vs. female, 32.6%) and diastolic (male, 22.1% vs. female, 20.4%) blood pressure ranges were similar. The proportion of males who however

had knowledge on the combined blood pressure reading was higher (32.0%) than the proportion of females (19.5%) whiles that of females who did not know about any of the three, was higher (27.6%) than males (13.9%). Similar proportions of the various religions had knowledge on normal blood pressure, however, the proportion of traditionalists who had no knowledge at all was higher than the proportions of other religions. Similarly, all ethnicities studied had similar knowledge on the normal blood pressures with the Ewe group showing higher proportions of respondents who did not know about normal blood pressure.

Knowledge on normal blood pressure was higher among respondents who resided in the urban area (25.6%), who had had tertiary education (30.6%) and were single (32.6%). The proportions of unemployed and employed respondents who had knowledge on normal blood pressure were similar, with both being higher than the proportion of self-employed individuals, whiles the proportion of GH¢ 1000- 1500 income earners was higher than other categories with respect to the knowledge on normal blood pressure readings,

Table 4. 4: Knowledge on Normal BP and Socio- Demographics characteristics

VARIABLE	Top (111)	Bottom (72)	Both (82)	Don't know (78)
Gender				
Male	39(32.0)	27(22.1)	39(32.0)	17(13.9)
Female	72(32.6)	45(20.4)	43(19.5)	61(27.6)
Religion				
Christian	69(30.0)	63(27.4)	54(23.5)	44(19.1)
Islam	24(38.7)	6(9.7)	15(24.2)	17(27.4)
Traditional	15(31.2)	3(6.2)	13(27.1)	17(35.4)
Others	3(100.0)	0(0.0)	0(0.0)	0(0.0)
Ethnicity				
Akan	54(25.2)	66(30.8)	48(22.4)	46(21.5)
Akuapim	10(55.6)	0(0.0)	4(22.2)	4(22.2)
Ewe	20(48.8)	0(0.0)	9(22.0)	12(29.3)
Fante	24(50.0)	3(6.2)	11(22.9)	10(20.8)
Ga	0(0.0)	3(30.0)	7(70.0)	0(0.0)
Gonja	3(25.0)	0(0.0)	3(25.0)	6(50.0)
Residence				
Rural	57(41.9)	24(17.6)	29(21.3)	26(19.1)
Urban	54(26.1)	48(23.2)	53(25.6)	52(25.1)
Educational level				
Primary	17(39.5)	8(18.6)	7(16.3)	11(25.6)
JHS	4(13.3)	9(30.0)	6(20.0)	11(36.7)
Secondary/technical/vocational	33(34.0)	25(25.8)	22(22.7)	17(17.5)
Tertiary	37(30.6)	26(21.5)	37(30.6)	21(17.4)
None	20(38.5)	4(7.7)	10(19.2)	18(34.6)
Marital status				
Married	55(46.6)	19(16.1)	18(15.3)	26(22.0)
Single	14(10.9)	41(31.8)	42(32.6)	32(24.8)
Divorced	17(34.0)	9(18.0)	13(26.0)	11(22.0)
Cohabitating	13(56.5)	0(0.0)	3(13.0)	7(30.4)
Widowed	12(52.2)	3(13.0)	6(26.1)	2(8.7)

Employment Status				
Unemployed	47(29.7)	39(24.7)	41(25.9)	31(19.6)
Self employed	34(34.7)	14(14.3)	19(19.4)	31(31.6)
Employed	30(34.5)	19(21.8)	22(25.3)	16(18.4)
Income Level				
< GH¢ 500	44(30.3)	22(15.2)	37(25.5)	42(29.0)
GH¢500-< GH¢1000	20(23.5)	29(34.1)	13(15.3)	23(27.1)
GH¢1000-< GH¢1500	18(32.1)	13(23.2)	19(33.9)	6(10.7)
GH¢1500-> GH¢2000	16(72.7)	0 (0.0)	3(13.6)	3(13.6)
> GH¢2000	13(37.1)	8(22.9)	10(28.6)	4(11.4)
Smoke Cigarette				
Yes	44(50.6)	18(20.7)	16(18.4)	9(10.3)
No	67(26.2)	54(21.1)	66(25.8)	69(27.0)
Smoke Shisha				
Yes	27(55.1)	6(12.2)	6(12.2)	10(20.4)
No	84(28.6)	66(22.4)	76(25.9)	68(23.1)
Alcohol				
Yes	44(41.5)	29(27.4)	17(16.0)	16(15.1)
No	67(28.3)	43(18.1)	65(27.4)	62(26.2)
Exercise				
Yes	65(32.2)	37(18.3)	52(25.7)	48(23.8)
No	**46(32.6)**	**35(24.8)**	**30(21.3)**	**30(21.3)**

Data presented as number (percentage)

4.8: Association between Knowledge on Risk Factors of hypertension and Socio-Demographics

Table 4.7 shows the association between the sociodemographic variables and knowledge of respondents on the risk factors hypertension. Majority (65.3%) of the

females in this study had high score of knowledge on risk factors whiles the least (34.7%) were males.

There was significant relationship ($p = 0.0035$) between Akuapim tribe and knowledge of respondents on the risk factors hypertension with 2.9% having high score on the risk factors and 10.6% having low score.

Again, 20.9% of participants who had secondary/technical/vocation education had high score and 45.2% of this same category had low score of knowledge of respondents on the risk factors hypertension and this was statistically significant ($p < 0.0001$). Furthermore, majority (40.6%) of participants with tertiary education had high score of knowledge of respondents on the risk factors hypertension with 23.1% scoring the least ($p = 0.0018$).

There were significant ($p < 0.05$) associations between divorced and widowed participants and knowledge of respondents on the risk factors hypertension with 17.2% and 4.2% of divorced and widowed having high score and 8.7% and 12.5% having low score respectively.

Furthermore, 13.4% of participants who received monthly income between GH¢ 1000-1500 had high score and 23.1% of the same category had low score and this was significantly ($p = 0.0257$) with knowledge of respondents on the risk factors hypertension (Table 4.5).

Table 4. 5: Association between Knowledge on Risk Factors of Hypertension and Socio- Demographics Characteristics

Variable	Knowledge on Risk Factors		Chi-square	P-value
	High, n (%)	Low, n (%)		
Gender				
Male	83 (34.7%)	39 (37.5%)	0.243	0.6221
Female	156 (65.3%)	65 (62.5%)		
Religion				
Christian	160 (66.9%)	70 (67.3%)	2.174	0.1404
Islam	44 (18.4%)	18 (17.3%)	0.059	0.8073
Traditional	35 (14.6%)	13 (12.5%)	0.277	0.5988
Others	0 (0.0%)	3 (2.9%)		
Ethnicity				
Akan	153 (64.0%)	61 (58.7%)	0.888	0.3460
Akuapim	7 (2.9%)	11 (10.6%)	8.525	**0.0035**
Ewe	26 (10.9%)	15 (14.4%)	0.865	0.3523
Fante	37 (15.5%)	11 (10.6%)	1.448	0.2288
Ga	7 (2.9%)	3 (2.9%)		
Gonja	9 (3.8%)	3 (2.9%)		
Residence				
Rural	88 (36.8%)	48 (46.2%)	2.638	0.1043
Urban	151 (63.2%)	56 (53.8%)		
Educational Level				
Primary	31 (13.0%)	12 (11.5%)	0.136	0.7127
JHS	30 (12.6%)	0 (0.0%)		
Secondary/technical/voc	50 (20.9%)	47 (45.2%)	21.050	< **0.0001**
Tertiary	97 (40.6%)	24 (23.1%)	9.730	**0.0018**
None	31 (13.0%)	21 (20.2%)	2.938	0.0865
Marital status				
Married	79 (33.1%)	39 (37.5%)	0.635	0.4257
Single	96 (40.2%)	33 (31.7%)	2.198	0.1382
Divorced	41 (17.2%)	9 (8.7%)	4.206	**0.0403**

Cohabitating	13 (5.4%)	10 (9.6%)	2.020	0.1552
Widowed	10 (4.2%)	13 (12.5%)	8.011	**0.0047**
Employment Status				
Unemployed	112 (46.9%)	46 (44.2%)	0.202	0.6532
Self employed	61 (25.5%)	37 (35.6%)	3.589	0.0582
Employed	66 (27.6%)	21 (20.2%)	2.186	0.1392
Income Level				
< GH¢500	104 (43.5%)	41 (39.4%)	0.497	0.4808
GH¢500-< GH¢1000	65 (27.2%)	20 (19.2%)	2.467	0.1163
GH¢1000-< GH¢1500	32 (13.4%)	24 (23.1%)	4.979	**0.0257**
GH¢1500-> GH¢2000	12 (5.0%)	10 (9.6%)	2.548	0.1104
> GH¢2000	26 (10.9%)	9 (8.7%)	0.392	0.5315

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.9: Association between Knowledge on Symptoms of Hypertension and Socio-Demographics Characteristics

Table 4.6 shows the association between knowledge on symptoms of hypertension and Socio-demographic respondents. There were significant association between Akan and Fante tribes and knowledge on symptoms of hypertension with 67.4% of Akan and 8.2% of Fantes responding “yes” to knowledge of symptoms while 56.6% of Akan and 20.8% responding “otherwise”. Participants who were divorced or widowed were significantly (p <0.05) linked to knowledge on symptoms of hypertension. Among divorced participants, 10.3% responded “yes” to having knowledge on symptoms of hypertension and 19.5% responded having “no” to having knowledge on symptoms of hypertension. Again, among the widowed, 9.8% responded to having knowledge on symptoms of hypertension whiles 3.1% responded

no respectively. Majority (50.3%) of the unemployed participants responded of having no knowledge on symptoms of hypertension and 42.4% had knowledge on symptoms of hypertension and this was statistically significant (p = 0.0463).

Furthermore, there were significant association (p < 0.05) between income level (those receiving average monthly income of GH¢ 500 and above) and knowledge on symptoms of hypertension with the majority responding to having knowledge on symptoms of hypertension (Table 4.6).

Table 4. 6: Association between Knowledge on Symptoms of Hypertension and Socio- Demographics Characteristics

VARIABLE	Knowledge on Symptoms		Chi-square	P-value
	Yes, n(%)	No, n(%)		
Gender				
Male	61 (33.2%)	61 (38.4%)	1.011	0.3146
Female	123 (66.8%)	98 (61.6%)		
Religion				
Christian	121 (65.8%)	109 (68.6%)	0.301	0.5832
Islam	37 (20.1%)	25 (15.7%)	1.108	0.2926
Traditional	23 (12.5%)	25 (15.7%)	0.736	0.3909
Others	3 (1.6%)	0 (0.0%)	-	-
Ethnicity				
Akan	124 (67.4%)	90 (56.6%)	4.230	**0.0397**
Akuapim	4 (2.2%)	14 (8.8%)	-	-
Ewe	26 (14.1%)	15 (9.4%)	1.788	0.1812
Fante	15 (8.2%)	33 (20.8%)	11.260	**0.0008**
Ga	3 (1.6%)	7 (4.4%)	-	-
Gonja	12 (6.5%)	0 (0.0%)	-	-
Residence				

Rural	70 (38.0%)	66 (41.5%)	0.428	0.5129
Urban	114 (62.0%)	93 (58.5%)		
Educational Level				
Primary	22 (12.0%)	21 (13.2%)	0.122	0.7271
JHS	12 (6.5%)	18 (11.3%)	2.461	0.1167
Secondary/technical/voc	49 (26.6%)	48 (30.2%)	0.532	0.4656
Tertiary	71 (38.6%)	50 (31.4%)	1.905	0.1676
None	30 (16.3%)	22 (13.8%)	0.404	0.5251
Marital Status				
Married	56 (30.4%)	62 (39.0%)	2.769	0.0961
Single	72 (39.1%)	57 (35.8%)	0.391	0.5316
Divorced	19 (10.3%)	31 (19.5%)	5.761	**0.0164**
Cohabitating	19 (10.3%)	4 (2.5%)	-	-
Widowed	18 (9.8%)	5 (3.1%)	6.008	**0.0142**
Employment Status				
Unemployed	78 (42.4%)	80 (50.3%)	3.969	**0.0463**
Self employed	58 (31.5%)	40 (25.2%)	1.693	0.1932
Employed	48 (26.1%)	39 (24.5%)	0.110	0.7408
Income Level				
<Ghc500	75 (40.8%)	70 (44.0%)	0.372	0.5417
Ghc500-<Ghc1000	37 (20.1%)	48 (30.2%)	4.649	**0.0311**
Ghc1000-<Ghc1500	35 (19.0%)	21 (13.2%)	2.111	0.1463
Ghc1500->Ghc2000	12 (6.5%)	10 (6.3%)	0.008	0.9302
>Ghc2000	25 (13.6%)	10 (6.3%)	4.957	**0.0260**

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.10: Hypertension Awareness

The findings in Table 4.7 show respondents hypertension awareness. A total of 22.7% had been confirmed hypertensive by a doctor or healthcare provider of which 20.5% were males and 24.0% were females from the 343 participants.

On doctor advise on how to control blood pressure 30.6% of the participants affirmed "no" to receiving doctor's advice of which 32.8% were males and 29.4% were females.

Again, on awareness of top number in blood pressure measurement, 28.7% males and 29.9% females were aware that, the value should be <140mmHg with the majority either did not know or responded that it should be >140mmHg. Also, on awareness of the bottom number in blood pressure measurement, 35.0% were aware the value should be <90mmHg with the rest responding to either >90mmHg or did not know.

When asked, which of the number on blood pressure measurement was important to keep under control, approximately 60% of the participants did not know whether the top or the bottom number. However, this was not statistically significant ($p > 0.05$) stratified by gender (Table 4.7).

Table 4. 7: Hypertension Awareness among Respondents stratified by gender

Variables	Total, n(%)	Male, n(%)	Female, n(%)
Person with HP			
Yes	78 (22.7%)	25 (20.5%)	53 (24.0%)
No	265 (77.3%)	97 (79.5%)	168 (76.0%)
Doctor Advise on how to control Blood Pressure			
Yes	189 (55.1%)	63 (51.6%)	126 (57.0%)
No	105 (30.6%)	40 (32.8%)	65 (29.4%)
Don't know	49 (14.3%)	19 (15.6%)	30 (13.6%)
Awareness of Top Blood Number			
<140	101 (29.4%)	35 (28.7%)	66 (29.9%)
140	81 (23.6%)	32 (26.2%)	49 (22.2%)
>140	73 (21.3%)	32 (26.2%)	41 (18.6%)
Don't know	88 (25.7%)	23 (18.9%)	65 (29.4%)
Awareness of Bottom Blood Number			
<90	120 (35.0%)	40 (32.8%)	80 (36.2%)
90	70 (20.4%)	31 (25.4%)	39 (17.6%)
>90	67 (19.5%)	19 (15.6%)	48 (21.7%)
Don't know	86 (25.1%)	32 (26.2%)	54 (24.4%)
Top Number is Important to Keep Under Control			
Yes	123 (35.9%)	38 (31.1%)	85 (38.5%)
No	106 (30.9%)	36 (29.5%)	70 (31.7%)
Don't Know	114 (33.1%)	48 (39.3%)	66 (29.9%)
Bottom Number is Important to Keep Under Control			
Yes	131 (38.2%)	43 (35.2%)	88 (39.8%)
No	111 (32.4%)	38 (31.1%)	73 (33.0%)
Don't Know	101 (29.4%)	41 (33.6%)	60 (27.1%)

Data presented as number (percentage).

4.11: Association between Awareness of Hypertension and Socio- Demographic Characteristics

Table 4.8 shows the association between the socio-demographic variables and awareness of hypertension. Gender was significantly associated ($p<0.0173$; $x^2 = 5.667$) with awareness of hypertension with majority (59.6%) being females.

Those with no formal education ($p < 0.0001$; $x^2 = 22.52$) and those with tertiary education ($p < 0.0001$; $x^2 = 19.3$) were significantly associated with awareness of hypertension. A higher percentage (44.1%) of respondents with tertiary education responded yes to awareness while smaller percentage (8.0%) of respondents with no formal education responding yes to awareness.

There were significant association between participants who were single, married, cohabitating and awareness of hypertension with 47.4% single, 30.0% married and 2.8%, cohabitating participants being aware of hypertension.

Again, 29.1% of those who were gainful employed were aware of hypertension and 19.2% were not and this was statistically significant.

In addition, respondents who smoke cigarette ($p = 0.0414$; $x^2 = 4.16$), shisha ($p <=0.0009$; $x^2 = 11$), and exercising ($p < 0.0001$; $x^2 = 36.09$) have significant association with the awareness of hypertension (Table 4.8).

Table 4. 8: Association between Awareness of Hypertension and Socio-Demographic Characteristics

Variable	Awareness of Hypertension			Chi-square	P-value
	Total, n (%)	Yes n (%)	No (%)		
Gender					
Male	122 (35.6%)	86 (40.4%)	36 (27.7%)	5.667	**0.0173**
Female	221 (64.4%)	127 (59.6%)	94 (72.3%)		
Religion					
Christian	230 (67.1%)	145 (68.1%)	85 (65.4%)	0.265	0.6070
Islam	62 (18.1%)	43 (20.2%)	19 (14.6%)	1.693	0.1932
Traditional	48 (14.0%)	25 (11.7%)	23 (17.7%)	2.379	0.1230
Others	3 (0.9%)	0 (0.0%)	3 (2.3%)	-	-
Ethnicity					
Akan	214 (62.4%)	140 (65.7%)	74 (56.9%)	2.667	0.1024
Akuapim	18 (5.2%)	74 (3.3%)	11 (8.5%)	4.348	**0.0370**
Ewe	41 (12.0%)	25 (11.7%)	16 (12.3%)	0.025	0.8744
Fante	48 (14.0%)	26 (12.2%)	22 (16.9%)	1.492	0.2219
Ga	10 (2.9%)	6 (2.8%)	4 (3.1%)	-	-
Gonja	12 (3.5%)	9 (4.2%)	3 (2.3%)	-	-
Residence					
Rural	136 (39.7%)	82 (38.5%)	54 (41.5%)	0.312	0.5765
Urban	207 (60.3%)	131 (61.5%)	76 (58.5%)	-	-
Educational Level					
Primary	43 (12.5%)	24 (11.3%)	19 (14.6%)	0.825	0.3637
JHS	30 (8.7%)	20 (9.4%)	10 (7.7%)	0.291	0.5893
Secondary/technical/voc	97 (28.3%)	58 (27.2%)	39 (30.0%)	0.305	0.5805
Tertiary	121 (35.3%)	94 (44.1%)	27 (20.8%)	19.300	< **0.0001**
None	52 (15.2%)	17 (8.0%)	35 (26.9%)	22.520	< **0.0001**
Marital Status					
Married	118 (34.4%)	64 (30.0%)	54 (41.5%)	4.724	**0.0297**
Single	129 (37.6%)	101 (47.4%)	28 (21.5%)	23.040	< **0.0001**
Divorced	54 (15.7%)	28 (13.1%)	26 (20.0%)	2.859	0.0908
Cohabitating	23 (6.7%)	6 (2.8%)	17 (13.1%)	13.580	**0.0002**

Widowed	23 (6.7%)	18 (8.5%)	5 (3.8%)	2.736	0.0981
Employment Status					
Unemployed	158 (46.1%)	93 (43.7%)	65 (50.0%)	1.305	0.2533
Self employed	98 (28.6%)	58 (27.2%)	40 (30.8%)	0.496	0.4815
Employed	87 (25.4%)	62 (29.1%)	25 (19.2%)	4.160	**0.0414**
Income Level					
<Ghc500	145 (42.3%)	85 (39.9%)	60 (46.2%)	1.291	0.2558
Ghc500-<Ghc1000	85 (24.8%)	60 (28.2%)	25 (19.2%)	3.460	0.0629
Ghc1000-<Ghc1500	56 (16.3%)	32 (15.0%)	24 (18.5%)	0.699	0.4033
Ghc1500->Ghc2000	22 (6.4%)	15 (7.0%)	7 (5.4%)	0.370	0.5433
>Ghc2000	35 (10.2%)	21 (9.9%)	14 (10.8%)	0.073	0.7871
Smoke Cigarette					
Yes	87 (25.4%)	62 (29.1%)	25 (19.2%)	4.160	**0.0414**
No	256 (74.6%)	151 (70.9%)	105 (80.8%)		
Smoke Shisha					
Yes	49 (14.3%)	20 (9.4%)	29 (22.3%)	11.000	**0.0009**
No	294 (85.7%)	193 (90.6%)	101 (77.7%)		
Alcohol					
Yes	106 (30.9%)	66 (31.0%)	40 (30.8%)	0.002	0.9664
No	237 (69.1%)	147 (69.0%)	90 (69.2%)		
Exercise					
Yes	202 (58.9%)	152 (71.4%)	50 (38.5%)	36.090	< **0.0001**
No	141 (41.1%)	61 (28.6%)	80 (61.5%)		

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.12: Association between Hypertension Status and Demographic Characteristics

The finding of Table 4.9 shows the associations between hypertension status and socio-demographic characteristics of study participants. Christians (p = 0.0007; x^2 = 11.370) and Muslims (p = 0.0082; x^2 = 6.995) were significantly associated with

hypertension status of which 51.3% Christians and 28.2% Muslims were hypertensives.

Majority (55.1%) of the respondents who reside in the rural areas were hypertensive and this was statistically significant ($p = 0.0015$; $x^2 = 10.110$).

About 10.3% of participants with primary education were hypertensive and 13.2% were not hypertensive.

There were significant association between participants who were single (25.6%), ($p = 0.0130$; $x^2 = 6.163$); cohabitating (16.7%), ($p < 0.0001$; $x^2 = 16.010$) and widowed (12.8%), ($p = 0.0140$; $x^2 = 6.035$) with hypertension and those without hypertension of the same category (41.1%, 3.8% and 4.9).

In addition, income level < GH¢500 ($p < 0.0089$; $x^2 = 6.836$) were significantly associated with hypertension status (Table 4.11)

Table 4. 9: Association between Hypertension Status and Demographic Characteristics

Variable	Hypertensive	Non-Hypertension	Chi-square	P-value
Gender				
Male	25 (32.1%)	97 (36.6%)	0.545	0.4604
Female	53 (67.9%)	168 (63.4%)	0.545	
Religion				
Christian	40 (51.3%)	190 (71.7%)	11.370	**0.0007**
Islam	22 (28.2%)	40 (15.1%)	6.995	**0.0082**
Traditional	13 (16.7%)	35 (13.2%)	0.599	0.4389
Others	3 (3.8%)	0 (0.0%)	10.280	0.9456
Ethnicity				
Akan	46 (59.0%)	168 (63.4%)	0.502	0.4786
Akuapim	6 (7.7%)	12 (4.5%)	1.213	0.2707
Ewe	10 (12.8%)	31 (11.7%)	0.072	0.7883
Fante	4 (5.1%)	44 (16.6%)	6.594	0.9961
Ga	3 (3.8%)	7 (2.6%)	0.309	0.9994
Gonja	9 (11.5%)	3 (1.1%)	19.330	0.4359
Residence				
Rural	43 (55.1%)	93 (35.1%)	10.110	**0.0015**
Urban	35 (44.9%)	172 (64.9%)	10.110	
Educational Level				
Primary	8 (10.3%)	35 (13.2%)	4.493	**0.0340**
JHS	6 (7.7%)	24 (9.1%)	0.141	0.7077
Secondary/technical/voc	20 (25.6%)	77 (29.1%)	0.347	0.5560
Tertiary	28 (35.9%)	93 (35.1%)	0.017	0.8962
None	16 (20.5%)	36 (13.6%)	2.249	0.1337
Marital Status				
Married	26 (33.3%)	92 (34.7%)	0.051	0.8211
Single	20 (25.6%)	109 (41.1%)	6.163	**0.0130**
Divorced	9 (11.5%)	41 (15.5%)	0.684	0.4082
Cohabitating	13 (16.7%)	10 (3.8%)	16.010	< **0.0001**

Widowed	10 (12.8%)	13 (4.9%)	6.035	**0.0140**
Employment Status				
Unemployed	39 (50.0%)	119 (44.9%)	0.630	0.4275
Self employed	19 (24.4%)	79 (29.8%)	0.878	0.3488
Employed	20 (25.6%)	67 (25.3%)	0.004	0.9491
Income Level				
<Gh¢500	43 (55.1%)	102 (38.5%)	6.836	**0.0089**
Gh¢500- Gh¢999	20 (25.6%)	65 (24.5%)	0.040	0.9994
Gh¢1000-< Gh¢1499	6 (7.7%)	50 (18.9%)	5.509	**0.0189**
Gh¢1500- Gh¢1999	9 (11.5%)	13 (4.9%)	4.560	**0.0327**
> Gh¢2000	0 (0 .0%)	35 (13.2%)	11.470	0.9069
Smoke cigarette				
Yes	21 (26.9%)	66 (24.9%)	0.130	0.9994
No	57 (73.1%)	199 (75.1%)	0.130	
Smoke Shisha				
Yes	18 (23.1%)	31 (11.7%)	6.372	0.9969
No	60 (76.9%)	234 (88.3%)	6.372	
Alcohol				
Yes	19 (24.4%)	87 (32.8%)	2.025	0.9994
No	59 (75.6%)	178 (67.2%)	2.025	
Exercise				
Yes	41 (52.6%)	161 (60.8%)	1.670	0.9969
No	37 (47.4%)	104 (39.2%)	1.670	

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.13: Awareness of Personal Blood Pressure Level and Socio-demographic Characterisstics

Table 4.10 illustrates the proportions between awareness of personal blood pressure level and Socio- demographic characteristics of respondents. As shown from the table, males and females had similar proportions (male, 51.6% vs. female, 57.0%) of awareness of their personal blood pressures. The proportions of Christians (60.4%) and Ewes (73.2%) who knew their personal pressures was higher than other groups in their respective categories. Whiles rural and urban respondents had similar responses (rural, 59.6% vs. urban 52.2%), the proportion of respondents with no education (59.6%) who were aware of their personal blood pressures was higher than the proportions of all other groups within the same category. Similarly, employed respondents (59.8%) and Ghc500-1500 (63.5%) income earners had higher proportions of respondents who knew their personal blood pressures as shown in table 4.10.

Table 4. 10: Awareness of Personal Blood Pressure Level and Socio-demographic Characteristics

VARIABLE	Yes	No
Gender		
Male	63(51.6)	59(48.4)
Female	126(57.0)	95(43)
Religion		
Christian	139(60.4)	91(39.6)
Islam	30(48.4)	32(51.6)
Traditional	20(41.7)	28(58.3)
Others	0(0.0)	3(100)
Ethnicity		
Akan	114(53.3)	100(46.7)
Akuapim	8(44.4)	10(95.6)
Ewe	30(73.2)	11(26.8)
Fante	27(56.2)	21(43.8)
Ga	7(70.0)	3(100)
Gonja	3(25.0)	9(95)
Residence		
Rural	81(59.6)	55(40.4)
Urban	108(52.2)	99(47.8)
Educational Level		
Primary	24(55.8)	19(44.2)
JHS	10(33.3)	20(66.7)
Secondary/technical/voc	54(55.7)	42(44.3)
Tertiary	70(57.9)	50(42.1)
None	31(59.6)	21(40.4)
Marital Status		
Married	75(63.6)	34(36.4)
Single	62(48.1)	56(51.9)
Divorced	31(62.0)	19(38)
Cohabitating	11(47.8)	12(52.2)
Widowed	10(43.5)	13(56.5)

Employment Status		
Unemployed	85(53.8)	60(46.2)
Self employed	52(53.1)	46(46.9)
Employed	52(59.8)	35(40.2)
Income Level		
<Ghc500	69(47.6)	76(52.4)
Ghc500-<Ghc1000	54(63.5)	31(36.5)
Ghc1000-<Ghc1500	33(58.9)	23(41.1)
Ghc1500->Ghc2000	13(59.1)	9(40.9)
>Ghc2000	20(57.1)	15(42.9)
Smoke Cigarette		
Yes	52(59.8)	35(40.2)
No	137(53.5)	119(46.5)
Smoke Shisha		
Yes	25(51.0)	24(49)
No	164(55.8)	130(44.2)
Alcohol		
Yes	70(66.0)	36(34)
No	119(50.2)	118(49.8)
Exercise		
Yes	120(59.4)	82(40.6)
No	**69(48.9)**	**72(51.1)**

Data presented as number (percentage)

4.14: Attitudes and Perceptions Related to Hypertension

As shown in Table 4.11, majority (42.6%) of the respondents most especially the hypertensives (73.1%) considered blood pressure as a personal health concern very seriously which was significant ($p < 0.0001$; $x^2 = 39.96$). However, 7.7% hypertensive did not show any seriousness with blood pressure as a personal health concern and this was statistically significant ($p = 0.0027$; $x^2 = 9.006$) too.

In addition, majority (52.6%) hypertensives showed some-what important to taking medicine to keep blood pressure under control ($p = 0.0001$; $x^2 = 15.30$) but 15.4% hypertensives did not attached importance to taking medicine to keep blood pressure under control ($p = 0.0068$; $x^2 = 7.333$).

Again, 57.7% hypertensive responded that hypertensive has a cure ($p = 0.0352$; $x^2 = 4.434$) but 23.1% hypertensives significantly ($p = 0.0261$; $x^2 = 4.948$) disagree to hypertension having a cure. However, about 19.2% of the hypertensive did not know whether hypertension has a cure or not.

Majority (53.8%) of hypertensive were of the view that changing lifestyle (such as; low cholesterol intake, low salt intake, less stress, quit smoking, exercising, etc) helps lower high blood pressure and this was statistically significant ($p = 0.0405$; $x^2 = 4.197$). However, 17.9% hypertensive thought otherwise ($p = 0.0132$; $x^2 = 6.138$).

Furthermore, majority (62.8%) hypertensives affirmed that, high blood pressure was an avoidable part of aging whiles 11.5% hypertensives did not know whether or not high blood pressure was an avoidable part of aging.

When asked a single most important factor in preventing or controlling high blood pressure; majority (48.7%) of the hypertensives chose hypertensive drugs

(medication) ($p < 0.0001$; $x^2 = 49.81$) and 9.0% hypertensives responded exercising ($p = 0.0074$; $x^2 = 7.162$) (Table 4.11).

Table 4. 11: Association between Respondents Attitude and Perceptions Related to Hypertension

Variables	Total, n(%)	Hypertensive	Non-hypertensives	Chi-square	P-value
Considers blood pressure as a personal health concern					
Very serious	146 (42.6%)	57 (73.1%)	89 (33.6%)	39.960	**< 0.0001**
Somewhat serious	130 (37.9%)	15 (19.2%)	115 (43.4%)	14.950	**0.0001**
Not at all serious	67 (19.5%)	6 (7.7%)	61 (23.0%)	9.006	**0.0027**
Taking medicine to keep blood pressure under control					
Very important	132 (38.5%)	25 (32.1%)	107 (40.4%)	1.575	0.2095
Somewhat important	117 (34.1%)	41 (52.6%)	76 (28.7%)	15.300	**< 0.0001**
Not at all important	94 (27.4%)	12 (15.4%)	82 (30.9%)	7.333	**0.0068**
Hypertension is a Lifelong Diseases					
Yes	142 (41.1%)	47 (60.3%)	95 (35.8%)	14.800	**0.0001**
No	91 (26.5%)	13 (16.7%)	78 (29.4%)	5.040	**0.0248**
Don't know	110 (32.1%)	18 (23.1%)	92 (34.7%)	3.748	0.0529
Hypertension Has a Cure					
Yes	162 (47.2%)	45 (57.7%)	117 (44.2%)	4.434	**0.0352**
No	115 (33.5%)	18 (23.1%)	97 (36.6%)	4.948	**0.0261**
Don't know	66 (19.2%)	15 (19.2%)	51 (19.2%)	8.176	0.9977
Changing Lifestyle Helps Lowering High Blood Pressure					
Yes	150 (43.7%)	42 (53.8%)	108 (40.8%)	4.197	**0.0405**
No	100 (29.2%)	14 (17.9%)	86 (32.5%)	6.138	**0.0132**
Don't know	93 (27.1%)	22 (28.2%)	71 (26.8%)	0.061	0.8051
High blood pressure is an avoidable part of aging					
Yes	170 (49.6%)	49 (62.8%)	121 (45.7%)	7.099	**0.0077**
No	102 (29.7%)	20 (25.6%)	82 (30.9%)	0.811	0.3679

Don't know	71 (20.7%)	9 (11.5%)	62 (23.4%)	5.162	**0.0231**
Single most important factor in preventing or controlling high blood pressure					
Medications	70 (20.4%)	38 (48.7%)	32 (12.1%)	49.810	**< 0.0001**
Exercising	67 (19.5%)	7 (9.0%)	60 (22.6%)	7.162	**0.0074**
Less Stress	71 (20.7%)	12 (15.4%)	59 (22.3%)	1.738	0.1875
Quit Smoking	49 (14.3%)	6 (7.7%)	43 (16.2%)	3.584	0.0583
Change Diet (Salt intake)	41 (12%)	9 (11.5%)	32 (12.1%)	0.017	0.8978
Reducing Alcohol	15 (4.4%)	0 (0.0%)	15 (5.7%)	4.617	0.0317
Losing Weight	7 (2%)	3 (3.8%)	4 (1.5%)	1.646	0.1995
Other	23 (6.7%)	3 (3.8%)	20 (7.5%)	1.319	0.2507

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.15: Perceive severity of hypertension as a personal health concern and socio-demographic characteristics of respondents

Table 4.12 illustrates the perceive severity of hypertension as a personal health concern and socio-demographic characteristics of respondents. Males and females showed similar responses with respect to the perception of hypertension, with both genders showing about 80% of responses of very serious and somewhat serious. A higher proportion of traditionalists (60.4%) said hypertension as a personal health concern is very serious whiles a higher proportion of Christians (43.9%) said it was somewhat serious. Generally, the proportions of Ewes and Akuapem ethnicities (56.1% and 55.6% respectively) who responded "very serious" was higher than the proportions of all other ethnicities, whiles more rural dwellers (48.5%) responded "very serious" compared to urban dwellers. The proportions of married respondents, employed respondents as well as GH¢ 1500- 2000 income earners who responded

"very serious" was higher (48.3%, 49.4% and 68.2% respectively) than the proportions of other groups in their respective categories.

Table 4. 12: Perceive Severity of Hypertension as a Personal Health Concern and Socio- Demographic Characteristics of Respondents

Variable	Very serious	Somewhat serious	Not at all serious
Gender			
Male	51(41.8)	51(41.8)	20(16.4)
Female	95(43.0)	79(35.7)	47(21.3)
Religion			
Christian	85(37.0)	101(43.9)	44(19.1)
Islam	32(51.6)	13(21.0)	17(27.4)
Traditional	29(60.4)	16(33.3)	3(6.2)
Others	0(0.0)	0(0.0)	3(100.0)
Ethnicity			
Akan	90(42.1)	81(37.9)	43(20.1)
Akuapim	10(55.6)	4(22.2)	4(22.2)
Ewe	23(56.1)	10(24.4)	8(19.5)
Fante	17(35.4)	22(45.8)	9(18.8)
Ga	3(30.0)	7(70.0)	0(0)
Gonja	3(25.0)	6(50.0)	3(25.0)
Residence			
Rural	66(48.5)	49(36.0)	21(15.4)
Urban	80(38.6)	81(39.1)	46(22.2)
Educational Level			
Primary	7(16.3)	25(58.1)	11(25.6)
JHS	9(30.0)	17(56.7)	4(13.3)
Secondary/technical/voc	38(39.2)	30(30.9)	29(29.9)
Tertiary	69(57.0)	43(35.5)	9(7.4)
None	23(44.2)	15(28.8)	14(26.9)
Marital Status			

Married	57(48.3)	42(35.6)	19(16.1)
Single	52(40.3)	53(41.1)	24(18.6)
Divorced	17(34.0)	20(40.0)	13(26.0)
Cohabitating	10(43.5)	7(30.4)	6(26.1)
Widowed	10(43.5)	8(34.8)	5(21.7)
Employment Status			
Unemployed	68(43.0)	50(31.6)	40(25.3)
Self employed	35(35.7)	44(44.9)	19(19.4)
Employed	43(49.4)	36(41.4)	8(9.2)
Income Level			
< GH¢500	69(47.6)	36(24.8)	40(27.6)
GH¢500-< GH¢1000	38(44.7)	41(48.2)	6(7.1)
GH¢1000-< GH¢1500	14(25.0)	30(53.6)	12(24.1)
GH¢1500-> GH¢2000	15(68.2)	7(31.8)	0
> GH¢2000	10(28.6)	16(45.7)	9(25.7)
Smoke cigarette			
Yes	42(48.3)	33(37.9)	12(13.8)
No	104(40.6)	97(37.9)	55(21.5)
Smoke Shisha			
Yes	13(26.5)	16(32.7)	20(40.8)
No	133(45.2)	114(38.8)	47(16.0)
Alcohol			
Yes	46(43.4)	38(35.8)	22(20.8)
No	100(42.2)	92(38.8)	45(19.0)
Exercise			
Yes	94(46.5)	79(39.1)	29(14.4)
No	**52(36.9)**	**51(36.2)**	**38(27.0)**

Data presented as number (percentage)

4.16: Association between perceptions of hypertension as a lifelong Disease and Socio- demographic Variables

Table 4.13 shows the findings on the association between perceptions of hypertension as a lifelong disease and socio-demographic characteristics. Approximately 20% Traditionalist affirmed that hypertension is a lifelong disease whiles 10.0% disagreed (p = 0.0102). The Ewe tribe, couples who were married, single and participants cohabitating were significantly associated (p < 0.05) with the perception that hypertension is a lifelong disease.

There were significant association with participants who received average monthly income of GH¢ 500 – GH¢ <1000 and between GH¢1500 – GH¢ <2000 and perception of hypertension being a lifelong disease.

In addition, smoking shisha and alcohol consumption have significant (p<0.05) association with perceptions of hypertension as a lifelong disease (Table 4.15).

Table 4. 13: Association between Perceptions of Hypertension as a Lifelong Disease and Socio- Demographic Characteristics

VARIABLE	Hypertension as a Lifelong Disease			Chi-square	P-value
	Total, n (%)	Yes n (%)	No, n (%)		
Gender					
Male	122 (35.6%)	46 (32.4%)	76 (37.8%)	1.065	0.3020
Female	221 (64.4%)	96 (67.6%)	125 (62.2%)		
Religion					
Christian	230 (67.1%)	92 (64.8%)	138 (68.7%)	0.564	0.4528
Islam	59 (17.2%)	19 (13.4%)	40 (19.9%)	2.484	0.1150
Traditional	48 (14.0%)	28 (19.7%)	20 (10.0%)	6.597	**0.0102**
Others	6 (1.7%)	3 (2.1%)	3 (1.5%)		
Ethnicity					

Akan	214 (62.4%)	83 (58.5%)	131 (65.2%)	1.603	0.2055
Akuapim	18 (5.2%)	3 (2.1%)	15 (7.5%)	-	-
Ewe	41 (12.0%)	23 (16.2%)	18 (9.0%)	4.147	**0.0417**
Fante	49 (14.3%)	24 (16.9%)	25 (12.4%)	1.354	0.2446
Ga	10 (2.9%)	4 (2.8%)	6 (3.0%)	-	-
Gonja	12 (3.5%)	6 (4.2%)	6 (3.0%)	0.379	0.5381
Residence					
Rural	136 (39.7%)	57 (40.1%)	79 (39.3%)	0.024	0.8759
Urban	207 (60.3%)	85 (59.9%)	122 (60.7%)		
Educational Level					
Primary	43 (12.5%)	12 (8.5%)	31 (15.4%)	3.689	0.0548
JHS	30 (8.7%)	9 (6.3%)	21 (10.4%)	1.761	0.1845
Secondary/technical/voc	97 (28.3%)	44 (31.0%)	53 (26.4%)	0.875	0.3496
Tertiary	121 (35.3%)	55 (38.7%)	66 (32.8%)	1.267	0.2603
None	52 (15.2%)	22 (15.5%)	30 (14.9%)	0.021	0.8852
Marital Status					
Married	118 (34.4%)	65 (45.8%)	53 (26.4%)	13.890	**0.0002**
Single	129 (37.6%)	39 (27.5%)	90 (44.8%)	10.630	**0.0011**
Divorced	50 (14.6%)	15 (10.6%)	35 (17.4%)	3.135	0.0766
Cohabitating	23 (6.7%)	16 (11.3%)	7 (3.5%)	8.062	**0.0045**
Widowed	23 (6.7%)	7 (4.9%)	16 (8.0%)	1.222	0.2690
Employment Status					
Unemployed	158 (46.1%)	50 (35.2%)	108 (53.7%)	11.490	**0.0007**
Self employed	98 (28.6%)	52 (36.6%)	46 (22.9%)	7.691	**0.0055**
Employed	87 (25.4%)	40 (28.2%)	47 (23.4%)	1.007	0.3157
Income Level					
<Ghc500	145 (42.3%)	53 (37.3%)	92 (45.8%)	2.433	0.1188
Ghc500-<Ghc1000	85 (24.8%)	43 (30.3%)	42 (20.9%)	3.933	**0.0473**
Ghc1000-<Ghc1500	56 (16.3%)	20 (14.1%)	36 (17.9%)	0.892	0.3450
Ghc1500-<Ghc2000	22 (6.4%)	16 (11.3%)	6 (3.0%)	9.510	**0.0020**
>Ghc2000	35 (10.2%)	10 (7.0%)	25 (12.4%)	2.644	0.1040
Smoke Cigarette					
Yes	87 (25.4%)	37 (26.1%)	50 (24.9%)	0.061	0.8045

No	256 (74.6%)	105 (73.9%)	151 (75.1%)		
Smoke Shisha					
Yes	49 (14.3%)	27 (19.0%)	22 (10.9%)	4.424	**0.0354**
No	294 (85.7%)	115 (81.0%)	179 (89.1%)		
Alcohol					
Yes	106 (30.9%)	54 (38.0%)	52 (25.9%)	5.760	**0.0164**
No	237 (69.1%)	88 (62.0%)	149 (74.1%)		
Exercise					
Yes	202 (58.9%)	91 (64.1%)	111 (55.2%)	2.699	0.1004
No	141 (41.1%)	51 (35.9%)	90 (44.8%)		

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.17: Perception that Hypertension has a Cure and Socio- Demographic Characteristics

Table 4.14 shows the perception of hypertension having a cure and socio-demographic characteristics. From the table, a higher proportion of females (49.8%) than males (42.6%) perceived that hypertension has a cure with a higher proportion of Muslims (66.1%) and Ewes (78.0%) as well as rural dwellers (51.5%) reporting a similar perception than other groups in their respective categories. Similarly, higher proportions of respondents who had no form of education (73.1%) and respondents who widowed (65.2%) were perceived hypertension has a cure. Though the responses of perception of hypertension having a cure was similar among all categories of employment, it was higher among respondents who earned > GH¢ 2000 (71.4%).

Table 4. 14: The Perception that Hypertension has a Cure and Socio-Demographic Characteristics

Variable	Yes	No
Gender		
Male	52(42.6)	70(57.4)
Female	110(49.8)	111(50.2)
Religion		
Christian	95(41.3)	135(58.7)
Islam	41(66.1)	21(33.9)
Traditional	26(54.2)	22(45.8)
Others	0 (0.0)	3(100)
Ethnicity		
Akan	96(44.9)	118(55.1)
Akuapim	3(16.7)	15(93.3)
Ewe	32(78.0)	9(22)
Fante	28(58.3)	20(41.7)
Ga	3(30.0)	7(100)
Gonja	0 (0.0)	12(100)
Residence		
Rural	70(51.5)	66(48.5)
Urban	92(44.4)	115(55.6)
Educational Level		
Primary	12(27.9)	31(72.1)
JHS	16(53.3)	14(46.7)
Secondary/technical/voc	46(47.4)	51(52.6)
Tertiary	50(41.3)	62(58.7)
None	38(73.1)	14(26.9)
Marital Status		
Married	44(37.3)	74(62.7)
Single	65(50.4)	64(49.6)
Divorced	27(54.0)	23(46)
Cohabitating	11(47.8)	12(52.2)
Widowed	15(65.2)	8(34.8)

Employment Status		
Unemployed	78(49.4)	80(50.6)
Self employed	44(44.9)	54(55.1)
Employed	40(46.0)	47(54)
Income level		
<Ghc500	73(50.3)	72(49.7)
Ghc500-<Ghc1000	34(40.0)	51(60)
Ghc1000-<Ghc1500	24(42.9)	32(57.1)
Ghc1500->Ghc2000	6(27.3)	16(92.7)
>Ghc2000	25(71.4)	10(28.6)
Smoke Cigarette		
Yes	42(48.3)	45(51.7)
No	120(46.9)	136(53.1)
Smoke Shisha		
Yes	28(57.1)	21(42.9)
No	134(45.6)	160(54.4)
Alcohol		
Yes	38(35.8)	68(64.2)
No	124(52.3)	113(47.7)
Exercise		
Yes	97(48.0)	105(52)
No	**65(46.1)**	**76(53.9)**

Data presented as number (percentage)

4.18: Association between the attitude and perception that changing lifestyle lowers blood pressure (BP) and Socio- Demographic Characteristics

The 4.15 indicate the association between attitudes and perception that changing lifestyle lowers and socio-demographic characteristics. The findings show that, there were significant ($p<0.05$) association between the perception that changing lifestyle lowers blood pressure levels and residence, educational level (no formal education,

junior high school and tertiary), and self-employed. About 69.3% of urban dwellers, 8.0% no formal education, 4.0% JHS levers, 47.3% with tertiary education and 21.3% of self-employed participants responded yes to attitudes and perception that changing lifestyle lowers blood pressure whereas, 53.4%, 12.4%,25.9%, 20.7% and 34.2% respectively responded no attitudes and perception that changing lifestyle lowers blood pressure (BP).

Table 4. 15: Association between the Attitude and Perception that Changing Lifestyle Lowers BP and Socio- Demographic Characteristics

VARIABLE	Changing Lifestyle Lowers BP			Chi-square	P-value
	Total, n(%)	Yes n (%)	No, n (%)		
Gender					
Male	122 (35.6%)	59 (39.3%)	63 (32.6%)	1.649	0.1991
Female	221 (64.4%)	91 (60.7%)	130 (67.4%)		
Religion					
Christian	230 (67.1%)	105 (70.0%)	125 (64.8%)	1.046	0.3064
Islam	62 (18.1%)	24 (16.0%)	38 (19.7%)	0.776	0.3785
Traditional	48 (14.0%)	21 (14.0%)	27 (14.0%)	0.008	0.9978
Others	3 (0.9%)	0 (0.0%)	3 (1.6%)	-	-
Ethnicity					
Akan	214 (62.4%)	95 (63.3%)	119 (61.7%)	0.101	0.7507
Akuapim	18 (5.2%)	3 (2.0%)	15 (7.8%)	-	-
Ewe	41 (12.0%)	18 (12.0%)	23 (11.9%)	0.001	0.9813
Fante	48 (14.0%)	18 (12.0%)	30 (15.5%)	0.881	0.3480
Ga	10 (2.9%)	7 (4.7%)	3 (1.6%)	-	-
Gonja	12 (3.5%)	9 (6.0%)	3 (1.6%)	-	-
Residence					
Rural	136 (39.7%)	46 (30.7%)	90 (46.6%)	8.991	**0.0027**
Urban	207 (60.3%)	104 (69.3%)	103 (53.4%)		
Educational Level					
Primary	43 (12.5%)	17 (11.3%)	26 (13.5%)	0.352	0.5530
JHS	30 (8.7%)	6 (4.0%)	24 (12.4%)	7.524	**0.0061**
Secondary/technical/voc	97 (28.3%)	44 (29.3%)	53 (27.5%)	0.146	0.7025
Tertiary	121 (35.3%)	71 (47.3%)	50 (25.9%)	16.160	< **0.0001**
None	52 (15.2%)	12 (8.0%)	40 (20.7%)	10.630	**0.0011**
Marital Status					
Married	118 (34.4%)	57 (38.0%)	61 (31.6%)	1.529	0.2163
Single	129 (37.6%)	57 (38.0%)	72 (37.3%)	0.017	0.8952
Divorced	50 (14.6%)	18 (12.0%)	32 (16.6%)	1.422	0.2331

Cohabitating	23 (6.7%)	9 (6.0%)	14 (7.3%)	0.212	0.6451
Widowed	23 (6.7%)	9 (6.0%)	14 (7.3%)	0.212	0.6451
Employment Status					
Unemployed	158 (46.1%)	73 (48.7%)	85 (44.0%)	0.727	0.3939
Self employed	98 (28.6%)	32 (21.3%)	66 (34.2%)	6.843	**0.0089**
Employed	87 (25.4%)	45 (30.0%)	42 (21.8%)	3.026	0.0819
Income Level					
<Ghc500	145 (42.3%)	69 (46.0%)	76 (39.4%)	1.517	0.2181
Ghc500-<Ghc1000	85 (24.8%)	36 (24.0%)	49 (25.4%)	0.087	0.7676
Ghc1000-<Ghc1500	56 (16.3%)	18 (12.0%)	38 (19.7%)	8.782	0.0530
Ghc1500->Ghc2000	22 (6.4%)	12 (8.0%)	10 (5.2%)	1.117	0.2905
>Ghc2000	35 (10.2%)	15 %)	20 (10.4%)	0.012	0.9123
Smoke Cigarette					
Yes	87 (25.4%)	37 (24.7%)	50 (25.9%)	0.069	0.7934
No	256 (74.6%)	113 (75.3%)	143 (74.1%)		
Smoke Shisha					
Yes	49 (14.3%)	25 (16.7%)	24 (12.4%)	1.234	0.2666
No	294 (85.7%)	125 (83.3%)	169 (87.6%)		
Alcohol					
Yes	106 (30.9%)	41 (27.3%)	65 (33.7%)	1.592	0.2071
No	237 (69.1%)	109 (72.7%)	128 (66.3%)		
Exercise					
Yes	202 (58.9%)	95 (63.3%)	107 (55.4%)	2.172	0.1405
No	141 (41.1%)	55 (36.7%)	86 (44.6%)		

Data presented as number (percentage). Categorical variable compared using chi-square test and p-value < 0.05 considered statistically significant

4.19: Perceptions that hypertension is an avoidable part of aging and socio-demographic Characteristics of Respondents

Table 4.16 depicts the association between perceptions that hypertension is an avoidable part of aging and socio- demographic variables. As indicated on the table, both genders had similar perceptions as to hypertension being an avoidable part of aging. A higher proportion of Traditionalists (64.6%) than other religious groups perceived hypertension to be an avoidable part of aging whiles a higher proportion of Ewe (73.2%) and rural dwellers (52.2%) made similar observations than other groups in their respective categories. Similarly, a higher proportion of respondents with tertiary education (58.7%) and cohabitating (73.9%) individuals had the same perception of hypertension being an avoidable part of aging. Also, a higher proportion of employed (58.6%) respondents as well as income earners of GH¢500-1000 (63.5%) perceived that hypertension was an avoidable part of aging.

Table 4. 16: Perceptions That Hypertension is an Avoidable Part of Aging and Socio- Demographic Characteristics

Variable	Yes	No
Gender		
Male	60(49.2)	62(50.8)
Female	110(49.8)	111(50.2)
Religion		
Christian	97(42.2)	133(57.8)
Islam	39(62.9)	23(37.1)
Traditional	31(64.6)	17(35.4)
Others	3(100.0)	0(0)
Ethnicity		
Akan	105(49.1)	109(50.9)
Akuapim	3(16.7)	15(83.3)
Ewe	30(73.2)	11(26.8)
Fante	19(39.6)	29(60.4)
Ga	4(40.0)	6(60)
Gonja	9(75.0)	3(25)
Residence		
Rural	71(52.2)	65(47.8)
Urban	99(47.8)	108(52.2)
Educational Level		
Primary	24(55.8)	19(44.2)
JHS	12(40)	18(60)
Secondary/technical/voc	43(44.3)	54(55.7)
Tertiary	71(58.7)	50(41.3)
None	20(38.5)	32(61.5)
Marital Status		
Married	68(57.6)	50(42.4)
Single	59(45.7)	70(54.3)
Divorced	19(38.0)	31(62)
Cohabitating	17(73.9)	6(26.1)
Widowed	7(30.4)	16(69.6)

Employment Status		
Unemployed	78(49.4)	80(50.6)
Self employed	41(41.8)	57(58.2)
Employed	51(58.6)	36(41.4)
Income Level		
< GH¢500	68(46.9)	77(53.1)
GH¢500-< GH¢1000	54(63.5)	31(36.5)
GH¢1000-< GH¢1500	18(32.1)	38(67.9)
GH¢1500-> GH¢2000	12(54.5)	10(45.5)
> GH¢2000	18(51.4)	17(48.6)
Smoke Cigarette		
Yes	41(47.1)	46(52.9)
No	129(50.4)	127(49.6)
Smoke Shisha		
Yes	24(49.0)	25(51)
No	146(49.7)	148(50.3)
Alcohol		
Yes	57(53.8)	49(46.2)
No	113(47.7)	124(52.3)
Exercise		
Yes	94(46.5)	108(53.5)
No	**76(53.9)**	**65(46.1)**

Data presented as number (percentage).

CHAPTER FIVE

DISCUSSIONS

5.0 Introduction

This section report on the major findings of the study in relation to the literature review. The discussion of the findings was based on the specific objectives of the study.

5.1 Socio demographic characteristics of the study population stratified by gender

The prevalence of hypertension was 22.7% with females being the majority. The findings of this study showed that hypertension is highly prevalent among adults (19-60 years) and that majority of affected individuals were females. These results are consistent with findings by Yemi *et al.,* (2017) who studied awareness of hypertension and its impact on blood pressure control among adult Nigerians: report from the Ibadan study of aging, and found that, hypertension was prevalent among adult of which majority were females. WHO, (1996) also reported that high BP was independently associated with men, older adults, blacks and a high body mass index, high alcohol consumption and low physical activity which is similar to this study

Again, prevalence of hypertension increased from 20-29 years category through to 60 above years. Hajjar *et al.,* (2013) study conducted in the United States concluded that hypertension prevalence was 35.6% with females being the majority and this prevalence increased from 6.7% in persons 20 to 39 years to 65.2% in persons 60

years or older. The greatest increase in hypertension prevalence between 1988–1991 (57.9%) and 1999–2000 (65.4%) occurred in individuals who are 60 years or older.

Also, WHO, (2016) revealed that the age-specific prevalence was 3.3% in white men (aged 18-29 years); this rate increased to 13.2% in the group aged 30-39 years. The prevalence further increased to 22% in the group aged 40-49 years, to 37.5% in the group aged 50-59 years, and to 51% in the group aged 60-74 years.

The World Health Organization, (2016) supports this finding that the prevalence of hypertension increases significantly with increasing age in all sex and race groups and the incidence of hypertension appeared to increase approximately 5% for each 10-year interval of age. The higher prevalence of hypertension among adults' women when compared with men could be explained by the loss of the estrogen cardiovascular protecting effects after menopause.

Majority of the respondents were Christians of which Akans dominated and resided in the urban areas. Most of the respondents were unmarried, comprising 37.6% singles, 14.6% divorcees and 6.7% each of widows and cohabitants. This implies that Christians from Akan residing in the urban areas were the most involved in the study.

When the respondents were stratified based on gender, there were significantly more females (42.5%) with the 20-29years age bracket than males (26.2%) whiles there were more males within the 40-49years (27%) and 50-59 years (10.7%) than females. This implies that the age-related (20-29years) BP increased for females exceeded that of males whiles within 40-59 years BP increased for males exceeded that of females. This study finding asserts with Dreisbach, (2014) that the age-related BP rise for women exceeds that of men.

5.2 Hypertension Knowledge

The results suggested that respondents in the present study had heard of hypertension before with most being males and was significant as stratified by gender but their level of knowledge about the risk factors and symptoms was low. The findings was similar to the study conducted in Saudi Arabia by Siddiqua *et al.* (2017) who concluded that a significant proportion of hypertensive patients had good knowledge and good attitude towards hypertension but their behaviour could lead to worsening their health condition in time being and resulting in severe complications and damaging of other vital organs.

Out of the 343 respondents, 62.1% acknowledged that they had heard of hypertension however, majority (30.9%) had no idea of the meaning of hypertension. The findings imply that majority of the respondents did not have adequate knowledge about hypertension though they had heard of it before. The results is in line with Liljevik & Lohre, (2012) which assessed the knowledge level and management practices of hypertension in pregnancy among health care workers in Moshi urban in Tanzania and concluded that the level of knowledge of hypertension during pregnancy is too low. The study found that participant were aware of the dangers of hypertension to their health of which majority were females. This implies that hypertension as one of the dangers associated with health were made known to the respondents.

With respect of the knowledge of respondents on risk factors associated hypertension, the study found that majority (51.6%) of the respondents were only able to identify other diseases as the risk factor of hypertension. However, less than 50% of the respondents identified factors such as; excessive alcohol consumption, excessive smoking, poor eating style, physical inactivity, high blood pressure, and age of a

person as the risk factors of hypertension. The findings imply that majority of respondents did not know the risk factors associated with hypertension. This means that lack of knowledge on the risk factors of hypertension could contribute to the prevalence of hypertension. Lack of knowledge on the risk factors of hypertension increase the incidence of the conditions since individuals may involve in those factors unknowingly. Also, the study supports Li et al., (2013) which concluded that hypertension knowledge levels are alarmingly low in rural areas of China, particularly concerning hypertension complications and medication.

With regards to respondents' knowledge on the symptoms of hypertension, the study found that majority of the respondents identified dizziness and shortness of breath as the symptoms of hypertension with less than 50% of the respondents identified headache, blurred vision, chest pain, high blood pressure and heart attack as the symptoms of hypertension among hypertensives. The findings imply that respondents did not have appreciable knowledge on the risk factors of hypertension. Shaikh *et al.*, (2012) affirmed to this study that was conducted on attitude and practice concluded that a significant proportion of hypertensive patients have poor knowledge about symptoms on hypertension.

The study further found that there was significant association between knowledge on the danger of hypertension). On the other hand, there was significant association between danger of hypertension and religion thus Christian and Islam, residence ($p < 0.0180$; $x^2 = 5.598$), no formal education ($p < 0.0203$; $x^2 = 5.390$) and cigarette ($p < 0.0132$; $x^2 = 6.144$) and shisha smoking ($p < 0.0002$; $x^2 = 13.690$).

With regard to proportion of knowledge of respondents on normal blood pressure range and the socio-demographic characteristics, it revealed that males and females

who had knowledge on the isolated systolic and diastolic blood pressure ranges, various religions, all ethnicities, and unemployed and employed were similar. This finding implies that respondents had higher knowledge on normal blood pressure range.

Again, association between the sociodemographic characteristics and knowledge of respondents on the risk factors of hypertension was found that females had high score of knowledge. Also, there was significant association between Akuapim tribe ($p < 0.0035$; $x^2 = 8.525$), secondary/technical/vocation education ($p < 0.0001$; $x^2 = 21.050$), tertiary education ($p < 0.0018$; $x^2 = 9.730$), divorced and widowed ($p < 0.0047$; $x^2 = 8.011$), monthly income between GH¢ 1000-1500 ($p < 0.0257$; $x^2 = 4.0257$) and knowledge level respondents on the risk factors hypertension.

Furthermore, the association between knowledge on symptoms of hypertension and socio-demographic characteristics respondents was identified. It shown that there was significant association between knowledge on symptoms of hypertension and demographic profile (Akan and Fante tribes ($p<0.0397$; $x^2 = 4.230$ and $p<0.0008$; $x^2 = 11.260$) respectively, divorced or widowed, unemployed ($p = 0.0463$; $x^2 = 3.969$) and income level of GH¢ 500 and above ($p < 0.05$)) whiles the rest of the demographic profiles were not significant.

5.3 Awareness of Hypertension

The study found that 22.7% of the respondents in the study were aware of their hypertension status and most were females as confirmed by a doctor or healthcare provider. The study found that there was a significant association between not knowing that doctor's advice can control blood pressure ($p < 0.0048$) and most were males. The finding showed that despite high awareness, patients had poor and

inappropriate practice for hypertension management. These findings are consistent with findings by Wilber and Barrow (2013) who concluded that only 26% of hypertensives in his study knew that they have hypertension and most cases were on antihypertensive medications. In addition, the respondents' low levels of awareness may be partly due to poorly developed health services and the relatively low functional literacy rate in urban (63%) Ghana.

The rate of awareness of hypertension in this population is similar to studies by Yemi et al., (2017) and Ulasi et al., (2011) of awareness of hypertension among similar sub-Saharan African population but lower when compared with studies from high income countries (Egan et al., 2010; Gee et al., 2012). The low awareness in this study may be due to the low level of education among the studied populations. It was shown that there was significant association between awareness of hypertension and demographic profile (no formal education ($p<0.0001$; $x^2 = 22.52$), tertiary education ($p<0.0001$; $x^2 = 19.3$), cigarette smoking ($p = 0.0414$; $x^2 = 4.16$), shisha smoking ($p <=0.0009$; $x^2 = 11$) and exercise ($p < 0.0001$; $x^2 = 36.09$).

This study was similar to Olatunbosun *et al.*, (2013) that having some degree of formal education carried a lower risk of developing hypertension compared to having no education at all but having more than nine years of education carried a higher risk compared to no education at all.

The findings imply that individuals who had no form of formal education are more likely to become hypertensive more than those who are educated. This may be attributed to the fact that persons who are educated stand the chance of being enlightened on the risk factors as linked with hypertension and therefore adopt healthy lifestyles to avoid the condition. Also this study is similar to Amaoh, (2013) which

asserts that prevalence of hypertension increased with age, as has been observed in most studies and may be partly responsible for the high prevalence of hypertension Sunyani municipality, Ghana. In addition, most of the participants resided in rural and semi-urban settings where access to health information and facilities are commonly limited.

Participants in the low socioeconomic class (less than GH¢ 1000 monthly) were less likely to be aware of their hypertension in this study and the relationship between hypertension awareness and socioeconomic status. This finding is similar to studies conducted from other studies (Hendriks et al., 2012; Mills et al., 2016).

5.4 Attitudes and Perceptions Related to Hypertension

To understand respondents' attitudes and perceptions with respect to hypertension, the study found that respondents were knowledgeable about the seriousness of hypertension as a personal health concern which was statistically significant ($p < 0.0001$; $x^2 = 39.960$). Respondents were aware of hypertension and also 52.6% of them knew that it is important in taking medicine to keep blood pressure under control.

Moreover, respondents mentioned that hypertension has a cure. The study found that majority (53.8%) of hypertensives were of the view that changing lifestyle (such as; low cholesterol intake, low salt intake, less stress, quit smoking, exercising, etc.) helps lower high blood pressure and this was statistically significant ($p = 0.0405$; $x^2 = 4.197$). This implies that knowledge on lifestyle changing, behaviour modification and perception can have effect on BP regulations. These findings was similar to the study conducted by Lima *et al.* (2015) on knowledge and perceptions related to

hypertension, lifestyle, behavior modifications and challenges that are facing hypertensive patients who concluded that there was poor knowledge about hypertension and perceptions toward lifestyle-modification. Patients lacked understanding some points of risk factors, manifestation and lifestyle modifications of hypertension.

When asked a single most important factor in preventing or controlling high blood pressure; most of the hypertensives responded hypertensive drugs (medication) ($p<0.0001$; $x^2 = 49.810$) and exercising ($p = 0.0074$; $x^2 = 7.162$).

The study found that there was a proportion between perceive severity of hypertension as a personal health concern and certain socio-demographic characteristics of respondents. The study revealed that gender has about 80% of high proportion of seriousness between perceived severities of hypertension as a personal health concern. According to Kjellgren et al. (2014) reductions in SBP and DBP and improved medication-use compliance have been achieved through an education program that stressed, in part, "knowing high BP." This recent research all points to the need to improve hypertension knowledge and awareness in order to increase medication-use compliance and BP control.

Furthermore, perceive severity of hypertension as a personal health concern was revealed to be higher proportion of traditionalists (60.4%) and Christians (43.9%) with seriousness. Generally, the proportions of Ewes and Akuapem ethnicities (80.5% and 77.8% respectively) with seriousness was higher than the proportions of all other ethnicities as well as residence. The proportions of marital status (>70%) employed respondents (>70%) as well as GH¢1500- 2000 income (>60%) were revealed to be higher proportions of seriousness and respectively) than the proportions of other

groups in their respective categories to perceive severity of hypertension as a personal health concern. This implies that demographic characteristics have influence on attitudes, perceptions of hypertension. In a study conducted, Abed & Abu-Haddaf (2013) inferred that hypertension was strongly linked with physical inactivity, education, obesity, low income and family history of high blood pressure.

The study found significant association between perceptions of hypertension as a lifelong disease and certain socio-demographic variables. Traditionalist, Ewe tribe, couples who were married, single and participants cohabitating, unemployed, self-employed, average monthly income of GH¢500–GH¢<1000 and between GH¢1500–GH¢<2000, smoking shisha and alcohol consumption were all significantly associated ($p < 0.05$) with the perception that hypertension is a lifelong disease. The findings imply respondents' attitude and perception related to hypertension is dependent on religion, ethnicity, marital status, employment, income level, smoking shisha and alcohol.

Findings indicate that there was a higher proportion between the perception that hypertension has a cure and socio-demographic characteristics of the respondents such as; females, Muslims, Ewe, rural dwellers, none formal education, widowed, employment and average income level of > GH¢ 2000. The gender, smoking cigarette and shisha, and exercise had low proportion with attitudes and perception that hypertension has a cure. The findings imply that respondents' attitude and perception regarding the ability of hypertension to be cured is dependent on gender, religion, and ethnicity, place of residents, educational level, marital status, and income level.

The study found that there was significant association between attitude and perception that changing lifestyle lowers hypertension and certain socio- demographic variables. The study found a significant ($p<0.05$) association between the perception that

changing lifestyle lowers hypertension and socio-demographic variables such as place of residence, educational level (no formal education, junior high school and tertiary), and self-employed. However, gender, religion, ethnicity, marital status, income level, smoke shisha, alcohol and exercise have no significant association between the perceptions that changing lifestyle lowers BP.

The study revealed proportions between the perception that hypertension is an avoidable part of aging and socio- demographic variables. The findings show that there was a higher proportion between the perception that hypertension is an avoidable part of aging and certain socio- demographic variables such as traditionalist, Ewe, rural dwellers, tertiary education, cohabiting, employed and income earners of GH¢500-1000 with p-values less than 0.05. However, gender, and other socio-demographic variables has lower proportions between perceptions that hypertension is an avoidable part of aging. This study showed that hypertensive with more awareness had better attitude than patients with less awareness.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This research investigates the knowledge, awareness and attitude of adults with regards to hypertension in the Sunyani Municipality, Ghana. The prevalence of hypertension was found to be 22.7% with females (67.9%) being the majority. The findings of this study showed that hypertension is highly prevalent among elderly.

The study also found that majority (62.1%) of the respondents in the present study had heard of hypertension with most (70.5%) being males but their level of knowledge about the risk factors and symptoms was low. Most of the respondents did not know their currents blood pressures status. It was shown that there was significant association between awareness of hypertension and demographic profile (no formal education ($p<0.0001$; $x^2 = 22.52$), tertiary education ($p<0.0001$; $x^2 = 19.3$), cigarette smoking ($p = 0.0414$; $x^2 = 4.16$), shisha smoking ($p <=0.0009$; $x^2 = 11$) and exercise ($p < 0.0001$; $x^2 = 36.09$).

Furthermore, the finding suggests that individuals who had no form of formal education are more likely to become hypertensive than those who are educated. This may be attributed to the fact that persons who are educated stand the chance of being enlightened on the risk factors as linked with hypertension and therefore adopt healthy lifestyles to avoid the condition.

The study found a significant association between the perception that changing lifestyle (such as low salt intake, quit smoking and engaging in exercise) lowers hypertension and socio-demographic variables.

In addition, it was shown that there was a higher proportion between the perception that hypertension is an avoidable part of aging and certain socio-demographic variables such as participants who had tertiary education, employed and income earners of GH¢500-1000 with p-values less than 0.05. However, gender (51%), and other socio-demographic variables has lower proportions between perceptions that hypertension is an avoidable part of aging.

6.2 Recommendations

Based on the finding of the study, the researcher recommended the following actions:

1. The Regional Health Directorate of Ghana Health Service should design educational package that will enlighten the general public especially people living in municipal on the risk factors of hypertension. This will increase the knowledge of the people on how to adopt healthy lifestyles.
2. The Sunyani MHD in collaboration with opinion leaders should organize mass screening programme for the people of district to enable them detect those who are hypertensive. This will enable them organize hypertension management and control programme for those who are affected.
3. The Sunyani MHD should also organize media education programmes on healthy living styles that will help avoid the prevalence of the condition among person's adults.

6.3: Limitations

This study had some limitations. First, in terms of scope because it was delimited to only the Sunyani Municipality, the findings are likely to be constrained and could not be generalized even within the Brong Ahafo region.

Secondly, since data were collected through survey questionnaires some respondents refused to answer some questions.

Financial constraints as well as little time are some of the limitations.

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APPENDIX

This project is being conducted by the Department of Public Health, to assess the knowledge, awareness and attitudes of adults with regards to hypertension. The information that you provide will contribute to our knowledge on the subject area.

A. SOCIODEMOGRAPHIC

1. Age (years): _____
2. Gender: [ ] Male [ ] Female
3. Religion: [ ] Christian [ ] Islam [ ]Traditional [ ] Others; specify_____
4. Ethnicity: _____
5. Place of residence: [ ] Rural [ ] Urban
6. Marital Status: [ ] Married [ ] Single [ ] Divorced [ ] Cohabitating [ ]Widowed
7. Educational Level: [ ] Primary [ ] JHS [ ] Secondary/Technical/Vocational [ ] Tertiary [ ]None
8. Employment Status: [ ] Unemployed [ ] Self Employed [ ] Employed
9. Occupation: _____
10. Income: [ ]<Ghc500 [ ]Ghc500-<Ghc1000 [ ]Ghc1000-<Ghc1500 [ ]Ghc1500->Ghc2000 [ ]>Ghc2000
11. Do you smoke cigarette? [ ] Yes [ ]No. If Yes, how many sticks per day?_____
12. Do you smoke shisha? [ ] Yes [ ]No
13. Do you take alcohol? [ ] Yes [ ]No. If Yes, specify which type of alcohol_____
14. Do you exercise? [ ]Yes [ ] No. If yes, how often? _____

B. HYPERTENSION KNOWLEDGE

1. Have you heard of hypertension before? [ ]Yes [ ]No

2. What does the term hypertension mean?

[ ]High Blood Pressure [ ]High Level Stress/Tension [ ] Nervous Condition [ ] High Blood Sugar [ ]Overactivity [ ]Don't Know

3. How dangerous is hypertension to your health?

[ ]Extremely [ ]Somewhat [ ]Not At All [ ]Don't Know

4. Would lowering high blood pressure improve a person's health?

[ ]Yes [ ]No [ ]Somewhat [ ]Don't Know

5. What do the two numbers reported for blood pressure mean?

i. Top number? _____

ii. Bottom number? _____

6. What should normal blood pressure levels be?

i. Top number? [ ]<140 [ ]140 [ ]>140 [ ]don't know

ii. Bottom number? [ ]<90 [ ]90 [ ] >90 [ ]don't know

7. Which measure(s) is (are) more important?

[ ]Top [ ]Bottom [ ]Both [ ]Don't know

8. Can people do things to lower their blood pressure?

[ ]Yes [ ]No [ ]Don't Know

9. Can lowering blood pressure even a little bit improve health?

[ ]Yes [ ]No [ ]Don't Know

10. Which of the following do you think may lead to hypertension? (Tick (√) in the Table below).

Risk Factor	**Tick (√)**
a. Excessive alcohol consumption	☐
b. Excessive smoking	☐
c. Poor eating style	☐
d. Other diseases	☐
e. Physical Inactivity	☐
f. High Blood Pressure	☐
g. Age of a Person	☐
h. Don't know	☐

11. Which of the following do you think are the symptoms of hypertension? (Tick **(√)** in the Table below)

Symptom	**Tick (√)**
a. Headache	☐
b. Blurred Vision	☐
c. Dizziness	☐
d. Shortness of Breath	☐
e. Chest Pain	☐
f. High Blood Pressure	☐
g. Heart Attack	☐
h. Don't know	☐

C. HYPERTENSION AWARENESS

1. Have you ever been told by your doctor or health care provider that you have hypertension? [ ] Yes [ ] No

2. Did your doctor or health care provider tell you what your personal blood pressure should be? [ ] Yes [ ] No [ ]Don't Know

3. If told, what should your top number be?

   [ ]<140 [ ]140 [ ]>140 [ ]don't know

4. If told, what should your bottom number be?

   [ ]<90 [ ]90 [ ] >90 [ ]don't know

5. Has a doctor or healthcare provider ever told your that the top number is important to keep under control?

   [ ] Yes [ ] No [ ]Don't Know

6. Has a doctor or healthcare provider ever told your that the bottom number is important to keep under control?

   [ ] Yes [ ] No [ ]Don't Know

D. ATTITUDES AND PERCEPTIONS RELATED TO HYPERTENSION

1. How serious do you consider your blood pressure as a personal health concern?

   [ ]Very Serious [ ]Somewhat Serious [ ]Not At All Serious

2. How important do you think taking medicine is to keeping blood pressure under control?

   [ ]Very Important [ ]Somewhat Important [ ]Not At All Important

3. Do you think that high blood pressure (hypertension) is a lifelong disease?

   [ ] Yes [ ] No [ ]Don't Know

4. Do you think that high blood pressure (hypertension) has a cure?

   [ ] Yes [ ] No [ ]Don't Know

5. Can changing lifestyle help to lower your blood pressure?

   [ ] Yes [ ] No [ ]Don't Know

6. Do you think high blood pressure is an avoidable part of aging?

   [ ] Yes [ ] No [ ]Don't Know

7. What is the single most important factor in preventing/controlling high blood pressure?

   [ ]Medications [ ]Exercising [ ]Less Stress [ ]Quitting Smoking [ ]Change Diet (Salt Intake) [ ]Reducing Alcohol [ ]Losing Weight [ ]Other

E. ANTHROPOMETRY

1. Pulse rate: _____
2. Height: _____
3. Weight: _____
4. Waist circumference: _____
5. Hip Circumference: _____
6. SBP: _____
7. DBP: _____